HEALTHCARE UTILIZATION AND HEALTH OUTCOMES:
US-BORN AND FOREIGN-BORN ELDERLY ASIAN AMERICANS

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In order to better understand variations of health behaviors between US-born and foreign-born elderly Asian Americans (65+) in the United States, the research aims to explore relationships among health outcomes, healthcare utilization, and sociodemographic characteristics. Data from the National Health Interview Survey 1998-2012 is used to construct structural equation models for the US born group and for the foreign born group.

The results found that there is a reciprocal relationship between health outcomes and healthcare utilization in both groups. Use of healthcare services can positively affect health outcomes, while better health outcomes reduce the need for healthcare utilization. In addition, some sociodemographic characteristics, such as age, sex, and marital status have a direct effect on health outcomes, but some others, such as education, family size and combined family income, have an indirect effect on health outcomes via healthcare utilization. The region of residency has both direct and indirect effects on health outcomes.

Regarding the effects of predictors on health outcomes, US-born elderly Asians usually receive more health advantages from using institutional health services than foreign-born elderly Asians. Practitioners, social gerontologists, and policy makers should be cautious about assuming that there is a positive impact of increased healthcare utilization on health outcomes in elderly Asian Americans.
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By

Jacob Chao-Lun Huang
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# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIST OF TABLES</td>
<td>vi</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>vii</td>
</tr>
<tr>
<td>CHAPTER 1 INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>1.1 PURPOSE OF THE STUDY</td>
<td>1</td>
</tr>
<tr>
<td>1.2 RESEARCH QUESTIONS</td>
<td>5</td>
</tr>
<tr>
<td>1.3 SIGNIFICANCE OF THE STUDY</td>
<td>6</td>
</tr>
<tr>
<td>CHAPTER 2 LITERATURE REVIEW</td>
<td>8</td>
</tr>
<tr>
<td>2.1 HISTORY AND IMPACT OF ASIANS AND ASIAN IMMIGRANTS IN THE UNITED STATES</td>
<td>9</td>
</tr>
<tr>
<td>2.2 HEALTH TENDENCIES AMONG ASIAN AMERICANS AND ELDERLY ASIAN AMERICANS</td>
<td>14</td>
</tr>
<tr>
<td>2.3 HEALTH BEHAVIORS AND HEALTH ATTITUDES OF ASIANS</td>
<td>19</td>
</tr>
<tr>
<td>2.4 THEORETICAL FRAMEWORK</td>
<td>23</td>
</tr>
<tr>
<td>2.4.1 HEALTH BELIEF MODEL</td>
<td>24</td>
</tr>
<tr>
<td>2.4.2 HEALTH LIFESTYLE THEORY</td>
<td>26</td>
</tr>
<tr>
<td>2.4.3 HEALTH BEHAVIOR MODEL</td>
<td>30</td>
</tr>
<tr>
<td>2.4.4 A CONCEPTUAL MODEL OF THE RESEARCH</td>
<td>34</td>
</tr>
<tr>
<td>2.5 RESEARCH HYPOTHESES</td>
<td>38</td>
</tr>
<tr>
<td>CHAPTER 3 DATA AND METHODS</td>
<td>41</td>
</tr>
<tr>
<td>3.1 DATA</td>
<td>41</td>
</tr>
<tr>
<td>3.2 MISSING VALUES</td>
<td>42</td>
</tr>
<tr>
<td>3.3 VARIABLES AND MEASUREMENTMENTS</td>
<td>43</td>
</tr>
</tbody>
</table>
# LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 3.1 Level of Measurement</td>
<td>45</td>
</tr>
<tr>
<td>Table 4.1 Means and Standard Deviations of Sociodemographic Characteristics</td>
<td>51</td>
</tr>
<tr>
<td>Table 4.2 Correlation Matrix for Variables for US-Born Elderly Asian Americans</td>
<td>53</td>
</tr>
<tr>
<td>Table 4.3 Correlation Matrix for Variables for Foreign-Born Elderly Asian Americans</td>
<td>55</td>
</tr>
<tr>
<td>Table 4.4 Factor Loadings for Variables for Foreign-Born Elderly Asian Americans</td>
<td>56</td>
</tr>
<tr>
<td>Table 4.5 Factor Loadings for Variables for US-Born Elderly Asian Americans</td>
<td>57</td>
</tr>
<tr>
<td>Table 4.6 Decomposition of the Effects of Predictor Variables for Foreign-Born Elderly Asian Americans</td>
<td>61</td>
</tr>
<tr>
<td>Table 4.7 Decomposition of the Effects of Predictor Variables for US-Born Elderly Asian Americans</td>
<td>64</td>
</tr>
<tr>
<td>Table 4.8 Decomposition of the Effects of Predictor Variables for Elderly Asian Americans</td>
<td>69</td>
</tr>
</tbody>
</table>
## LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 2.1</td>
<td>Health Lifestyle Paradigm</td>
<td>29</td>
</tr>
<tr>
<td>Figure 2.2</td>
<td>Framework of Producing Health and Consuming Health Care</td>
<td>31</td>
</tr>
<tr>
<td>Figure 2.3</td>
<td>The Emerging Model of the Health Behavior Model</td>
<td>33</td>
</tr>
<tr>
<td>Figure 2.4</td>
<td>Conceptual Framework of the Study</td>
<td>37</td>
</tr>
<tr>
<td>Figure 4.1</td>
<td>Healthcare Utilization and Health Outcomes for Foreign-Born Asian Americans</td>
<td>60</td>
</tr>
<tr>
<td>Figure 4.2</td>
<td>Healthcare Utilization and Health Outcomes for US-Born Asian Americans</td>
<td>63</td>
</tr>
</tbody>
</table>
1.1 PURPOSE OF THE STUDY

Health is always an important issue for aging studies. Instead of discussing biological dysfunction, social gerontologists are more interested in how the elderly in society access relevant resources for maintaining their health, what barriers they might face due to their social position, and how social factors influence their behaviors for accessing resources and seeking better health. Health research on racial minority elderly is especially important due to this population’s differing levels of assimilation to the mainstream society. Because of their experiences as racial minorities, their racial backgrounds may influence their unique life experiences, and in turn, these experience may affect their social behaviors.

Compared to other racial minorities, Asian Americans, and its elderly population, are often characterized by their immigrant experiences and behaviors. Even though this group becomes more visible in US society due to their rapidly growing population, many studies note that some factors, such as language and cultural identity, are still common barriers in accessing sufficient health resources and services (Vincent & Velkoff 2010, Reeves & Bennett 2004, Gryn & Gambino 2012, Mui 2003; Mui, Nguyen, Kang, & Domanski 2006, Guo 2000). Based on these perceptions, it might be easy to build a misconception of this group because there are actually a number of Asian Americans who were born in the United States, and therefore do not have an immigrant experience. In fact, nearly 14 % of elderly Asian Americans are US-born (Gryn & Gambino 2012). US-born elderly Asian Americans might not have any immigrant experiences or face conflicts of cultural assimilation in the society as much as foreign-born elderly Asian Americans.
In addition, some social factors, such as citizenship or length of immigration time in the United States, are often used to examine Asian American immigrants' cultural competency in terms of health resource utilization. Among foreign-born elderly Asian Americans, 66% of them are naturalized US citizens, and many of them have even stayed in the United States for 21 or more years (Gryn & Gambino 2012, National Asian Pacific Center on Aging 2013). When these factors are taken into account, it assumes that foreign-born elderly Asian Americans are limited in their ability to access health services and that their poor access to healthcare services could affect their health. Nevertheless, it must be recognized that health outcomes of immigrants tend to mirror US-born the longer that they reside in the country.

However, some research indicates that foreign-born Asian Americans have better self-reported health status than US-born ones. Gomez, Kelsey, Glaser, Lee, and Sidney (2004) indicate that foreign-born Asian Americans usually have lower Body Mass Index (BMI) than US-born ones because of their consumption of heathier food, such as soy products. From their point of view, neither acculturation, nor language, has a significant association with the health status of Asian Americans. In addition, Frisbie, Cho, and Hummer (2001) point out that immigrant status plays an important, positive role in the health of Asians and Pacific Islanders. Immigrant Asian Americans tend to be healthier and have less activity limitation. Furthermore, the authors found that immigrant Asians and Pacific islanders have less adequate access to healthcare services.

Similarly, Choi (2000) discusses healthcare utilization for the general Asian American population. First, he agrees that place of birth for Asians in the United States is a considerable factor when examining an internal heterogeneity of social behaviors, especially health behaviors. US-born Asians have less difficulty accessing social resources due to a
higher degree of social and cultural assimilation. Instead, foreign-born Asians, regardless of whether they are refugees or not, are more likely to struggle with the cultural competency needed for accessing relevant resources. Their behaviors are more likely to follow by their original customs, including values, norms, and other common traditions. For this reason, place of birth should be seen as one of the most important factors related to the health behaviors of Asian Americans.

Second, due to limited research and limitations of previous research designs, the relationship between health and health behaviors of elderly Asian Americans is often underreported. This lack of accurate and complete data may misled healthcare providers and may indirectly affect elderly Asian Americans’ access to adequate health services. Choi (2000) indicates that many health studies of elderly Asian Americans are relatively small scaled. Since elderly Asians are often underrepresented in national health surveys, results from the small scaled health studies may not present a complete scenario. Furthermore, because of the limited ability to gather grand scaled empirical evidence, many studies were conducted using qualitative methods and nonrandom samples. Even though these methods can explore some underreported factors about health status in this group, the results lack empirical evidence based on rigorous scientific methods (Choi 2000). Moreover, results from studies based on nonrandom samples cannot be applied to the population that is being studied. In other words, the lack of empirical evidence of the social behaviors of elderly Asian Americans may mislead our understanding and efforts to meet the needs of this aging minority group in the society.

There are two common gaps of knowledge that might contribute to a biased understanding of this group. The first problem is that elderly Asian Americans, regardless of
variations in social and cultural experiences, are often combined as one research subject. This method may overgeneralize the results of the foreign-born/immigrant group to the non-immigrant group because there is a higher percentage of elderly Asian Americans who are foreign-born immigrants than are US-born natives (Gryn & Gambino 2012).

Also, there is limited research that has used place of birth as an indicator to distinguish the effects of health behaviors on health outcomes between US-born and foreign-born elderly Asian Americans (Mui 2003; Mui, Nguyen, Kang, & Domanski 2006). However, this study only shows the significance of place of birth in the behavioral model, but could not fully present variations in patterns of health behaviors between the two groups.

Second, many health studies on elderly Asian Americans were conducted in specific geographic regions, such as in New York, Los Angeles, Chicago and California (Asian Health Coalition. 2010; Zhang, Snowden, & Su 1998). Whether results from these regional health studies can be representative explanations of the general elderly Asian American population is questionable.

Taking into account the limitations of previous studies, and the gaps in the literature, the purpose of this study is to examine the relationship between health behaviors in the formal healthcare institutions and health outcome among elderly Asian Americans. In order to reduce the gap in understanding the health behaviors of elderly Asian Americans in the United States, this study uses a nation-wide health survey that contains data related to health behaviors in the past decade. The results will be beneficial for healthcare professionals, aging service facilitators, and social gerontologists by providing a better understanding of the trends of health behaviors and health outcomes among elderly Asian
Americans. Based on the empirical evidence, healthcare providers will be able to make more suitable services to improve the quality of later life for elderly Asian Americans.

1.2 RESEARCH QUESTIONS

In order to overcome these problematic methodological practices used in the studies explained above, some objectives are utilized in this research. First, regarding the sample size, it is necessary to collect data on elderly Asian respondents from a consistently conducted survey through certain years. A sufficient sample size makes the subsequent analysis more effective. Second, in order to improve the validity of this research, a national health survey using random sampling is needed. This strategy can avoid some assumptions from nonrandom sampling and improve the reliability of the result.

Moreover, it will allow the results to be generalized to the research population. Furthermore, since foreign-born Asian Americans are very much characterized by their immigrant experiences, a better understanding of their health behaviors, and what specific advantages these behaviors provide them in regards to their health outcomes, can be beneficial indicators for health policy implications. This research is therefore expected to initially categorize elderly Asians into US-born and foreign-born groups and then to analyze the different effects of health behaviors on their health outcomes guided by the following questions:

First, how do the effects of healthcare utilization on health vary between US-born and foreign-born elderly Asian Americans?
Second, how do the effects of sociodemographic characteristics on health vary between US-born and foreign-born elderly Asian Americans?

Third, how does healthcare utilization mediate the effects of sociodemographic characteristics on health vary between US-born and foreign-born elderly Asian Americans?

1.3 SIGNIFICANCE OF THE STUDY

This study seeks to improve the understanding of health behaviors among elderly Asian Americans and their variations between US-born and foreign-born groups. Therefore, this research has three major goals:

First, regarding the uniqueness of life experiences and social characteristics as indicators to health behaviors among elderly Asian Americans, this research examines the influence of these characteristics on health behaviors and health outcomes between US-born and foreign-born elderly Asian Americans. In other words, this research not only intends to demonstrate the relationship between health behaviors and health outcomes between US-born and foreign-born elderly Asian Americans, but also to present their different influences of social characteristics. In light of these research results, practitioners in the aging industry, such as nurses, doctors, and aging facility managers, will be aware of differentiations between US-born and foreign-born elderly Asian Americans in their social characteristics, health behaviors, and health outcomes.

Second, this research is designed to present the variations of health behaviors and their effects on health outcomes between foreign-born and US-born elderly Asian
Americans. Upon the research design, the results can be developed as applicable strategies for aging policy makers so that by taking into account the social and cultural characteristics, elderly Asian Americans can be treated more equally and appropriately in the United States.

Third, the results of the study will help health administrators more comprehensively understand health behaviors and their related factors among elderly Asians Americans in the United States. Based on the findings, more appropriate strategies can be initiated which can improve the effectiveness of aging services and reduce some unnecessary cost or expenses. Different from descriptive analysis in early reports, this study aims to establish a comprehensive model that examines how Asian Americans’ health behaviors in the US health system regarding social characteristics affect health outcomes.

As a result, this research is not only beneficial for academic research on health behaviors of elderly Asian Americans in the United States but also for the general public, aging service practitioners, and aging policy-makers, in order to develop their awareness and sensitivity to treat in a more equitable manner, a better understanding of patterns of their health behaviors and health outcomes is needed. Their needs in the health systems will become more visible. As a result, the society will be able to respond to their needs in a more appropriate way.
CHAPTER 2
LITERATURE REVIEW

In order to discuss the relationships between social characteristics, health behaviors, and health outcomes of elderly Asian Americans, this chapter focuses on four major themes. The first theme is the history of Asian Americans in the United States. Their immigration experience in the United States history contributes to their unique social and cultural characteristics. Also, these characteristics, based on their cultural roots, determine to some extent their social behavior in the society.

Second, the health tendencies of Asians illustrates risks, diseases, and limitations that usually challenge or endanger the health status of Asian Americans, including the elderly. These challenges can be physical disabilities, mental conditions, and even social barriers. Therefore, for Asian Americans sometimes struggle with how to improve their health status by overcoming social barriers.

Third, the section of health attitudes of Asians discusses how Asian Americans with immigrant experiences brought knowledge and attitudes of health from their culture of origin. Because knowledge of health is highly linked with health behaviors, the early research presented that immigrant experiences can be used to distinguish differences of health behaviors and health outcomes between US-born and foreign-born elderly Asian Americans.

Fourth, the section of theoretical orientation purposes to illustrate the theories that link factors of health behaviors and health outcomes. Basically, health behaviors have the following dimensions: health belief, health lifestyle, and healthcare utilization. The first two
theories indicate the importance of social characteristics for health behaviors of healthcare utilization. The last theory indicates healthcare utilization is a direct way to predict health outcomes. The conceptual framework of the research is therefore formed upon these three major theoretical aspects,

2.1 HISTORY AND IMPACT OF ASIANS AND ASIAN IMMIGRANTS IN THE UNITED STATES

According to a demographic analysis in the United States, approximately 86% of elderly Asian Americans are foreign-born, and 66% of the foreign-born elderly Asian Americans are naturalized US citizens (Gryn, & Gambino 2012). This data represents two demographic facts. First, the population of elderly Asian Americans is heavily characterized by immigration. Second, since over half of elderly Asian Americans are naturalized citizens in US society, struggles and conflicts between the host environment and their original cultures may be an important factor in establishing the uniqueness of their social behavior. In order to further understand these characteristics in light of the history of Asian immigration, two major dimensions must be explored: the causation of Asian immigration and the impact of Asian immigrants in the United States.

Regarding the causation of Asian immigration, Min (2005) pointed out four aspects. First, in the process of immigration, the push factors, including economic difficulties, wars, natural disasters, political change, and so on, can be a force to push people out of the sending countries; in the meantime, the pull factors, such as opportunities of education, job market, economy, and so on, can attract people to immigrate to the host country. This means that the process of immigration is simultaneously accomplished by the push and the pull
factors. For example, in the period of 1850-1882, in order to pursue better monetary benefits in the U.S., the first Chinese immigrants arrived in California for labor jobs. At the same time, these Chinese labor immigrants did not intend to stay in the United States for the rest of their life; instead, they planned to move back to China in order to obtain a better socioeconomic position after accumulating sufficient monetary benefits in the United States, like a bird migration. For these early Chinese immigrants, the push factors were hardships of living in China, while the pull factors in their decision to come to the United States were abundant job opportunities with better financial income. For this reason, the push-pull theory of immigration demonstrates the motivations of immigrants leaving their home countries and moving to the host country either temporarily or permanently.

Second, the U.S. immigration policy and the emigration policy of each Asian country are other important factors regarding Asian immigrants in the United States. Before 1965, Asian immigrants, especially Chinese, had been restricted by immigration policies, including the Chinese Exclusion Act of 1882, the Scott Act in 1888, the Geary Act in 1892, and other exclusionary immigration policies in 1902. Due to these racially biased policies, Chinese in the United States faced a severe racial exclusion. They were not able to freely immigrate to this country. Later, according to legislation in 1921, husbands’ U.S. citizenship was denied if their wives were foreign-born. The citizenship of US-born Chinese males was even stripped away from those with foreign-born wives. This meant that together with their wives, they needed to leave the United States and immigrate to China.

Later, the Immigration Act of 1924 prohibited Asian husbands to apply citizenship for their wives, even though some of their wives had already moved to the United States. (Wong 2006). Although many of these immigration restrictions were revised, and even abandoned
afterward, the way that Asian immigrants perceived discrimination and immigration restriction has deeply influenced the demographic structure among the Asian immigrants. It was not until the Immigration and Nationality Act of 1965, passed in the Congress, that all immigrants, regardless of their racial backgrounds and original nationalities, were to be fairly treated by the law. After that, the population of Asian immigrants started consistently growing from 1.43 million in 1970 to 14.7 million in 2010 (Vincent, & Velkoff, 2010).

Third, the military, political, and economic linkages between the United States and Asian countries are factors that pull people from Asian countries to the country. Min (2005) indicates that after several wars in Asia, such as World War II, the Korean War, and the Vietnam War, the international relationship has developed a closer tie between the United States and these Asian countries, economically, militarily, and politically. Because the U.S. government has a stronger force in Asia, this tight relationship can be explained as a type of semi-colonialism. As a result, many Asians immigrate to the United States for some common purposes, such as child adoption, marriage, as refugees, asylum, and so on. For example, in the period of the 1970s and the 1980s, about 3,000-3,500 Korean orphans annually were adopted by U.S. citizens (Min 2005, pp.232-233). Due to the presence and intervention of the U.S. military in East Asia, including in Japan, the Philippines, Korea, and Vietnam, many Asian women from these countries married U.S. military servicemen and then immigrated to the United States.

Lastly, the globalization and the ease of population movement due to the convenience of transportation, the globalized economy, and the development of media, are forces contributing to the flow of international laborers and capitalist firms. In other words, with the expansion of the capitalist market, the United States, as an important unit of global economy,
attracts Asian intellectuals working for U.S.-stationed businesses. On the other hand, because of these immigrant intellectuals, Asian immigrants, when compared to other racial minority groups in the United States, are characterized by their socioeconomic achievement, including being well-educated, well-skilled, and holding well-paid occupations.

Moreover, concerning the impact of elderly Asian immigrants in the United States, there are three main aspects that should be considered, including the demographic impact, the impact on race and ethnic relations, and the sociocultural impact. First, in regards to the impact of demography, Yang (2011) indicated that the demographic structure of Asians tends to be immigrant and female oriented. This means that Asians, as a group in the United States, are more likely to be composed of foreign-born immigrants and females. More specifically, when comparing the composition of the foreign-born population, there is high percentage of elderly Asian Americans that are foreign-born immigrants. Among the foreign-born Asian immigrants, approximately one out of five are elderly with an age of sixty and above (Yang 2011, Gryn, & Gambino 2012).

Second, regarding the impact of race and ethnic relations, even with higher socioeconomic positions and a trend of interracial marriage, even now Asians still are not totally accepted in the mainstream society. Instead, the perception of discrimination from other racial groups, and the consistent new arrival of immigrants, reinforce the boundaries of the Asian ethnicity (Yang 2011, p.157). In other words, for the whole Asian group, the internal factor is that the degree of assimilation might decrease due to the arrival of new immigrants and the external factor Asians face is the perceived level of prejudice from other racial groups. For this reason, Asians inevitably face the stereotype of being “perpetual
foreigners”, referring to the misconception that Asians will never become real Americans. As a result, there is no indication to show that Asians are “whitened” (Yang 2011, p.157).

Third, Asian immigration also has a sociocultural impact on the receiving society, including through food and health behaviors. Asian cuisine businesses are mostly operated by immigrants (Yang 2011, pp.169-170). Because of this huge Asian cruise market, American dietary habits have therefore changed, and dietary-related diseases, such as diabetes, heart disease, obesity and so on, have decreased (Yang 2011).

Besides, traditional Eastern medicines, including herbology, acupuncture, qigong, yoga, and so on, brought by Asian immigrants have influenced the U.S. health services. Nowadays, acupuncture has become a formal therapy in the U.S. health system. More than 10 million adults in the U.S. have used this therapy and over 1,800 physicians are members of the American Academy of Medical Acupuncture (AAMA) (Yang 2011, pp.170-171). Nearly 19 % of adults in the U.S. have applied the traditional Chinese herbal therapy; 18.8 million practitioners have practiced Qigong or Tai-Chi; and 5.1 % of adults in the U.S. practice yoga (Yang 2011). With a huge number of health care employees using Eastern medical practices, elderly Asian immigrants may have more options for accessing health behavior practices that reflect their original culture.

In regards to the factors related to the causation of immigration, and the subsequent social and cultural impact on this society, the Asian population has some unique characteristics. With the convenience of globalization, and the openness of immigration policies, especially since 1965, the growth of Asian immigration has been consistent. With the consistent incoming of immigrants, Asians in US society encounter difficulties of social assimilation. Due to the steady number of newly arrived immigrants, and to the
independence of this ethnic group, elderly Asian Americans, especially those that are
immigrants, may not necessarily assimilate into the society.

For this reason, some cultural elements, such as food, languages, and medical
techniques, are more easily preserved in this ethnic group. Based on these considerations,
it can be assumed that among Asians, the foreign-born Asian elderly tend to practice these
preserved cultural elements more than the U.S. born ones. At the same time, due to different
levels of social and cultural assimilation, the Asian elderly develop different health
behaviors, including lifestyles and health seeking behaviors. These health behaviors in their
daily lives may produce different health outcomes. In order to improve the health care
services for elderly Asian Americans, it is necessary to explore the social and cultural
characteristics of the Asian elderly according to their original place of birth.

2.2 HEALTH TENDENCIES AMONG ASIAN AMERICANS AND
ELDERLY ASIAN AMERICANS

In this section, the health tendencies of Asians and its aging group is reviewed.
Basically, the concept of health can be categorized into physical diseases/limitations, mental
illness, and general self-reported health status. Physical diseases/limitations refer to some
chronic diseases, such as diabetes, heart attacks and physical disabilities among the
elderly. Mental illness includes depression and mental disorders and self-reported health
status means how a person evaluates his/her own general health status. Since health status
is influenced by social behavior, it is important to understand the health tendencies of elderly
Asian Americans in the United States due to their unique social characteristics,
In studying the aging population, physical disability and chronic diseases are often discussed. In fact, over 80% of the elderly in the United States are suffering from at least one chronic disease (Barnes, Adams, & Powell-Griner, 2008). Among common chronic diseases, over 40% of the elderly have hypertension; 15% of the elderly have diabetes, and about 10% of the elderly have related heart diseases (Barnes, Adams, & Powell-Griner, 2008). Due to the decline of physical function, the elderly are at a higher risk of physical diseases than younger adults.

In fact, unlike in most medical and biological research, in social gerontology, the relationship between social characteristics and physical function among Asians, especially elderly Asian Americans, often lacks attention. Through very few reports, health status and health behaviors of Asians are limitedly reported. For example, according to the 2004-2006 National Health Interview Survey, the results showed that when compared to other racial/ethnic groups, Asian adults had the lowest rate of smoking, prevalence of current cigarette smoking, current moderate or heavier drinking, prevalence of obesity, delay of receiving medical care due to its cost, being diagnosed with hypertension and diabetes, functional limitation, and psychological distress (Barnes, Adams, & Powell-Griner, 2008). However, for further discussion regarding the associations between other determinants and health outcomes, this report was limited in presenting more sophisticated perspectives due to its selected sociodemographic factors and descriptive analysis.

Moreover, in Chicago, an area of highly concentrated Asian demography, the Asian population had the lowest rate of disability than other racial/ethnic groups and during 2003-2007, also had the lowest rate of mortality (Asian Health Coalition, 2010). However, different from other races in having heart disease as the top cause of death, cancer was the most
severe disease for Asians, followed by heart disease and stroke. Interestingly, diabetes as well as violence, are not a main cause of mortality for Asians when compared to other races (Asian Health Coalition 2010). Through the data collected by previous surveys, in regards to health conditions, health behaviors, and psychological distress, Asian adults seem to have greater health advantages than other racial and ethnic groups.

Furthermore, some studies pointed out that functional limitation among Asians is usually associated with mental distress. Wu, Tran, and Amjad (2004) indicated that for Asians, back and neck pains are common indicators of their depressive symptoms. Even they pointed out that when comparing Westerners elderly Asian Americans, especially Chinese elders, are more likely to have symptoms of somatization (Wu, Tran, and Amjad 2004; Kleinman 1977). Suen & Morris (2006) also pointed out that Taiwanese women are more likely to have higher depression scores, more physical illness, poorer sleep scores, and less physical activity.

With great attention focused on the increasing number of people with mental illness, it has been discovered that many elderly Asian Americans also suffer mental illness. In fact, even though elderly Asian Americans often experience some symptoms of depression, such as sadness, loss of interest or pleasure, feelings of guilt or low self-worth, disturbed sleep or appetite, feelings of tiredness, and poor concentration, the Asian population often underreported their need of mental health treatments due to certain sociocultural characteristics, such as stigma attached to mental health illnesses (Asian Health Coalition 2010). This raises two questions. First, what kinds of mental illness are common among elderly Asian Americans? Second, what factors cause these symptoms among elderly Asian Americans?
First, regarding mental health, depression is common among elderly adults, including elderly Asian Americans (Blazer, 2003; Fernandez, Levy, Lachar, & Small, 1995). Abe-Kim et al. (2007) also indicated that a lower rate of Asians use mental health related services compared to the rest of the population. Nevertheless, service providers can benefit from second generation Asian individuals to better understand the immigrant parents. However, in the past, Asians often went underreported regarding their symptoms of mental illness, such as depression (Ying 1988). In Los Angeles, California, Zhang, Snowden, and Su (1998) conducted a study comparing whites and Asian adults seeking mental health professionals/centers for assistance. Compared to 13% of whites, only 3 % of Asians would seek mental health professionals for help; similarly, compared to 25% of whites, only 12% of Asians would share their mental distress with their friends/ family (Zhang, Snowden, and Su 1998). In other words, the mental health needs are often underrepresented among Asians. However, the reality is that Asians, including elderly Asian Americans, are struggling with mental disorders. In New York, Mui & Kang (2006) indicated that about 40 % of elderly Asian Americans immigrants are facing symptoms of depression.

Some factors contributing to depression among elderly Asian Americans were discussed. First, the perception of the cultural gap between the elderly and their adult children, the perception of health status, stressful life events, religiosity, the proximity of children, assistance received via resources from adult children, and the period of residence in the United States were all factors identified as contributing to depression among the Asian elderly (Mui & Kang 2006, pp.251-253). Among these factors, family relations and self-adjustment of assimilation are the two major concerns that impact mental health status.
Moreover, there are similar findings of underutilizing mental health services among the elderly Chinese immigrants in Canada (Lai 2000, 2004a, 2004b, 2005).

In addition, other research also indicated that Asians tend to resist and underuse mental health services due to immigration-related factors (Alegria, Chatterji, Wells, Cao, Chen, Takeuchi, Meng, 2008). Le Meyer, Zane, Cho, & Takeuchi (2009) noted language proficiency as a barrier that influences foreign-born Asians to underutilize mental health services. In fact, language is the most important factor for Asians when considering utilizing mental health services. Moreover, since language proficiency provides confidence in building a reliable relationship with health professionals, the ability to verbalize mental problems, as well as the acculturation level, are considerations related to whether respondents are U.S. born residents or foreign-born immigrants (Le Meyer, et al, 2009). In other words, since immigration-related factors are important in Asian health studies, place of birth can be counted as the most important indication of social and cultural acculturation.

Last, considering the impacts of underutilizing mental health services among Asians and elderly Asian Americans, symptoms of depression may increase the mortality rate (Takeshita, Masaki, Ahmed, Foley, Li, Chen, & White, 2002). Kuo, Chong, & Joseph (2008) even pointed out those elderly Asian Americans, especially female elderly Asian Americans, are at a higher risk of depression than are the elderly from other racial groups. Moreover, besides factors of social isolation, such as language and cultural gaps, this study also notes that family support from adult children is another important factor in the mental health of elderly Asian immigrants. This means that for the elderly Asian immigrants, adult children are an important source of social inclusion. As a result, types of living arrangements should be considered as another factor in mental health among elderly Asian Americans.
According to previous research, place of birth and living arrangements are two main considerations of depression, one of the most common mental illnesses among elderly Asian Americans. First, place of birth indicates elderly Asian Americans’ social and cultural acculturation. This means that for U.S. born elderly Asian Americans, language and social acculturation are advantageous factors for using mental health services to reduce depression. Second, living arrangements is another important consideration of social inclusion for elderly Asian Americans immigrants. With a stable foundation of family support, especially from adult children, elderly Asian immigrants are expected to have better mental health with less risk of depression.

2.3 HEALTH BEHAVIORS AND HEALTH ATTITUDES OF ASIANS

Regarding the cultural impacts on health attitudes among Asians, there are three major aspects that should be considered: religious belief, family ethic and socioeconomic characteristics. First, religious belief refers to the attitude toward the relationship between human beings and the universe. Different from Western societies where a sickness is seen as a biological symptom, in Asian societies, health represents a balanced relationship between body, mind, and the universe. On the other hand, in order to retain this balanced status, Asians practice some physical excises (e.g., Yoga, Tai-Chi Chun, and meditation), dining habits (e.g., ginseng and traditional remedy medicine), and health behaviors (e.g., acupuncture). For example, Park (2011) and Guo (2000) indicated that due to the influence of Taoism, Chinese people are more likely to practice Traditional Chinese Medicine (TMC), acupuncture, Qi-Gong, and Tai-Chi Chuan to relieve their acute and chronic pains and to improve the function of their immune system. Beyond these practices, an interactive
condition of Ying-Yang, and a balanced condition of the body and mind are the ultimate goal to pursue. In other words, being sick represents a disruption of a balanced state between body, mind, and the universe, while being healthy is to “naturally” recover from the disruption to this balance. Furthermore, Guo (2000) noted that at the present, health beliefs of Chinese reflect “the history of integration of traditional Chinese health beliefs and practices with knowledge and use of Western medicine (p. 22)”. Therefore, while Asians tend to seek Eastern religious practices to recover their health, they also tend to utilize the knowledge and the resources of health care in the United States.

Second, family as an important social support for health outcomes among Asians is often considered in previous research. Park (2011) noted that Confucianism in Chinese communities is an important foundation of the family-centered value that can benefit Chinese people with positive health outcomes from social harmony, or in other words, balanced social relationships (Park 2011, p. 74). In addition, Bajekal, Blane, Grewal, Karlsen, and Nazroo (2004) noted that in Britain, white elderly are most likely to benefit from of material circumstances, health, participation in formal social networks, and quality physical environment, while the Asian elderly are conversely weak in these areas. However, regarding subjective elements, the Asian group ranked at the top on who gets their benefits from high frequency of family contact and desirability of residential neighborhood. Horne, Graupner, Frost, Weinman, Wright, & Hankins (2004), in their study on 500 UK college students with Asian or European cultural background, noted the relationship between cultural beliefs and medication, including the degree of course, the experience of taking prescribed medication, age, and gender. Because of that, in order to provide appropriate
Regarding functions of family support for health outcomes, Wong, Yoo, & Stewart (2005) noted that tangible material, information/advice, emotional support and companionship are four major domains that influence elderly Asian Americans’ health status. First, considering tangible materials, adult children offer stronger support to deal with personal situations for elder immigrants, and friendships in the ethnic community is another important source of information/advice and companionship. This shows the importance of kinship ties for Asians. Second, based on the National Latino and Asian American Study (2002-2003), Asian Americans are significantly impacted by generational interaction. It means that a higher level of family cohesion is more likely to result in willingness to seek mental health services (Ta, Holck, & Gee 2010). Third, Juang & Alvarez (2010) conducted a study among 181 Chinese old adults that found that discrimination is deeply related to poorer adjustment to the United States, in terms of loneliness, anxiety, and somatization; however, family conflict and cohesion might be factors to modify these relations. Greater family conflict increases the negative effects of discrimination, and greater family cohesion buffers the negative effects of discrimination. Furthermore, Kakai, Maskarinec, Shumay, Tatsumura, & Tasaki (2003) examined different ethnical patterns and education levels of health information-seeking behavior. They found that people with lower levels of education tended to gather medical information from interpersonal communication, whereas people with higher levels of education tended to seek objective, scientific and updated medical information. For example, Japanese Americans tend to have higher levels of education among Asians in general. The researchers found that these patients relied on media and
commercial sources to get medical information, while non-Japanese Asians and Pacific Islanders preferred to use information sources through person-to-person communication, social connections and other patients.

Based on previous research, family as an important factor in health attitudes and health behaviors is obvious. However, family is not always positively correlated with health conditions. While family cohesion may improve elderly Asians health conditions, at the same time, family conflicts might increase their perceived sense of discrimination within the family.

Third, socioeconomic characteristics are important determinants to health outcomes among Asians. First, geographical distribution of education level is an important indicator of socioeconomic characteristics. Zhang, McCubbin, McCubbin, Chen, Foley, Strom, & Kehl (2010) indicated that the location of the school district is related to self-reported general health condition at neighborhood levels.

On the other hand, individual differences, including in ethnic backgrounds and educational level, are also related to self-reported health status. Based on these concepts, by using Geographic Information System (GIS) and binary logistic regression models, the authors noted the importance of education, which is based on geographic distribution at both individual and neighborhood level. Education is seen as an initial element of social capital because the school district determines the quality of social networks in neighborhoods.

Gorman & Chu (2009) indicated socioeconomic status as a factor in the relationship between racial/ethnic differences and asthma-related problems. Though the sample size of Asians in this study is too small to be able to compare with whites, the authors find that
socioeconomic status may be a crucial factor for the quality of the living environment, including the quality of air, which may cause health problems (Gorman & Chu 2009).

Moreover, Haritatos, Mahalingam, & James (2007) in their study examined the relationship between John Henryism and self-reported physical health among high socioeconomic status Asian immigrant groups. John Henryism is a measurement that monitors strategies of coping in an exposure of stress. They collected data from 318 respondents who self-identified as Chinese and Indian immigrants aged 18–73, with an average of 10.2 years living in the United States. The results suggest that John Henryism is valued to measure physical and mental outcomes of Asian immigrants who have higher socioeconomic status (Haritatos, Mahalingam, & James 2007). As a result, socioeconomic characteristics might provide the way of accessing medical information and attitudes that affect health outcomes among Asians.

Therefore, cultural beliefs, family ethics, and socioeconomic characteristics are considered to be determinants of health outcomes among Asians. In other words, by examining the effects of living arrangements, life habits, and socioeconomic characteristics on health outcomes, these four major dimensions can help to better understand the health tendencies among elderly Asian Americans in the United States.

2.4 THEORETICAL FRAMEWORK

Regarding the conceptual understanding of health behaviors and health outcomes, there are some important theoretical aspects that must be considered. First, the health belief model provides the perspective that health behaviors result from the perception of health risks. Health risks are perceived due to varying degrees of health information and knowledge.
Second, the health lifestyle theory indicates the importance of sociodemographic characteristics, including at the structural level, on health behaviors. This means that the social position of individuals can also determine their health-related behaviors. Last, the health behavior model illustrates a relationship between health behaviors in institutional health services and health outcomes. The effects of healthcare utilization behaviors on health outcomes in this model are observable and testable. Based on these three theories, for individuals, health outcomes are determined by health behaviors as well as by sociodemographic characteristics.

2.4.1 HEALTH BELIEF MODEL: PERCEPTION OF HEALTH RISKS AND HEALTH BEHAVIORS

Health belief model provides a way to examine the relationship between people's perception of health risks and their engagement of health behaviors. In the beginning, Rosenstock (1966), in his article “Why People Use Health Services”, noted the association of belief with health behaviors. Based on concepts of social psychology, the process of developing health behaviors is an action that tends to reduce risks and to attain health benefits. Belief in this process is a key.

In fact, Rosenstock emphasized that health belief is composed of, not only physical, but also psychological and social factors. Due to a comprehensive consideration of internal conditions (such as diseases and symptoms) and external conditions (such as sociodemographic variations), people’s health behaviors are the result of a continuous process of health decision making (Rosenstock 1966, 1974). Later, when Rosenstock’s concepts were analyzed, some studies found that people who did not join health-related
programs had worse health outcomes than those who joined (Becker, Maiman, Kirscht, Hanefner & Drachman, 1977; Janz & Becker, 1984). A lack of perceived health threats, may adversely affect people's health. If people perceive more factors as risks to health, they may be more likely to engage in health behaviors. Therefore, this model is characterized by six key components: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cue to action, and self-efficacy (Green & Kreuter, 1991; Schiavo, 2007).

First, perceived susceptibility refers to individuals' recognition of their health risks. The greater the perceived risks, the more likely people will change their behaviors in order to reduce those risks. Perception of the seriousness of the risks has a positive effect on people's preventive behavior, especially for disease prevention (Chen, Fox, Cantrell, Stockdale, & Kagawa-Singer, 2007; de Wit, Vet, Schutten, & van Steenbergen, 2005). Meanwhile, if people do not perceive they are at a high risk for an unhealthy situation, they may not easily change their behaviors until perception of threat (Lamanna, 2004; Rose 1995; Strecher & Rosenstock, 1997; Yep, 1993).

Second, perceived severity refers to whether a person subjectively feels his/her health risks are severe. Due to their different social demographic characteristics, such as economic status, education, gender, and so on, factors affecting health may not always be a primary concern for some people. Third, perceived benefits contend that individuals adopt advantageous recommendations in order to reduce health risks. In changing recognition and behaviors of health risks, individuals are also in the process of making reasonable decisions that benefit them.

Fourth, perceived barriers are obstacles to adopting recommended actions. If people determine that the cost of adopting health recommendations is too high, they may not adopt
those recommendations and the related behaviors. Sometimes, although the elderly are aware of the importance of a healthier diet, due to limitations of physical mobility, they still cannot easily buy healthier food.

Fifth, cue to action means public or social events encourage individuals to take action. For example, because some neighbors in a community get cancer, some neighboring families may change their dietary habits in order to reduce their risk of cancer. Likewise, when mass media frequently reports the disadvantages of diabetes, housewives may likely adopt healthier dietary habits.

Sixth, self-efficacy refers to individuals’ confidence in their ability to sustain the recommended behaviors independently. This is related to if a person is able to continue these recommended behaviors continuously as well as to help others to do the same. Moreover, these six components can be seen as independent subjects from one another (Pechmann, 2001).

Both institutional health care advice and personal social networks can be sources of delivering health information. However, the effects of health behaviors on health outcomes are limitedly discussed in the health belief model. That means that this theory is limited in fully demonstrating the associations between health behaviors and health outcomes.

2.4.2 HEALTH LIFESTYLE THEORY: SOCIODEMOGRAPHIC CHARACTERISTICS AND HEALTH BEHAVIORS

The health lifestyle theory provides another perspective on health behaviors. Based on Weber’s concepts of lifestyle and Bourdieu’s discussion on lifestyle within the agency-structure relationship, Cockerham (2005) indicated that a healthy lifestyle is reproduced
from daily life practices/actions that people engage in in different structural contexts, in order
to avoid health risks and to pursue a healthy life habitus. Weber’s lifestyle theory is defined
as collective behaviors that people, according to their life chances, make in regards to
This means that individuals’ life choices within status groups are a representation of agency
and life chances are a representation of a form of structure. Bourdieu further noted that due
to class differences, tastes of life and explanations of what a healthy life is among people
are different (Bourdieu 1984 as cited in Cockerham 2005, p. 56). In other words, individuals’
choices of health behaviors represent not only their personal taste but also the chances
available to them according to their status group.

At the individual level, health habits are developed by an individual’s social agency due
to choices of socialization and personal experiences, such as living conditions or marital
status. On the other hand, at the structural level, exterior conditions, such as age, gender,
race/ethnicity, and so on, may affect the life chances of having a healthy lifestyle. Life
choices and life chances as a foundation of life habitus interplay with each other. In other
words, lifestyle dispositions are simultaneously affected by life choices at the agency level,
as well as by life chances at the structural level.

Furthermore, lifestyle dispositions formulate a cognitive map that principally evaluates
and guides a person’s routine choices within options (Cockerham 2005, p.61). Through the
internalization of similar structural conditions and characteristics, personal inclination and
personal expectations, individuals in a similar class condition are more likely to have a
similar life habitus. For this reason, life health practices and a healthy lifestyle are patterns
of health behaviors among individuals who are situated in collectives with similar social conditions.

In order to examine the structural factors relationship of health lifestyle, Cockerham (2005) suggested that we should concentrate on the effects of social class on individuals. For this reason, the effects of social class on a healthy lifestyle can be examined through socioeconomic characteristics at the family/household level. Moreover, education can be used to examine a reflection of the institution and living conditions can be tested by characteristics of the household environment, such as house utilities and living arrangements. Last, health status can be used to examine outcomes of a healthy lifestyle. As a result, this theory provides a perspective that health behaviors are not only about how individuals make their own decisions in their daily lives, but also how individuals encounter chances available to them according to their social class (See Figure 2.1).
According to the health belief model and the health lifestyle theory, there are some insights that can be garnered. First, health behaviors, regarding health seeking behaviors, preventive health behaviors and daily lifestyle behaviors usually develop due to the perception of health risks. The perception of health risks can come from institutional advice, such as from health professionals, and from non-institutional approaches, such as family, friends, and ethnic groups. That means that health behaviors can be influenced at the individual level as well as at the structural level. At the individual level, health behaviors can be daily health practices, such as a daily workout, while at the structural level, health
behaviors can be identified as use of health services. In order to effectively discuss the associations between health behaviors and health outcomes at both the individual level and the structural level, it is necessary to explore their different effects on health outcomes.

2.4.3 HEALTH BEHAVIOR MODEL: HEALTH BEHAVIORS AND HEALTH OUTCOMES

Inspired by the health belief model, the health behavior model seeks to demonstrate the relationships between a pattern of health behaviors and health outcomes. Andersen (1968) imitated a health behavioral model to examine inequality of health service access among families. In this early model, family composition, social structure, and health beliefs were three sets of characteristics that were used. In addition, age, sex, family size, ethnicity, and social class were considered as indicators of the family’s position in society, since that could reflect the personal lifestyle and their physical and social environment.

Later, Andersen & Newman (1973) noted that predisposing components, such as sociodemographic characteristics and personal health belief, and enabling components, such as resources retained in family and community, affected perceived needs of using formal health services. At this time, discussion of the association between formal health service utilization and health outcomes actually did not get much attention.

Meanwhile, during the 1980s-1990s, Evans & Stoddart (1990) pointed out that health outcomes are correlated with use of formal health care services. On one hand, perceived health status can be a factor for the need of health care services; while on the other hand, use of health care services may be an indicator of how perceived health status is influenced by a person’s demographic characteristics in social structures.
Moreover, personal health practices, such as diet, exercise, and self-care, were considered as interacting factors in the United States of health care as well as health outcomes. Regarding primary determinants of health behaviors, including sociodemographic characteristics, some structural characteristics, such as health care system and external environment, were also included in the model (see Figure 2.2).

![Figure 2.2 Framework of Producing Health and Consuming Health Care](Source: Evans & Stoddart 1990, p.1536)

In addition, health change is an important indicator of the effectiveness of health care utilization (Aday, Begley, Lairson, Slater, Richard & Montoya 1993). Effectiveness of health care utilization is measured through the relationship between the level of health status that increased and the amount of formal health care services consumed. Based on this input-output relationship, use of formal health care services is expected to maximize its benefits on the increased level of health status.

Based on the revisions of the health behavior model, Andersen (1995, 2002) pointed out the latest version of the health behavior model. This model is composed of four main
components. First, outcomes including perceived health status, evaluated health status, and consumer satisfaction are affected by health behaviors, environment, and predisposing characteristics of the population. In the meantime, outcomes also affect personal health practices and enabling resources.

In addition, since health behaviors, including personal health practices and use of health care services are affected by the needs of the population, health behaviors also can affect enabling resources and outcomes. Third, in regards to population characteristics, there is a case-effect relationship among predisposing characteristics, enabling resources, and need. Predisposition characteristics can affect outcomes but can also be affected by the environment.

Enabling resources can affect need but can also be affected by outcomes and behaviors. Need can affect health behaviors but can also be affected by enabling resources. In this model, health outcomes are influenced by the associations between individual and societal components which cross over individual and social structures (see Figure 2.3).
Figure 2.3 The Emerging Model of the Health Behavior Model

(source: Andersen 1995, p.8)

In the health behavior model, health outcomes are simultaneously impacted by health behaviors, environment, and population predisposing characteristics. Since the components in this model cross over individual and social structural levels, this model has been widely implemented to examine the health outcomes of patients with various predisposing sociodemographic characteristics in different types of formal health care institutions (Phillips, Morrison, Andersen, & Aday 1998; Andersen, Yu, Wyn, Davidson, Brown, & Teleki 2002; Bradley, McGraw, Curry, Buckser, King, Kasl, & Andersen. 2002).

After reviewing the health behavior model and its related research during 1998-2012, Babitsch, Gohl, & von Lengerke (2012) noted that many studies did not clearly categorize predisposing characteristics and enabling resources. For example, dependent variables
were access and utilization of health care services and perceived health status and evaluated health status were often used as need factors.

Because of that, it is more difficult to compare these indicator categories to each other in order to determine the category with the most impact. In addition, many studies were also limited to presenting the direction and strength among indicator variables. Without using complex statistical methods, many studies based on the health behavior model were not able to fully present the complex associations among the variables in this model. It is necessary to adequately operationalize the variables and complex statistical analysis are strongly needed in the future (Babitsch, Gohl, & von Lengerke 2012).

2.4.4 A CONCEPTUAL MODEL OF THE RESEARCH

Even though perspectives of health behaviors and health outcomes among these three theories might vary, there is the commonality that health status is affected by the perception of health risks and practice of health behaviors, which is related to sociodemographic characteristics. In this study, health outcomes are examined through self-reported health status and health status change.

Moreover, in order to examine health behaviors and their effects on health outcomes, three indicators of healthcare utilization are used in the research. First, a visit to a general doctor is a very common way to see whether the elderly seek any medical treatment, assistance, or health information for dealing with their general physical illness. As they get older, the elderly are more likely to rely on the medical assistance of a general physician. Thus, this indicator is included to predict health outcomes for elderly Asian Americans.
Second, previous research indicates that Asians usually underutilize mental health services compared to other racial groups (Alegria, Chatterji, Wells, Cao, Chen, Takeuchi, Meng, 2008; Le Meyer, Zane, Cho, & Takeuchi 2009). However, it is still unknown if there is any difference in seen/talked mental health professionals on health outcomes between US-born and foreign-born elderly Asians. In order to explore this variation, a visit to a mental health professional is used to examine its effect on health outcomes between the groups. Third, having surgery is another key indicator of physical illness. For the elderly, surgery is a very common way to remove health risks directly.

The relationship between health outcomes and healthcare utilization is assumed to be reciprocal. Adopting concepts from the health behavior model, it is understood that on one hand, the more that the elderly utilize healthcare services, the better health outcomes they will have. On other hand, the better health outcomes the elderly have, the less healthcare services health they need.

In addition, as discussed above, based on previous health research on Asian Americans, for elderly Asian Americans, there is a relationship between sociodemographic characteristics and health behaviors. In fact, certain sociodemographic characteristics provide more advantages than others in accessing social resources and health related information. With better ability to access relevant resources, elderly Asian Americans can have more positive health behaviors. Therefore, some sociodemographic characteristics can be seen as direct factors on health outcomes; while others can be indirect indicators of health outcomes through behaviors of healthcare utilization.

Regarding sociodemographic characteristics in the present study, age, sex, marital status, region of residency, education, family size and family income are considered. Some
indicators, such as age, sex, marital status, and region of residency, provide basic demographic information of respondents. Other indicators, such as education, family size, and family income, represent the support an individual can access through external environments within social networks and social structures. Since these characteristics may vary in the relationship between health behaviors and health outcomes, these factors will be used when comparing foreign-born and US-born elderly Asian respondents (see Figure 2.4).
Figure 2.4: Conceptual Framework of the Study
2.5 RESEARCH HYPOTHESES

Based on the conceptual model and previous research, US-born elderly Asian Americans are expected to have better cultural competency than foreign-born elderly. That means that United States healthcare services have a greater effect on health status for US-born elderly Asian Americans than for foreign-born elderly Asian Americans. Therefore, the primary hypotheses are as follows:

Based on the assumption that there is a reciprocal relationship between health outcomes and healthcare utilization, therefore:

To access healthcare services has a greater positive effect on health outcomes for US-born elderly Asian Americans than for foreign-born elderly Asian Americans (H₁).

With better health outcomes, less healthcare services are needed and this varies between US-born and foreign-born elderly Asian Americans (H₂).

In addition, sociodemographic characteristics can have either a direct effect on health outcomes or an indirect effect on health outcomes via healthcare utilization. Considering that age is an important indicator of biological dysfunction for the elderly, it has a negative effect on health outcomes but a positive effect on healthcare utilization. Therefore, the additional hypotheses are as follows:

There is a direct negative effect between age and health outcomes in both groups (H₃.₁).

There is an indirect positive effect between age and health outcomes via healthcare utilization in both groups (H₃.₂).
In addition, considering the role of sex, and that men on average have worse health outcomes than women, therefore:

There is a direct negative effect between males and health outcomes in both groups (H4.1).

There is an indirect negative effect between males and health outcomes via healthcare utilization in both groups (H4.2).

Regarding marital status, the elderly might have better health outcomes if married. Therefore:

There is a direct positive effect between being married and health outcomes in both groups (H5.1).

There is an indirect positive effect between being married and health outcomes via healthcare utilization in both groups (H5.2).

For region of residency, the West is selected as the reference category due to its high Asian population density. Therefore:

There is a direct positive effect between living in the West and health outcomes in both groups (H6.1).

There is an indirect positive effect between living in the West and health outcomes via healthcare utilization in both groups (H6.2).

Regarding the positive effect of education on health, it is predicted that:

There is a direct positive effect between education and health outcomes in both groups (H7.1).

There is an indirect positive effect between education and health outcomes via healthcare utilization in both groups (H7.2).
Since family support can be seen as a positive factor to health outcomes for the elderly Asian Americans, therefore:

There is a direct positive effect between family size and health outcomes in both groups (H_{8.1}).

There is an indirect positive effect between family size and health outcomes via healthcare utilization in both groups (H_{8.2}).

Last, family income refers to levels of financial freedom for the elderly. Therefore:

There is a direct positive effect between family income and health outcomes in both groups (H_{9.1}).

There is an indirect positive effect between family income and health outcomes via healthcare utilization in both groups (H_{9.2}).
CHAPTER 3
DATA AND METHODS

There are three sections of research design in this chapter. The first is data. In the section, the process of selecting the research respondents and survey years from the dataset is introduced. The second is variables and measurements. In this section, all variables and measurements used and designed in the research are presented. The third section is data analysis. In order to reach the best way to present the research results and to explain the research questions, in the section, the methods and statistical techniques used in the research will be introduced.

3.1 DATA

In order to demonstrate trends of health conditions and related factors among elderly Asian Americans, this research used data from the National Health Interview Survey (NHIS) 1998-2012 for two reasons. First, the NHIS is designed to monitor the health of the United States since 1957. Through annual personal household interviews, information on a varied range of relevant health topics is collected by the U.S. Census Bureau, the Centers for Disease Control (CDC), and Prevention's National Center for Health Statistics. This is a multistage probability sample survey whose main objectives are to assess national health, health status and health care access. Based on the reliability of its instrumental tools and the survey institution, the NHIS is an appropriate, and credible, dataset to be used in this research.
Second, the NHIS questionnaires and sample design are revised, modified, and updated every 10-15 years. In order to demonstrate the trends in national health consistently, this research used the data from the last released data in 2012 and track back to 15 years ago in 1998, so that the results will represent the trend of health for elderly Asian Americans steadily.

Respondents in the research were selected through three steps. First, those who self-reported as Asians were selected. Second, among self-reported Asians, those whose age was 65 or above were selected. Third, in order to take into account the place of birth, the selected cases were further divided into two groups: US-born and foreign-born. After completing the process of selection, there were 1,359 US-born and 4,902 foreign-born elderly Asian Americans. Overall, in the research, foreign-born subjects are nearly 78.3% of the total elderly Asian population, while US-born are nearly 21.7% of the total elderly Asian population.

3.2 MISSING VALUES

In order to reduce possible errors of estimation due to the amount of missing values, this research applied single imputation in which the substituted value for the missing values of measurements of healthcare utilization (such as seen/talked a general doctor in past 12 months, seen/talked a mental health professional in past 12 months, and having a surgery in past 12 months), are replaced by the predicted value through regression analyses (Allison 2001). Despite the increased sample size, there is no statistically significant difference
between the missing and non-missing groups in regards to the variables selected for this study.

3.3 VARIABLES AND MEASUREMENTS

Based on the conceptual framework, it is likely that there are associations between health outcomes, behaviors of healthcare utilization, and sociodemographic characteristics among Asians. That means that for elderly Asians, health outcomes are not only related to their behaviors of accessing healthcare services but are also influenced by their sociodemographic characteristics. This research seeks to compare variations in health outcomes, healthcare utilization, and sociodemographic characteristics between US-born and foreign-born elderly Asian Americans by analyzing the effects of certain predictors on health outcomes.

In Table 3.1, the measurement of health outcomes are self-reported health status and health status change compared to the last year. Both of these are ordinal variables and are based on how a respondent self-reports his/her current health status (1=Poor, 2=Fair, 3=Good, 4=Very good, and 5=Excellent) and how he/she perceives health status change compared to the last year (1=Worse, 2= Same, and 3=Better).

In addition, the measurement of healthcare utilization is composed of three main indicator variables. The first asks whether the respondent has seen/talked to a general doctor in past 12 months. The second asks whether the respondent has seen/talked to any mental health professional in past 12 months. The third predictor asks whether the
respondent has had any surgery in past 12 months. All of these predictors are dichotomous variables measured by 0= no and 1= yes.

In addition to the main predictor variables, eight control variables concerning sociodemographic characteristics are used such as age, sex, marital status, region of residency, education, family size, and combined family income. These are also considered important indicators of respondents’ demographic backgrounds and socioeconomic status. Age was an interval variable (65-99). Sex was a dichotomous nominal variable with female as the reference category (0=female, 1=male). Current marital status was a dichotomous nominal variable with not married as the reference category (0= not married, 1=married). Region of residency was also a dichotomous nominal variable with non-West as the reference category (0=non-West, 1= West). Education was an ordinal variable (1=Lower than high school, 2= High school graduate, 3= Some college, 4= College graduate or higher). Family size was an interval variable (1-30). Last, combined family income was an ordinal variable (1=0-4,999, 2=5,000-9,999, 3=10,000-14,999, 4=15,000-19,999, 5=20,000-24,999, 6=25,000-34,999, 7=35,000-44,999, 8=45,000-54,999, 9=55,000-64,999, 10=65,000-74,999, and 11=75,000 and above).
Table 3.1 Level of Measurement

<table>
<thead>
<tr>
<th>Variable</th>
<th>Name</th>
<th>Level of Measurement</th>
<th>Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Health Outcomes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-reported health status</td>
<td>HEALTH</td>
<td>Ordinal</td>
<td>1=Poor</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2=Fair</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3=Good</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4=Very good</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5=Excellent</td>
</tr>
<tr>
<td>Health status change</td>
<td>HSTATYR</td>
<td>Ordinal</td>
<td>1= Worse</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2= Same</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3= Better</td>
</tr>
<tr>
<td><strong>Healthcare Utilization</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1) Seen/talked to a general doctor in past 12 months</td>
<td>SAWGEN</td>
<td>Nominal</td>
<td>0=no/1=yes</td>
</tr>
<tr>
<td>(2) Seen/talked to a mental health professional in past 12 months</td>
<td>SAWMENT</td>
<td>Nominal</td>
<td>0=no/1=yes</td>
</tr>
<tr>
<td>(3) Had any surgery in past 12 months</td>
<td>SURGERY</td>
<td>Nominal</td>
<td>0=no/1=yes</td>
</tr>
</tbody>
</table>
### Sociodemographic Characteristics

<table>
<thead>
<tr>
<th>(1) Age</th>
<th>AGE</th>
<th>Interval</th>
<th>65-85</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2) Sex</td>
<td>SEX</td>
<td>Nominal</td>
<td>0=female/1=male</td>
</tr>
<tr>
<td>(3) Current marital status</td>
<td>MARST</td>
<td>Nominal</td>
<td>0=Not married/</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1=Married</td>
</tr>
<tr>
<td>(4) Region of residency</td>
<td>REGION</td>
<td>Nominal</td>
<td>0=non-West/</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1= West</td>
</tr>
<tr>
<td>(5) Education</td>
<td>EDUC</td>
<td>Ordinal</td>
<td>1=Lower than high</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>school</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2=High school</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>graduate</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3=Some college</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4=College graduate or</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>higher than college</td>
</tr>
<tr>
<td>(6) Family size</td>
<td>FAMSIZE</td>
<td>Interval</td>
<td>1-30</td>
</tr>
<tr>
<td>(7) Combined family income</td>
<td>INCIMPI</td>
<td>Ordinal</td>
<td>1=0-4,999</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2=5,000-9,999</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3=10,000-14,999</td>
</tr>
<tr>
<td></td>
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<td>4=15,000-19,999</td>
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<td>5=20,000-24,999</td>
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<td>6=25,000-34,999</td>
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<td>7=35,000-44,999</td>
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<td>8=45,000-54,999</td>
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<td></td>
<td>9=55,000-64,999</td>
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<td></td>
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<td></td>
<td>10=65,000-74,999</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>11=75,000 and above</td>
</tr>
</tbody>
</table>
3.4 DATA ANALYSIS

The purpose of this study is to examine the relationships among health outcomes, healthcare utilization and sociodemographic characteristics. There are three statistical methods applied in this research.

First, descriptive statistics were used to analyze the distributions of all variables. These variables are compared between US-born elderly Asians and foreign-born elderly Asians. Second, bivariate correlations were conducted among all the variables used in the analysis. This was done to identify statistically significant correlations among the variables. Third, since the relationships between healthcare utilization and health outcomes can simultaneously be affected by sociodemographic characteristics, the most suitable method of analysis in this study is structural equation modeling (SEM) due to two main considerations:

First, a structural equation model is constructed in order to examine the relationships between exogenous and endogenous variables. Basically, exogenous variables are considered predictors that are not affected by other variables in the model. Endogenous variables can be viewed as both predictors and as dependent variables. They can predict other endogenous variables or be predicted by exogenous variables. Based on the conceptual model (see Figure 2.4), this method is used to present a causal modeling between exogenous variables and endogenous variables (Kelloway, 1998).

In this study, exogenous variables include sociodemographic characteristics (such as sex, marital status, region of residency, education, family size, and combined family
income). Since exogenous variables are used to predict latent variables in the model, they are also called indicators.

There are two latent variables, health outcomes and healthcare utilization, in this study. They are composed of endogenous variables. The first latent variable is health outcomes, which is composed of current health status and health status change compared to the last year. The second latent variable is healthcare utilization that includes seen/talked a general doctor in past 12 months, seen/talked a mental health professional in past 12 months, and having any surgery in past 12 months. By using this method, causal relationships between indicators and latent variables can be illustrated.

In order to use structural equation modeling, there are some minimum requirements that must be met. First, the minimum sample size must be 200 cases or more, and there must be at least five cases or observations per parameter. In this research, the initial sample size is 1,359 for the United States-born group and 4,902 for the foreign-born group. Therefore, these requirements are met.

Second, a non-recursive model is the proper way in which to demonstrate the reciprocal relationship between healthcare utilization and health outcomes. Moreover, the operation of SEM is composed of path analysis and factor analysis. That means that SEM can present feedback loops between variables. Since the conceptual model of this research (see Figure 2.4 in Chapter 2) assumes there is a reciprocal relationship between health outcomes and healthcare utilization, SEM can be used to examine, and to present, reciprocal or bidirectional relationships among indicators and latent variables with statistical validity.
As a result, the conceptual model justified through previous research and related theories has possible reciprocal or bidirectional relationships between healthcare utilization and health outcomes. Based on the advantages of SEM mentioned above, direct, indirect, as well as total, effects among variables in the research can be well presented.

In the research, SPSS 20 is used to analyze the descriptive statistics and bivariate correlations among all the variables. The LISREL 8.70 program is used to evaluate the appropriateness of indicators and to estimate the structural equation model.

3.5 SUMMARY

In this research, because of the credibility of the survey data, and the consistency of study variables, use of the NHIS in the research is beneficial for illustrating the representative results for both US-born and foreign-born elderly Asian Americans. Based on the literature review, variables, including measurement of healthcare utilization and other control variables are included in this study. Regarding research methods, descriptive statistics, bivariate analysis, and SEM are used to analyze the data and to demonstrate the causal relationships between health outcomes, healthcare utilization, and sociodemographic characteristics between the United States-born and the foreign-born groups.
CHAPTER 4
RESULTS AND DISCUSSION

In this chapter, there are three ways that the results are presented. First, the descriptive statistics present the distribution of each variable, such as frequency, mean, and standard deviation. The results demonstrate basic statistical information of socio-demographic characteristics between foreign-born and US-born elderly Asians. Second, bivariate analysis is presented to show the relationships among variables between the two groups. Some variables are correlated with each other, while others are not. The results reveal that there are differences of correlated variables between the two groups. Third, SEM is used to verify the causal relationships among health status, measurements of healthcare utilization, and sociodemographic characteristics in the United States-born and the foreign-born groups. Based on the results of the SEM analyses, the research questions and hypotheses will be answered and discussed.

4.1 DESCRIPTIVE STATISTICS

Table 4.1 summarizes the descriptive statistics of the sociodemographic variables used in this study. Among the United States-born elderly Asian Americans, the average age was 75.74, which was a little higher than 72.81, the average age of the foreign-born elders. Considering the gender distribution, about 44.3% of US-born elderly, and 43.2% of foreign-born elderly Asian Americans, were males. In regards to marital status, 56.8% of US-born elderly Asian Americans were married and 65.2% foreign-born elders were married.
Regarding the region of residency, not surprisingly, the majority of US-born and foreign-born elderly Asian Americans lived in the West (US-born: 81%, foreign-born: 59.3%).

The average family size of US-born elderly Asian Americans was 2.2. Meanwhile, the average family size of foreign-born elderly Asian Americans was 3.1. Educational attainment on average is about the same in the two groups, with the United States-born having slightly more education (US-born: 2.387, foreign-born: 2.168).

Lastly, combined family income is about the same between the two groups, with US-born slightly higher (7.4, foreign-born: 6.96). That means that the combined family income for the United States-born elderly Asian Americans on average was between 35,000-49,999 dollars per year. Meanwhile, the average combined family income of foreign-born elderly Asian Americans was 25,000-34,999 dollars per year.

Table 4.1 Means and Standard Deviations (S.D.) of Sociodemographic Characteristics Used in the Analysis, US-Born (N=1,359) and Foreign-Born (N=4,902) Elderly Asian Americans

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Sociodemographic Characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>1,359</td>
<td>4,902</td>
<td>75.74</td>
<td>72.81</td>
<td>6.646</td>
<td>6.141</td>
<td></td>
</tr>
<tr>
<td>Sex (Male)</td>
<td>602</td>
<td>2,119</td>
<td>.443</td>
<td>.432</td>
<td>.497</td>
<td>.495</td>
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</tr>
<tr>
<td>Marital Status (married)</td>
<td>768</td>
<td>3,173</td>
<td>.568</td>
<td>.652</td>
<td>.496</td>
<td>.477</td>
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</tr>
<tr>
<td>Region of Residency (the West)</td>
<td>1,106</td>
<td>2,905</td>
<td>.814</td>
<td>.593</td>
<td>.389</td>
<td>.491</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>1,320</td>
<td>4,540</td>
<td>2.387</td>
<td>2.168</td>
<td>.870</td>
<td>1.122</td>
<td></td>
</tr>
<tr>
<td>Family Size</td>
<td>1,359</td>
<td>4,902</td>
<td>2.225</td>
<td>3.113</td>
<td>1.261</td>
<td>1.982</td>
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</tr>
<tr>
<td>Combined family income</td>
<td>1,359</td>
<td>4,902</td>
<td>7.405</td>
<td>6.961</td>
<td>2.845</td>
<td>3.320</td>
<td></td>
</tr>
</tbody>
</table>

Source: the 1998-2012 NHIS
4.2 BIVARIATE ANALYSIS

4.2.1 HEALTH STATUS OF US-BORN ELDERLY ASIAN AMERICANS

Table 4.2 presents the relationships of variables among US-born elderly Asian Americans. Regarding the relationships between health status and measurements of healthcare utilization, there is a statistically significant negative relationship between health status and seeing/talking a mental health professional in past 12 months ($r=-.106, p \leq .01$) and having any surgery in past 12 months ($r=-.095, p \leq .05$), respectively. However, there is no relationship between health status and seeing/talking to a general doctor in past 12 months in the group.

There are some statistically significant relationships between health status and socio-demographic characteristics, such as age ($r=-.140, p \leq .001$) and family size ($r=-.080, p \leq .05$). Meanwhile, education ($r=.237, p \leq .001$) and combined family income ($r=.136, p \leq .001$) are positively related to health status. Sex, marital status, and region of residency do not have any statistically significant relationship with health status.

In addition, there is a negative statistically significant relationship between health status change and age ($r=-.098, p \leq .01$). For the relationships among the measurements of healthcare utilization, there is a statistically significant positive relationship between seeing/talking to a general doctor in past 12 months and age ($r=.085, p \leq .05$), region of residency ($r=.181, p \leq .001$), and education ($r=.090, p \leq .05$), respectively.
Table 4.2 Correlation Matrix for Variables Used in the Analysis for US-Born Elderly Asian Americans during 1998-2012 (N=1,359)

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
<th>(9)</th>
<th>(10)</th>
<th>(11)</th>
<th>(12)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Health status</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) Health status change</td>
<td>.217***</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3) Seen/talked a general doctor</td>
<td>-.032</td>
<td>-.045</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(4) Seen/talked a mental health professional</td>
<td>-.106**</td>
<td>.014</td>
<td>-.005</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(5) Had any surgery</td>
<td>-.095*</td>
<td>-.037</td>
<td>.056</td>
<td>.004</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(6) Age</td>
<td>-.140***</td>
<td>-.098**</td>
<td>.085*</td>
<td>-.065</td>
<td>-.043</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(7) Sex (Male)</td>
<td>-.008</td>
<td>.017</td>
<td>-.004</td>
<td>-.028</td>
<td>-.001</td>
<td>-.106**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(8) Marital status (Married)</td>
<td>.009</td>
<td>-.009</td>
<td>.048</td>
<td>-.063</td>
<td>-.022</td>
<td>-.224***</td>
<td>.357***</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(9) Region of residency (the West)</td>
<td>-.044</td>
<td>-.016</td>
<td>.181***</td>
<td>.013</td>
<td>.011</td>
<td>.059</td>
<td>.058</td>
<td>-.011</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(10) Education</td>
<td>.237***</td>
<td>.047</td>
<td>.090*</td>
<td>.025</td>
<td>.025</td>
<td>-.258***</td>
<td>.132***</td>
<td>.133***</td>
<td>.020</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(11) Family Size</td>
<td>-.080*</td>
<td>.015</td>
<td>.064</td>
<td>.029</td>
<td>.001</td>
<td>-.188***</td>
<td>.142***</td>
<td>.475***</td>
<td>.115**</td>
<td>.051</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>(12) Combined family income</td>
<td>.136***</td>
<td>-.028</td>
<td>.163</td>
<td>-.042</td>
<td>.011</td>
<td>-.195***</td>
<td>.196***</td>
<td>.360***</td>
<td>.082*</td>
<td>.357***</td>
<td>.447***</td>
<td>1</td>
</tr>
</tbody>
</table>

*p≤.05  ** p≤.01  ***p≤.001 (2 tailed test)

Source: the 1998-2012 NHIS
4.2.2 HEALTH STATUS OF FOREIGN-BORN ELDERLY ASIAN AMERICANS

Table 4.3 presents the relationships among variables in the foreign-born group. All measurements of healthcare utilization had a statistically significant, negative relationship with health status. That means that there was a negative relationship between health status and seeing/talking a general doctor (r=−.147, p≤.001), seeing/talking to a mental health professional (r=−.083, p≤.001), and having any surgery (r=−.076, p≤.001).

Among sociodemographic characteristics, age (r=−.215, p≤.001) and living in the West (r=−.096, p≤.001), respectively, had a negative relationship with health status. Meanwhile, there was a positive relationship between health status and sex (r=.076, p≤.001), being married (r=.101, p≤.001), education (r=.270, p≤.001), and combined family income (r=.229, p≤.001), respectively.

In addition, there is a negative statistically significant relationship between health status change and age (r=−.101, p≤.001) and living in the West (r=−.062, p≤.001), respectively. There is a positive statistically significant relationship between health status change and education (r=.132, p≤.001) and combined family income (r=.114, p≤.001), respectively.

Basically, compared to US-born elderly Asian Americans, healthcare utilization and health status are more evidently correlated to one another for the foreign-born elderly. Even though the tables were unable to present the cause and effect direction between the indicators of healthcare utilization and health status in both groups of elderly Asian Americans, therefore, SEM is used to examine the causal relationships among healthcare utilization, sociodemographic characteristics, and health outcomes.
Table 4.3 Correlation Matrix for Variables Used in the Analysis, Foreign-Born Elderly Asian Americans during 1998-2012 (N=4,902)

<table>
<thead>
<tr>
<th>Variable</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
<th>(9)</th>
<th>(10)</th>
<th>(11)</th>
<th>(12)</th>
</tr>
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<tbody>
<tr>
<td>Health status</td>
<td>1</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Health status change</td>
<td>.240***</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seen/talked a general doctor</td>
<td>-.147***</td>
<td>-.026</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seen/talked a mental health professional</td>
<td>-.083***</td>
<td>-.010</td>
<td>.059*</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Had any surgery</td>
<td>-.076***</td>
<td>.011</td>
<td>.114***</td>
<td>.009</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>-.215***</td>
<td>-.101***</td>
<td>.113***</td>
<td>.040</td>
<td>.068**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex (Male)</td>
<td>.076***</td>
<td>.008</td>
<td>-.027</td>
<td>.004</td>
<td>.016</td>
<td>-.123***</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital status (Married)</td>
<td>.101***</td>
<td>.031</td>
<td>-.023</td>
<td>-.017</td>
<td>-.005</td>
<td>-.297***</td>
<td>.401***</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Region of residency (the West)</td>
<td>-.096***</td>
<td>-.062**</td>
<td>.01</td>
<td>-.020</td>
<td>-.016</td>
<td>.093***</td>
<td>-.093***</td>
<td>-.025</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>.270***</td>
<td>.132***</td>
<td>.004</td>
<td>-.013</td>
<td>.027</td>
<td>-.211***</td>
<td>.214***</td>
<td>.213***</td>
<td>-.101***</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family Size</td>
<td>.027</td>
<td>.020</td>
<td>-.035</td>
<td>.015</td>
<td>-.001</td>
<td>-.049*</td>
<td>.117***</td>
<td>.248***</td>
<td>.020</td>
<td>-.105***</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Combined family income</td>
<td>.229***</td>
<td>.114***</td>
<td>.004</td>
<td>-.011</td>
<td>-.006</td>
<td>-.170***</td>
<td>.109***</td>
<td>.249***</td>
<td>-.052*</td>
<td>.283***</td>
<td>.464***</td>
<td>1</td>
</tr>
</tbody>
</table>

*p≤.05  **p≤.01  ***p≤.001 (2 tailed test)

Source: the 1998-2012 NHIS
4.3 STRUCTURAL EQUATION MODELING

4.3.1 FACTOR LOADINGS OF MEASUREMENTS OF HEALTH OUTCOMES AND HEALTHCARE UTILIZATION

In Table 4.4, the factor loadings of health outcomes (HO) and healthcare utilization (HCU) among foreign-born elderly Asian Americans are represented in a structural equation model. For the latent variable of health outcomes, both indicators score above .300. This means that both health status and health status change are appropriate measures of health outcomes in the model. In addition, for the latent variable of healthcare utilization, all indicators score above .300. That means that seeing/talking a general doctor, seeing/talking a mental health professional, and having any surgery, are appropriate measures of healthcare utilization in the structural equation model.

Table 4.4 Factor Loadings for Variables for Foreign-Born Elderly Asian Americans (N=4,902)

<table>
<thead>
<tr>
<th></th>
<th>Unstandardized</th>
<th>(SE)</th>
<th>Standardized</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health outcomes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health Status</td>
<td>.80</td>
<td>.69</td>
<td>.72</td>
<td>.48</td>
</tr>
<tr>
<td>Health status change</td>
<td>.18**</td>
<td>.26</td>
<td>.33</td>
<td>.89</td>
</tr>
<tr>
<td>Healthcare Utilization</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seen/talked a general doctor</td>
<td>.34</td>
<td>.04</td>
<td>.85</td>
<td>.27</td>
</tr>
<tr>
<td>Seen/talked a mental health</td>
<td>.04**</td>
<td>.01</td>
<td>.40</td>
<td>.84</td>
</tr>
<tr>
<td>had any surgery</td>
<td>.12**</td>
<td>.04</td>
<td>.53</td>
<td>.72</td>
</tr>
</tbody>
</table>

*p ≤ 0.05. **p ≤ 0.01. ***p ≤ 0.001. (one-tailed test).
Source: the 1998-2012 NHIS
In Table 4.5, the factor loadings of health outcomes (HO) and healthcare utilization (HCU) among US-born elderly Asian Americans are presented. For the latent variable of health outcomes, both indicators score above .300. This means that both health status and health status changes are appropriate measures of health outcomes in the model. In addition, for the latent variable of healthcare utilization, only seeing/talking a general doctor scores above .300. That means that in the US-born group, seeing/talking a general doctor is the only appropriate measure of healthcare utilization. Factor loadings for seeing/talking a mental health professional or having any surgery are below .300. That means that they are not suitable measures of healthcare utilization. However, for the purposes of fair comparison with the foreign-born group, these variables are still kept in the structural equation model.

<table>
<thead>
<tr>
<th>Health outcomes (HO)</th>
<th>Unstandardized</th>
<th>(SE)</th>
<th>Standardized</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Status</td>
<td>.31</td>
<td>.90</td>
<td>.41</td>
<td>.84</td>
</tr>
<tr>
<td>Health status change</td>
<td>.16*</td>
<td>.10</td>
<td>.73</td>
<td>.47</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Healthcare Utilization (HCU)</th>
<th>Unstandardized</th>
<th>(SE)</th>
<th>Standardized</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seen/talked a general doctor</td>
<td>.31</td>
<td>.05</td>
<td>.82</td>
<td>.32</td>
</tr>
<tr>
<td>Seen/talked a mental health professional</td>
<td>-.05**</td>
<td>.02</td>
<td>-.31</td>
<td>.90</td>
</tr>
<tr>
<td>Having a surgery</td>
<td>-.05**</td>
<td>.06</td>
<td>-.20</td>
<td>.96</td>
</tr>
</tbody>
</table>

*p ≤ 0.05. **p ≤ 0.01. ***p ≤ 0.001. (one-tailed test).


4.3.2 RESULTS OF PATH COEFFICIENTS

In Figure 4.1, the best model of SEM for the foreign-born group is presented. In the structural equation model, the root mean square error of approximation (RMSEA) is .053, which is lower than .10. That means that the average of the residuals between the actual correlation/covariance and the expected model correlation/covariance is strongly restricted. In addition, the Comparative Fit Index (CFI) in the model is .94, which is higher than .90. That means that the model is statistically a good fitting model.

For the model is a good fitting, there are path coefficients among the predictor variables to health status for foreign-born elderly Asian Americans. There is a reciprocal relationship between health outcomes and healthcare utilization. Healthcare utilization has a positive effect on health outcomes; meanwhile, health outcomes has a negative effect on healthcare utilization. In other words, for foreign-born elderly Asian Americans, when their health is better, they use less healthcare services (-.41). On the other hand, when the elderly use more healthcare services, their health outcomes are expected to be better (.31).

Considering the standardized effects of sociodemographic characteristics on health outcomes (see Table 4.6), age (-.29), sex (.03), married (.11), and living in the West (-.09) have a direct effect on health outcomes. Age and living in the West have a negative effect on health outcomes; while male and being married have a positive effect on health outcomes. In addition, living in the West, education, family size and combined family income have an indirect effect on health outcomes via healthcare utilization. For living in the West, the indirect effect on health outcomes via healthcare utilization is slightly positive (-.01) and education also has a slightly positive indirect effect on health outcomes via healthcare utilization (.03). However, family size has a negative indirect effect on health outcomes via
healthcare utilization (-.09), and combined family income has a slightly negative effect on health outcomes via healthcare utilization (-.01).

It should be understood that the model in Figure 4.6 assumes that outside variables do not differentially modify the relationship of the variables in the model. This is a dubious assumption. However, all models make this assumption and this is a frequent limitation of all statistical model creations. The intercorrelations of the exogenous variables are also provided on the left side of the model. It is not within the scope of this analysis to interpret these interrelationships. This is also true in Figure 4.7.
Figure 4.1 Healthcare Utilization and Health Outcomes for Foreign-Born Elderly Asian Americans

Chi-Square=435.35, df=30, P-value=0.00000, RMSEA=0.053, CFI= 0.94
Table 4.6 Decomposition of the Effects of Predictor Variables for Foreign-Born Elderly Asian Americans during 1998-2012

<table>
<thead>
<tr>
<th>Predictor on Healthcare Utilization</th>
<th>Direct Effect</th>
<th>Indirect Effect</th>
<th>Total Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Outcomes</td>
<td>-.41</td>
<td>NA</td>
<td>-.41</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Predictors on Health Outcomes</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthcare Utilization</td>
<td>.31</td>
<td>NA</td>
<td>.31</td>
</tr>
<tr>
<td>Age</td>
<td>-.29</td>
<td>NS</td>
<td>-.29</td>
</tr>
<tr>
<td>Sex</td>
<td>.03</td>
<td>NS</td>
<td>.03</td>
</tr>
<tr>
<td>Married</td>
<td>.11</td>
<td>NS</td>
<td>.11</td>
</tr>
<tr>
<td>West</td>
<td>-.09</td>
<td>-.03</td>
<td>-.12</td>
</tr>
<tr>
<td>Education</td>
<td>NS</td>
<td>.03</td>
<td>.03</td>
</tr>
<tr>
<td>Family Size</td>
<td>NS</td>
<td>-.09</td>
<td>-.09</td>
</tr>
<tr>
<td>Combined family income</td>
<td>NS</td>
<td>-.01</td>
<td>-.01</td>
</tr>
</tbody>
</table>

NA-Not applicable
NS-Not Significant
Source: the 1998-2012 NHIS

As a result, not surprisingly, healthcare utilization, being male, and education, respectively, have a positive direct effect on health outcomes. However, although being married has a direct positive effect on health outcomes; family size has an indirect negative indirect effect on health outcomes via healthcare utilization. In addition, combined family income cannot directly improve health outcomes of foreign-born elderly Asian Americans but rather has a slightly negative indirect effect on health outcomes via healthcare utilization.

In addition, in Figure 4.2, the best model of SEM for the United States-born group is presented. In the structural equation model, RMSEA is .053 and CFI is .90. Both values confirm that the model is a good fitting model. For the model is a good fitting model, there are path coefficients among the predictor variables to health status for US-born elderly Asian Americans. Like in the foreign-born group, there is a reciprocal relationship between health
outcomes and healthcare utilization. Healthcare utilization has a positive effect on health outcomes; meanwhile, health outcomes has a negative effect on healthcare utilization. For US-born elderly Asian Americans, when their health is better, less healthcare services are used (-.84). On the other hand, when the elderly use more healthcare services, their health outcomes are expected to be better (.84).

Considering the standardized effects of the sociodemographic characteristics on health outcomes (see Table 4.7), age (-.27), being male (-.04), married (.19), and living in the West (-.04) have a direct effect on health outcomes, respectively. Age, being male, and living in the West have a negative effect on health outcomes, while being married has a positive effect on health outcomes.

In addition, living in the West, education, family size and combined family income have an indirect effect on health outcomes via healthcare utilization. For living in the West, the indirect effect on health outcomes via healthcare utilization is positive (.11) and education also has a slightly positive indirect effect on health outcomes via healthcare utilization (.17). However, family size has a negative indirect effect on health outcomes via healthcare utilization (-.37) and combined family income has a slightly negative effect on health outcomes via healthcare utilization (.07).
Figure 4.2 Healthcare Utilization and Health Outcomes for US-Born Elderly Asian Americans

Chi-Square=147.56, df=31, P-value=0.00000, RMSEA=0.053, CFI= 0.90
Table 4.7 Decomposition of the Effects of Predictor Variables for US-Born Elderly Asian Americans during 1998-2012

<table>
<thead>
<tr>
<th>Predictor on Healthcare Utilization</th>
<th>Direct Effect</th>
<th>Indirect Effect</th>
<th>Total Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Outcomes</td>
<td>-.84</td>
<td>NA</td>
<td>-.84</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Predictors on Health Outcomes</th>
<th>Direct Effect</th>
<th>Indirect Effect</th>
<th>Total Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthcare Utilization</td>
<td>.84</td>
<td>NA</td>
<td>.84</td>
</tr>
<tr>
<td>Age</td>
<td>-.27</td>
<td>NS</td>
<td>-.27</td>
</tr>
<tr>
<td>Sex</td>
<td>-.04</td>
<td>NS</td>
<td>-.04</td>
</tr>
<tr>
<td>Married</td>
<td>.19</td>
<td>NS</td>
<td>.19</td>
</tr>
<tr>
<td>West</td>
<td>-.04</td>
<td>.11</td>
<td>.07</td>
</tr>
<tr>
<td>Education</td>
<td>NS</td>
<td>.17</td>
<td>.17</td>
</tr>
<tr>
<td>Family Size</td>
<td>NS</td>
<td>-.37</td>
<td>-.37</td>
</tr>
<tr>
<td>Combined family income</td>
<td>NS</td>
<td>.07</td>
<td>.07</td>
</tr>
</tbody>
</table>

NA-Not applicable
NS-Not Significant
Source: the 1998-2012 NHIS

4.4 DISCUSSION OF THE HYPOTHESES

In light of the results, below the hypotheses regarding the comparison of the two groups are discussed. First, regarding the positive effect of healthcare utilization on health outcomes, US-born elderly Asian Americans indeed obtain a better advantage from using healthcare services than foreign-born Asian Americans (US-born:.84 vs. foreign-born: .31). This means that when US-born elderly Asian Americans use institutional healthcare services, they will receive more positive health outcomes than foreign-born elderly Asian Americans. Therefore, H1 is confirmed.
This result supports the literature that indicates that due to better cultural competency, US-born elderly Asian Americans are more advantaged when it comes to using these services for maintaining, or even improving their health status, than are foreign-born elderly Asians. In fact, some research indicates that foreign-born elderly Asian Americans are more likely to face obstacles of accessing institutional healthcare services, such as language and lack of acculturation (Vincent & Velkoff 2010, Reeves & Bennett 2004, Gryn & Gambino 2012, Mui 2003; Mui, Nguyen, Kang, & Domanski 2006, Guo 2000). On the other hand, due to a limitation of the dataset, the present study is unable to further discover what kind of factors may impede foreign-born elderly Asian Americans use of healthcare services.

Second, this research also confirms that elderly Asian Americans with better health outcomes are less likely to use healthcare services. US-born elderly Asian Americans having better health outcomes, are less likely to use healthcare services rather than foreign-born ones (US-born: -.84 vs. foreign-born: -.41). Therefore, H2 is confirmed.

This result shows that when elderly Asians have better health, their need for using healthcare services is reduced. In other words, when elderly Asian Americans can maintain their health in good condition, the less they need of healthcare services. In the health behavior model (Andersen 1995), need of healthcare services is influenced by how much a person’s sociodemographic characteristics can provide enabling resources for utilizing healthcare services. Thus, the hypotheses regarding how healthcare utilization mediates the effects of sociodemographic characteristics on health outcomes will be discussed later below.

Regarding the effects of sociodemographic characteristics on health outcomes, not surprisingly, age has a direct negative effect on health outcomes in both groups because
age is a key biological dysfunction for people, especially the elderly. There is not much variation in the negative effect of age on health outcomes (US-born: -.29 vs. foreign-born: -.27). Therefore, H3.1 is confirmed. However, without statistical significance in the models, whether age has an indirect effect on health outcomes via healthcare services is not confirmed. Therefore, H3.2 is not supported. It should be noted that there are other factors, such as income or education, that can affect willingness to use healthcare services. Even though age is an important factor to health outcomes for the elderly, it is not a direct determinate of healthcare utilization, according to the results presented here.

For the effect of sex on health outcomes, the results in both groups are different. For foreign-born elderly Asian males, their health outcomes are slightly higher and positive, than are those of foreign-born elderly Asian females (.03). Meanwhile, in the United States-born group, males have slightly worse health outcomes than females (-.04). Therefore, H4.1 is not supported. Similar with age, due to a lack of statistical support, there is no indirect negative effect between sex and health outcomes via healthcare utilization in both groups. Therefore, H4.2 is also not confirmed.

Moreover, family is another common factor related to health outcomes, such as mental health, for Asian Americans (Mui & Kang 2006). For elderly Asian Americans in both groups, being married has a stronger direct positive effect on health outcomes than those who are not married (US-born: .19 vs. foreign-born: .11). H5.1 is therefore confirmed. However, an indirect positive effect between being married and health outcomes in both groups is not statistically supported. Therefore, H5.2 is not confirmed.

The effects of living in the West on health outcomes in both groups are negative (US-born: -.04 vs. foreign-born: -.09). That means that for elderly Asian Americans living in the
West, their health outcomes are likely to be worse than those living in other regions. But there is not much difference. Therefore, H6.1 is not accepted.

Furthermore, there is an indirect effect between living in the West and health outcomes via healthcare utilization in both groups. For foreign-born elderly, there is a negative effect of living in the West on health outcomes via healthcare utilization (-.03); however, there is a positive effect of living in the West on health outcomes via healthcare utilization in the United States-born group (.11). Therefore, H6.2 is not supported.

Due to a lack of statistical support, there is no direct positive effect between education and health outcomes in both groups. Therefore, H7.1 is not confirmed. However, there is an indirect positive effect between education and health outcomes via healthcare utilization in both groups (US-born: .17 vs. foreign-born: .03). Therefore, H7.2 is supported. It is probable that elderly Asian American with better education are more likely to maintain their health outcomes through using healthcare services.

In addition, due to the lack of statistical significance, there is no direct positive effect between family size and health outcomes in both groups. Therefore, H8.1 is not accepted. However, there is a statistically significant indirect negative effect between family size and health outcomes via healthcare utilization in both groups (US-born: -.37 vs. foreign-born: -.09). However, since the indirect effect is not positive, H8.2 is rejected.

In fact, previous research points out that family is able to provide a great support for Asian Americans’ health (Park 2011, Bajekal, Blane, et al, 2004, Wong, Yoo, & Stewart 2005, Ta, Holck, & Gee 2010). For the Asian elderly, family can be seen as an important factor of social support that improves the elderly’s willingness to use health services that can maintain health outcomes. However, on the other hand, conflicts in family can be
harmful for health status (Juang & Alvarez 2010). Based on the results of the present study, although there is no direct effect of family size on health outcomes, family size has a negative effect on health outcomes via healthcare utilization. Whether there is an interaction of family size and family conflict on health outcomes for the Asian elderly needs to be verified by further research in the future.

Family income does not have any direct positive effect on health outcomes in both groups. Therefore, $H_{9.1}$ is not supported. Although family income has an indirect effect on health outcomes via healthcare utilization in both groups, the effect is positive in the United States-born group (.07) and the effect in the foreign-born group is negative (-.01). However, it is important to note that these are not strong coefficients. Kakai, et al (2003) indicate that family income can help Asian Americans have better health outcomes, but the positive effect is only applied in the United States-born group in the research. $H_{9.2}$ is thus partially accepted.

As a result, in Table 4.8, regarding the positive effects on health outcomes, healthcare utilization and being married, respectively, have a better direct positive effect on health outcomes for US-born elderly Asian Americans than for foreign-born ones. Education has an indirect effect on health outcomes via healthcare utilization for US-born rather than foreign-born ones. For negative effects on health outcomes, age and living in the West, respectively, have a direct negative effect on health outcomes. Family size has an indirect negative effect on health outcomes in both groups. Last, being male, living in the West, and combined family income, respectively, have an opposite effects on health outcomes between the United States-born and foreign-born groups. More research is needed in the future to further discuss the nuances of these variations.
In this chapter the research questions and hypotheses were examined and discussed in light of the quantitative analysis. Descriptive analyses summarized the measurements of sociodemographic characteristics in this study, including means and standard deviations between the United States-born and the foreign-born elderly Asian Americans. SEM was
used to illustrate the causal relationships among health outcomes, healthcare utilization, and sociodemographic characteristics between the United States-born and the foreign-born groups. As mentioned above, for a direct effect on health outcomes, healthcare utilization and being married have a direct positive effect in both groups; while age and living in the West have a direct negative effect on health outcomes in both groups. Being male has a direct negative effect on health outcomes only in the US-born group.

In addition, for the indirect effects on health outcomes via healthcare utilization, education has a positive effect in both groups; while the effects of living in the West and family income are positive only in the United States-born group. Last, family size has an indirect negative effect on health outcomes in both groups; while living in the West and family income have an indirect negative effect on health outcomes only in the foreign-born group.
CHAPTER 5
CONCLUSION

5.1 SUMMARY OF THE FINDINGS

This research compared the causal relationships among health outcomes, healthcare utilization, and sociodemographic characteristics between US-born and foreign-born elderly Asian Americans. Based on previous research, due to the adherence of their original culture, US-born and foreign-born elderly Asian Americans might have different levels of health behaviors that affect their health outcomes (Mui 2003, Mui et al 2006, Guo 2000, Choi 2000). Therefore, in regards to the effects of cultural competency in accessing institutional healthcare services, this study hypothesized that the direct influence of using institutional healthcare services on health outcomes is greater for US-born elderly Asian Americans than foreign-born elderly Asian Americans. Moreover, it was hypothesized that the indirect influence of sociodemographic characteristics on health outcomes via healthcare utilization for both US-born and foreign-born elderly Asian Americans.

In a previous study, Evans & Stoddart (1990) pointed out that there is a correlation between health outcomes and use of formal healthcare services. In this present study, not only is the correlation between health outcomes and healthcare utilization confirmed, but the correlation is reciprocal for elderly Asian Americans. Use of healthcare utilization has a positive effect on health outcomes; and at the same time, health outcomes has a negative effect on healthcare utilization.

In fact, some prior research discusses the effect of sociodemographic characteristics on health outcomes through using healthcare services (Andersen & Newman 1973, Aday,
et al 1993). As was mentioned earlier, in the present study, education has a positive indirect effect on health outcomes via healthcare utilization in both groups, but family income has a slightly positive effect on health outcomes via healthcare utilization only in the United States-born group. To better understand the variation between both groups, it is necessary to discover more information about whether the elderly in both groups have different attitudes and behaviors toward health service expenditures. In addition, since health outcomes are an important indicator of the effectiveness of healthcare utilization (Aday, et al 1993), this result also confirms that institutional healthcare services in the United States are still beneficial for the health outcomes of elderly Asian Americans.

In addition, some findings about the sociodemographic characteristics are important to discuss. Not surprisingly, age has a negative effect on health outcomes. US-born elderly Asian males have worse health outcomes than the United States-born elderly Asian females; however, foreign-born elderly Asian males have better health outcomes than the foreign-born elderly Asian females. In order to further understand this finding, it is necessary that future studies explore other factors, such as diseases and lifestyles, as mediators for health outcomes for the Asian American population.

Being married can also be a positive factor for health outcomes in both groups. However, family size is a negative factor for health outcomes via healthcare utilization in both groups. Also, family income is a positive factor for health outcomes via healthcare utilization only for US-born elderly Asian Americans but not for the foreign-born. Therefore, for future health research on Asian Americans, another important topic to discuss is the correlation between these factors of family dynamics.
Education affects health outcomes positively in both groups. That means that with better levels of education, elderly Asian Americans can have better ways to promote their health outcomes (Kakai, et al 2003). Living in the West has a negative effect on health outcomes in both groups. However, for US-born elderly Asian Americans, living in the West can be a positive factor to health outcomes via healthcare utilization. That means that compared to foreign-born elderly Asian Americans, US-born elderly Asians will receive more health advantages from using these institutional health services than will foreign-born elderly Asians. In other words, it is important to establish effective healthcare services that foreign-born elderly Asians can easily access as well as services that will improve their health outcomes.

All in all, these findings distinguish the degree to which the measure of healthcare utilization impact health outcomes and the effects of sociodemographic characteristics on health outcomes via healthcare utilization between US-born and foreign-born elderly Asian Americans. The results can provide researchers, healthcare professionals, aging service facilitators, policy makers, health educators, and so on with relevant information that can be used to establish an aging Asian friendly environment with appropriate services in the United States.

5.2 IMPLICATIONS

This research sought to examine the effects of healthcare utilization on health status between US-born and foreign-born elderly Asian Americans. Based on the findings, there are some implications for practice:
First, the research identifies relationships between health outcomes, healthcare utilization, and sociodemographic characteristics. The results can contribute to a better understanding of the health behavior model, especially regarding the causal relationships between health outcomes and healthcare utilization. In addition, the research not only examines how healthcare utilization affects health outcomes, but also how healthcare utilization can mediate the relationship between sociodemographic characteristics and health outcomes. These findings can be beneficial for improving the health behavior model.

Second, in the future, it is also important to clarify some family related factors, such as marital status, family size, and family income, and to discuss their different effects on health for elderly Asian Americans. The research presented here found that there are some variations in health outcomes between both groups. Future health studies on elderly Asian Americans should be aware of how the effects these family factors may vary among health outcomes.

In addition, the research presented that sociodemographic characteristics as factors of health outcomes are not only a one way relationship to each other but sometimes the relationship can be bidirectional. Future researchers should be more sensitive to the complexity of the relationships among indicators of healthcare utilization, sociodemographic characteristics, and health outcomes. Regardless of using quantitative or qualitative methods on this subject in the future, it is important to untangle the factors correlated to each other so that the indicators of health outcomes for the elderly can be more clearly understood.

For aging health practitioners and administrators, in order to improve health status in Asian immigrant communities, it is necessary to promote relevant health programs, especially in the western region United States. As mentioned above, since Asian Americans tend to be group
–oriented, or collectivistic, it is important that health professionals deliver health information and promote health programs in local or regional civic organizations, such as associations and churches. Also, health professionals need to know how to use existing ethnic social networks to encourage elderly Asian Americans to participate in group activities and to increase their trust of accepting health information from legitimate health institutions.

5.3 LIMITATIONS

There are some limitations of this study. First, based on the health behavior model, the research illustrates the causal relationships between population characteristics (predisposing characteristics and enabling resources), health behaviors (use of health services), and outcomes (perceived health status). However, due to the constrains of the research design, along with the use of secondary data, this research is limited in its ability to explore whether there are more factors of environment (healthcare system and external environment) to more completely present the health behavior model. In the research, only region of residency (the West) might be counted as a proxy for environmental factors.

Second, due to limitations of the dataset, this research is also limited in discovering whether there are any additional sociodemographic factors and health behaviors that could affect health outcomes. For this reason, future research should use more complex methods to discover other possible indicators and their effects on health outcomes for the elderly.

In addition, the research is limited in its ability to find sufficient evidence to explain why some sociodemographic characteristics do not directly or indirectly affect health outcomes in the SEM models. In the future, it is necessary to include more possible factors to examine
and explain the relationship between these sociodemographic characteristics, health outcomes and healthcare utilization.

Third, due to limitations of the dataset, the research is not able to locate variables for the measurement of perceived needs of healthcare services and the measurement of knowledge of using health services. According to the health behavior model, these factors could also affect health behaviors. Therefore, in the future, perceived needs of healthcare services and knowledge of using health services should be considered when examining the relationship between health outcomes and healthcare utilization.

Last, but not least, despite some limitations in the research, it should be noted that the research provides some important contributions to health research on elderly Asian Americans. When analyzing factors related to the health status of elderly Asian Americans, it is important to distinguish their place of birth due to the development of different social characteristics that this usually entails.

Therefore, the research suggests that there is a variation of effects of health behaviors on health outcomes between US-born and foreign-born elderly Asian Americans. Second, based on the three theoretical models, including, the health behavior model, the health lifestyle theory, and the health belief model, the research comprehensively examined and presented the relationships between various health behaviors and health outcomes among elderly Asian Americans in the United States.
5.4 RECOMMENDATIONS

This research intended to demonstrate the relationships of health behaviors and health outcomes among elderly Asian Americans. In the future, it is suggested that research on health behaviors among the elderly focus on the following aspects:

First, in order to better understand the effects of health behaviors on health outcomes, it is necessary to build a reliable set of health indicators for elderly Asian Americans. Due to the limitations of the NHIS, this research was limited in its scope to explore effective variables of health behaviors on health outcomes. In order to reduce this gap, it is suggested that future research establish a systematic understanding of health behaviors with additional indicators by implementing perception of health risks.

Second, health research on racial minority aging should be aware of the variation among racial subgroups. Since this research is limited by the design of NHIS, elderly Asians are the main research subject. Nevertheless, the concept of “Asian” is limited in its ability to fully represent the cultural diversity in Asia. According to the 2010 US census, there are twenty Asian subgroups, and each subgroup has its own social and historical background of immigration and migration in the United States. Therefore, based on the foundation of this research, which gave a picture of health behaviors among elderly Asians, it is suggested that future research explore factors related to health behaviors in each Asian subgroup, and to present the relationships between health behaviors and health outcome among Asian subgroups.

Furthermore, based on this research, it is suggested that future research examine the effects of health behaviors on health outcome for other racial aging groups. Comparative
studies on health behaviors among different aging racial groups would be beneficial for future aging health services so that they can meet the needs and desires of the elderly, while taking into account their unique social and cultural experiences.

Finally, this research used 15 years of cross-sectional NHIS data to observe the determinants of health behaviors for health outcome between US-born and foreign-born Asian Americans. Future studies are encouraged to have a research design which utilizes longitudinal data, such as a panel study, in order to explore changes over time in some of the other health behaviors and health outcomes between US-born and foreign-born elderly Asian Americans, or even of other minority aging groups.
REFERENCES


