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Factors Associated with Hepatitis B Vaccination Among Asian Adults (≥ 18 years) in the United States.

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2020

Abstract

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by

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MBA, Mercer University, 2014

MHSA, Strayer University, 2013

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Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

In the United States, hepatitis B disproportionately affects Asian and Pacific Islanders (AAPIs). Hepatitis B related liver cancer is the leading cause of cancer deaths among Asian Americans. Despite the proven significant economic, health, and social effect of hepatitis B virus, immunization rates remain low. The purpose of this study is to examine the association between sociodemographic factors (age, marital status, gender, work experiences), health status factors (chronic disease, nonchronic disease), health behavior factors (smoking, alcohol intake, tobacco use, physical activity), and hepatitis B vaccination among Asian adults (≥ 18 years) in the United States. The main theory that frames this work is Andersen's behavioral model. This study employed a quantitative research design with cross-sectional secondary data that was obtained from the Inter-University Consortium for Political and Social Research (ICPSR) Website. In addressing the research question, binary logistic regression was used. The results showed that there was a statistically significant relationship between sociodemographic factors, health status factors, health behavior factors, and hepatitis B vaccination among Asian adults (≥ 18 years) in the United States. The findings of this study may promote positive social change by improving vaccination campaigns and awareness especially, among Asian adults (≥ 18 years) through the development of community health informative programs that are specifically tailored to the Asian civilian noninstitutionalized population.

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Dedication

I dedicate this study to God and the memory of my late daughter Ewurabena Nyameye Aggrey. I also dedicate this study to my parents Kwabena Ohemeng-Tinyase and Lydia Kwofie. To my siblings Kwaku, Kwabena, Maame Afua, Maame Akua, Nana Yaw and Nana Asante, I am grateful for having you all as a family. I am grateful to my fiancée Johann Lebrecht Hesse. I dedicate this study to all Hepatitis B patients.

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Section 1: Foundation of the Study and Literature Review

Introduction

Topic of Study

Hepatitis B virus (HBV) is transmitted via blood or sexual contact (Center for Disease Control Prevention [CDC], 2016). According to the CDC (2016), HBV is common worldwide especially in many parts of Asia and the Pacific Islands. In the United States, HBV disproportionately affects Asian and Pacific Islanders (AAPIs). While AAPIs make up less than 5% of the U.S. population, they account for more than 50% of Americans living with HBV (CDC, 2016). Left untreated, one in four people living with HBV develop serious liver problems, even liver cancer (CDC, 2016). HBV related liver cancer is the leading cause of cancer deaths among Asian Americans (CDC, 2016).

In this study I investigated factors associated with HBV vaccination among Asian adults (≥ 18 years) in the United States. This study applied the Andersen's 1968 behavioral model to examine sociodemographic, health status and health behavior factors predicting HBV vaccination among Asian adults (≥ 18 years) in the United States. In this study, I described sociodemographic factors (age, marital status, gender, religion, and work experiences), health status factors (chronic disease, nonchronic disease), and health behavior factors (smoking, alcohol intake, tobacco use, physical activity). Looking at the nature of the study, multivariate logistic regressions was employed to estimate factors associated with HBV vaccination among Asian adult population in the United States.

Study Justification

The focus of the study was on factors associated with HBV vaccination among Asian adults (≥ 18 years) in the United States because Asian Americans are disproportionately affected by HBV (Juon et al., 2014). They have the highest incidence (58.5 per 100,000 for men and 20.9 for women) of hepatocellular carcinoma (HCC), the major form of primary liver cancer (Juon et al., 2014). Incidence among Korean males (34.9) and Chinese males (24.1) was much higher than among white males (8.9) (Juon et al., 2014). Chronic HBV infection is the most common cause of HCC, and as many as one in four Asian Americans are chronically infected with HBV as compared to 0.1% among whites in the United States (Juon et al., 2014). According to Li et al. (2017), a physician recommendation was consistently associated with HBV screening and vaccination outcomes.

After tobacco use, chronic hepatitis B (CHB) viral infections are the most important cause of cancer globally in that one out of three individuals have been infected with HBV (Chen, & Dang 2015). Worldwide, 2 billion people (1 in 3) have been infected with the HBV, making HBV one of the most common and serious infections in the world (Chen, & Dang 2015). In the United States, Asian Americans comprise less than 5% of the United States population; however, they represent the highest and the most disproportionate (approximately 58%) burden linked to HCC (Chen, & Dang 2015). Asian Americans experienced a 51% increase in the population and by the year 2050 there will be a 213% in population compared to a 49% increase for the rest. On a national basis, findings from the National Health and Nutrition Examination Survey (NHANES)

indicate that of the 1.32 million people living with CHB, 58% (about 765,000 individuals) migrated from Asia (Chen, & Dang 2015). Per 100,000 Asian Americans experience the highest incidence for cancer of the liver and intrahepatic bile (male: 21.2 vs. 8.9 for Whites; females: 8.0 vs. 3.0 for Whites) (Chen, & Dang 2015). Most dramatically, the HBV seroprevalence rate among foreign born Asian/Pacific Islander women of childbearing ages was. 8.9% compared to 0.08% for nonHispanic White mothers (Chen, & Dang 2015).

Potential Positive Social Change

The findings of this study may help improve vaccination campaigns and awareness, especially among the Asian American adults (≥ 18 years) population through the development of community health informative programs that are specifically tailored to the Asian American civilian noninstitutionalized population. Commercial marketing techniques and principles can be used to bring about positive social change in health behaviors by developing meaningful culturally appropriated messages for healthcare providers to increase their recommendation for HBV vaccination among Asian Americans. The study's findings could give direction to policymakers on individuals who are less likely to enroll in HBV vaccination for onward health education and awareness creation for potential future attitudinal change.

Also, the findings from this study may help contribute to the World Health Organization (WHO) Strategy on the Elimination of Viral Hepatitis as a public health threat by 2030 through having an increase in HBV vaccination among the Asian American population, and also using a multipronged approach that includes diverse

partnership and community based strategies. The result of this study may contribute to positive social change by using it to develop culturally tailored educational programs that increase HBV awareness to vaccination and social marketing strategies to improving various health related behavior risk factors toward HBV vaccination among Asian Americans. Finding of this study may assist policy strategists in the implantation of interventions that will facilitate the incorporation and scaled up of HBV education, screening, and vaccination campaigns.

Preview Major Sections

Section 1 of the chapter was devoted to the topic of the study, study justification and potential positive social change. The second section of the chapter focuses on the problem statement and justification of the problem selection. The justification of the research problem will be done based on whether the research problem is relevant, current and significant. Section 3 focuses on the purpose of the study. Section 4 is devoted to research questions and hypotheses. The last section considers the theoretical framework of the study.

Problem Statement

Research Problem

Globally about 2 billion people have been infected with the HBV (Li et al., 2017). Hepatitis B virus (HBV) causes approximately 240 million chronic infection and approximately 780,000 deaths from cirrhosis and liver cancer annually (CDC, 2017). Nationally, between 800,00 and 2 million persons are infected with HBV in the United States with Asians accounting for more than 50% of those infected (Li et al., 2017). HBV

and associated liver cancer in AAPIs represent one of the most serious health disparities in the United States (Li et al., 2017). The death rate from HBV among Asian Americans/Pacific Islanders (AAPIs) is 7 times greater than the rate among whites (Li et al., 2017). The mortality rates are, male: 14.5 versus 7.3 for Whites; females: 6.0 versus 3.0 for Whites (Chen & Dang, 2015).

HBV vaccination coverage ≥ 3 doses among adults is associated with sociodemographic factors (such as age, marital status, gender, region, work experiences), health status factors (such as chronic disease, nonchronic disease) and health behavior factors (such as smoking, alcohol intake, tobacco use, physical activity) (CDC, 2016). Unfortunately, similar findings are not available for Asian adults living in the United States (Zacharias et al., 2015). Past research on Asian adults focused on factors such as limited time to seek vaccinations, poor knowledge on where to get screened, not having a primary care provider, not speaking the same language as their physician (Menninga, 2015), the cost of the vaccine, concern about missing work for evaluation, and lack of provider recommendation (Zacharias et al., 2015).

Justification of the Research Problem Selection

Research Problem is Current

Despite the provision of life saving services for HBV, more global interventions are needed to attain the elimination targets by 2030 (WHO, 2019). Hence, HBV vaccination remains one of the current public health challenges. Currently, the public health community has witnessed a slight increase in HBV vaccination (WHO, 2019). For instance, in 2016, for adults aged ≥ 18 years, the CDC reported HBV vaccination

coverage ≥ 3 doses was 24.8%. 32.9% for adults 19-49 years, and 15.9% for adults ≥ 50 years which is similar to the estimates for 2015 (CDC, 2016). The CDC reported HBV vaccination coverage ≥ 3 doses among adult Asian Americans/Pacific Islanders (AAPIs) was lower than among White Americans (CDC, 2016) despite AAPIs being disproportionately affected by HBV related illnesses (Frew et al., 2014). Among adults, coverage for HBV vaccination for Blacks (27.0% and Hispanics (25.8%) was lower than that for Whites (36.2%) (CDC, 2016).

Research Problem is Relevant

Despite the proven significant economic, health, and social effect of HBV (Frew et al., 2014), HBV can lead to liver cirrhosis, chronic liver disease, and liver cancer (Frew et al., 2014), yet immunization rates remain low (Zacharias et al., 2015). WHO reported that vaccination against HBV is 95% effective in preventing infection and the development of chronic disease and liver cancer due to HBV (WHO, 2018). This calls for the need to increase awareness and public health education on the need for people to undergo HBV vaccination (WHO, 2018, 2019). This will help to reduce the various diseases and death associated with HBV (Aroke et al., 2018). This study will also address gaps in knowledge regarding predictors of HBV vaccination which will help to contribute to empirical knowledge. Thus, examining factors associated with HBV vaccination is relevant to public health as a discipline.

Research Problem is Significant

HBV virus is a significant public health problem (Aroke et al, 2018). For instance, in 2015, about 887, 000 people worldwide died from complications including cirrhosis

and hepatocellular carcinoma (WHO, 2018). Thus, there is a need for intervention through policy and research to address it. One of the interventions is the evaluation of factors associated with HBV vaccination and this is what this study seeks to do. The significance of the research problem being investigated lies in the fact that it will have implications for the formulation of health policy that will guide policy actors in their quest to increase awareness on HBV vaccination among the Asian adult population.

Purpose of Study

The purpose of this study was to examine the association between sociodemographic factors (age, marital status, gender, work experiences), health status factors (chronic disease, nonchronic disease), health behavior factors (smoking, alcohol intake, tobacco use, physical activity), and HBV vaccination among Asian adults (≥ 18 years) in the United States.

Research Questions and Hypotheses

In this study, the research questions are:

Research Question 1: What is the relationship between sociodemographic factors (age, marital status, gender, region, work experiences) and HBV vaccination among the Asian adults (≥ 18 years) in the United States?

$H_0$1: There is no association between sociodemographic factors (age, marital status, gender, region, work experiences) and HBV vaccination among the Asian adults (≥ 18 years) in the United States.

H_a1: There is a statistically significant association between sociodemographic factors (age, marital status, gender, region, work experiences) and HBV vaccination among Asian adults (≥ 18 years) in the United States.

Research Question 2: What is the relationship between health status factors (chronic disease, nonchronic disease) and HBV vaccination among Asian adults (≥ 18 years) in the United States?

H_02: There is no association between health status factors (chronic disease, nonchronic disease) and HBV vaccination among the Asian adults (≥ 18 years) in the United States.

H_a2: There is a statistically significant association between health status factors (chronic disease, nonchronic disease) and HBV vaccination among Asian adults (≥ 18 years) in the United States.

Research Question 3: What is the relationship between health behavior /lifestyle practices (smoking, alcohol intake, tobacco use, physical activity) and HBV vaccination among the Asian adults (≥ 18 years) in the United States?

H_03: There is no association between health behavior /lifestyle practices (smoking, alcohol intake, tobacco use, physical activity) and HBV vaccination among the Asian Adults (≥ 19 years) population in the United States.

H_a3: There is a statistically significant association between health behavior /lifestyle practices (smoking, alcohol intake, tobacco use, physical activity) and HBV vaccination among the Asian adults (≥ 18 years) in the United States.

Theoretical Foundation for the Study

Description

The main theory that framed this work was Andersen's behavioral model. This theory was developed in 1968 by Ronald M. Andersen who was a United States medical sociologist and health services expert. The model is mostly used in public health research and has been frequently applied in studies conducted in the United States and the United Kingdom (Chan et al., 2019; Downing, Horvath, & Swartz, 2018). The model proposes three factors including predisposing, enabling and need factors (Andersen, 1995; Andersen & Newman, 1973).

The predisposing factors indicate that the use of health services by an individual is also more or less likely to be influenced by demographic factors, position within the social structure and belief in health services benefits (Andersen & Newman, 1973; Boateng et al., 2017). Individuals with diverse demographic characteristics such as age cohorts have different health care utilization patterns (Andersen, 1995). On the other hand, social structure is explained as to how a person can cope with problems or possess adequate means to solve problems (Andersen & Newman, 1973). The tenet of the predisposing factor is that individuals with certain characteristics have a higher chance of using health care services.

The enabling factors are conditions that permit people to act on a value or satisfy a need regarding health service use (Andersen, 1995; Andersen & Newman, 1973). The need factors hold the principle that there may be the presence of predisposing and

enabling conditions; persons must perceive illness before making use of health care services (Andersen, 1995; Andersen & Newman, 1973).

Justification

Andersen's behavioral model is employed due to its applicability to the study. The various components of the theory such as predisposing, enabling and needs factors to share similar traits to the study. For instance, in their study on HBV screening and linkage to care among West African immigrants' population in New York City, Blanas et al. (2015) adapted the Andersen's behavioral model to investigate the above topic. As this study also seeks to examine factors associated with HBV vaccination among Asian adults (≥ 18 years) in the United States, the Andersen's behavioral model may as well help to determine these factors.

The main variables under the predisposing factors include age, sex, marital status, employment, education, ethnicity; religion, residential mobility, family size and past illness (Andersen & Newman, 1973; Andersen, 1995). Thus, some of the variables that this current study seeks to test could be found in the theory which is framing this study.

The model also indicates that enabling factors such as income, availability of transportation, health insurance enrollment, distance from healthcare facilities and occupation and work experience influence people in terms of their healthcare utilization. In this study, I also seek to find out how work experience influences an individual to undertake HBV vaccination. There were other key variables under the enabling factor such as income, enrollment in health insurance, social support/family support, however, due to the nature of the dataset, it was not possible to consider them.

Andersen's behavioral framework is still in use in health research. For instance, Tesfaye, Chojenta, Smith & Loxton (2018) applied the framework to understand antenatal care use in Kersa District, Eastern Ethiopia. Also, Hirshfield et al. (2018) employed the model to examine risk factors for hypertension among US MSM. Besides, Kaya, Guven, Aydan, and Toka (2019) applied the model to determine the predictors of hospital readmissions in internal medicine patients in Turkey. Again, Chan et al., (2019) used the framework to understand influenza vaccination among pregnant women in the United States. Thus, it is observed that Andersen's behavioral framework has been applied in multiple current health research and as such remains a current research theoretical framework in health research.

In building on the predisposing factors, Andersen added that health behavior factors such as smoking, alcohol intake, tobacco use, and physical inactivity may influence healthcare utilization. One of the research questions of this study is to determine whether there is a relationship between health behavior /lifestyle practices (smoking, alcohol intake, tobacco use, physical activity) and HBV vaccination among the Asian adult (≥ 18 years) in the United States. Andersen further stated that individuals with lifestyle such as smoking, alcohol intake, tobacco use, physical activity may use healthcare services more. This suggests that lifestyle may influence an individual to perform a certain action. Based on this theory, it could be theorized that lifestyle factors may influence an individual to undertake HBV vaccination.

The framework further states that need factors such as chronic disease or nonchronic disease may either facilitate or hinder the use of health services (Andersen,

1995; Andersen & Newman, 1973). In this study, I also attempt to examine health status factors such as chronic and nonchronic diseases that may facilitate or hinder enrollment in the HBV vaccination among Asian adult (≥ 18 years) in the United States. Employing the Andersen's behavioral model to study factors associated with HBV vaccination would extend our knowledge on the model to guide future studies.

Nature of the Study

Justification of Design

The secondary cross-sectional data is analyzed to examine the association between sociodemographic factors (age, marital status, gender, region, work experiences), health status factors (chronic disease, nonchronic disease), health behavior factors (smoking, alcohol intake, tobacco use, physical activity), and HBV vaccination among Asian adult (≥ 18years) in the United States. The cross-sectional data provides us with a snapshot of the Asian adult population at one point in time. It is used to determine the existence and the magnitude of the causal effects of the independent variables (sociodemographic factors, health status factors, and health behavior factors) upon the dependent HBV at a given point in time. The cross-sectional data analyses will help in the evaluation of the effectiveness of intervention which is aimed at improving the health of the target population.

Key Study Variables or Concept/Phenomenon

The dependent variable for the study is HBV vaccination and the independent variables are sociodemographic factors (age, marital status, gender, region, work experiences), health status factors (chronic disease, nonchronic disease), and health

behavior factors (smoking, alcohol intake, tobacco use, physical activity. These variables and numbers were gotten from the secondary dataset that was retrieved from the Inter-University Consortium for Political and Social Research (ICPSR) Website. The table 1 below helps in knowing the various variables and the number of cases as well as the number of missing values to each variable. This will help in a successful data management and also to draw an accurate inference about the data values for the purpose of this research study.

Table 1

Unique Entries of Each Variable

Variable	Number of Cases	Number of Missing Values
Age	34,557	None
Marital status	34,557	None
Sex/Gender	34,557	None
Heart problem (nonchronic disease)	34,524	33
Stroke (nonchronic disease)	34,525	32
Hypertension (nonchronic disease)	34,518	39
Asthma (nonchronic disease)	34,525	32
Ulcer (nonchronic disease)	34,517	40
Cancer (nonchronic disease)	34,524	33
Severe headache (chronic disease)	34,526	31
Stomach problem (chronic disease)	34,537	20
Ever smoked 100 cigarettes	34,466	111
Tobacco products	34,435	122
Smokeless tobacco products	34,437	120
Frequent vigorous activity	33,510	1047
Alcohol intake (ever drink in a year)	34,332	225

Summary of Methodology

Data Collection

The secondary dataset was retrieved from the ICPSR website. The data were collected in 2013 with a document version date of May 29, 2014. This data was collected

using questionnaires during the National Health Interview Survey (NHIS) which is administered by the United States Department of Health and Human Services. With the data being 5 years old, this is the most recent data available. The ICPSCR data contains the dependent variables (HBV) and the independent variables (age, marital status, gender, region, work experience, having chronic diseases, nonchronic diseases, smoking, alcohol intake, tobacco use, physical activity).

Also, secondary information from archives and documents are sourced from literature reviews. Books, book chapters, journal articles, periodicals, monographs, national survey documents are retrieved to assist in the record review in the course of the study.

Data Analysis

IBM's SPSS application was used to analyze the data. The descriptive frequency was the first analysis to be done to quantitatively describe the characteristics of the data sets. The binary logistic regression method is used to determine the relative influence of the independent variables on the dependent variables. It also helped to identify irregularities.

Section 1 – Foundation of the Study and Literature Review Introduction

Literature Search Strategy

This study was conducted to examine the association between sociodemographic factors (age, marital status, gender, work experiences), health status factors (chronic disease, nonchronic disease), health behavior factors (smoking, alcohol intake, tobacco use, physical activity), and hepatitis HBV among Asian adult (≥ 18 years) in the United

States. The literature for this study was mainly obtained from the Walden Library database, the CDC, peer-reviewed articles and the Google search engines. In searching this database, the following keywords were used: HBV, vaccination, Asian adult in the United States. Articles that were relevant for the study criteria were reviewed. These same articles were used to address the knowledge gaps in the study.

Literature Review Related to sociodemographic factors, health status factors, health behavior factors, Vaccination, and Hepatitis B.

The focus of this aspect of the study was to review related literature on factors associated with HBV vaccination among Asian adults residing in the United States. The literature has been reviewed in line with the research questions underpinning the study. Specifically, the study reviewed the literature on sociodemographic, health status and health behavior factors associated with HBV vaccination. Since that this study is quantitative, the literature reviewed on the above areas is quantitative so as not to deviate from the focus of the study.

Sociodemographic Correlates of HBV Vaccination

In a quantitative study on factors associated with HBV vaccine series completion in a randomized trial for injection drugs reached through syringe exchange programs in three U.S. cities, Bowman, Grau, Singer, Scott, and Heimer (2014) revealed that older age was significantly associated with HBV vaccinating. In a current quantitative cross-sectional study on sociodemographic and other risk factors associated with HBV potential infectivity among HBV surface Antigen Negative, Busari, Ojo, and Aken'Ova, (2018) found that age and marital status were associated with HBV vaccination. Whereas

Antigen et al. (2018) advanced sociodemographic factors associated with HBV vaccination by including marital status, his finding on age as correlates of HBV vaccination further agrees with the earlier study by Bowman et al. (2014).

Validating the above findings, a systematic review on factors associated with HBV vaccination among men who have sex with men by Vet, de Wit, and Das (2017) found that younger age was associated with HBV vaccination. Another quantitative study on evaluation of factors associated with response to HBV vaccination in patients with inflammatory bowel disease by Cekic et al. (2015) indicated that age < 45 years was associated with adequate vaccine HBV response. Advancing the argument, 2014 multivariate study on the acceptance of HBV vaccination among healthcare workers in Western Greece by Karaivazoglou et al. (2014) revealed that occupational category was associated with HBV vaccination.

Contrary to the above findings, a multivariate regression analysis on clinical factors associated with HBV screening and vaccination in high risk adults by Ayoola, Larion, Poppers, and Williams (2019) revealed no association between age and HBV vaccination. This observation represents conflict in knowledge regarding age as a variable associated with HBV vaccination. Therefore, in this study, an attempt would be made to determine whether age is associated with HBV vaccination among Asian adults residing in the United States to contribute to the literature on sociodemographic factors associated with HBV vaccination.

Health Status Correlates of HBV Vaccination

In a quantitative cross-sectional study on sociodemographic and other risk factors associated with HBV potential infectivity among HBV surface Antigen Negative, Busari, Ojo, and Aken'Ova, (2018) observed that dental, surgical procedure, traditional practices such as tattoo, body piercing, and scarification and previous blood transfusion were associated with the presence of HBV infection. Further, in a binary logistic regression analysis on prevalence and influencing factors of HBV among a rural residential population in Zhejiang Province, Yang et al. (2017) found out that history of HBV examinations and vaccination were factors associated with HBV infection. However, Busari et al. (2018) and Yang et al.'s studies ignored the vaccination aspects particularly health-related factors associated with HBV vaccination. In another related quantitative study, Bowman et al. (2014) reported that poorer self-related health score was correlates of HBV vaccination.

In my view, the poorer self-related score is too broad and as such, there is the need to focus on specific health-related variables such as having chronic and nonchronic diseases. A quantitative study on factors influencing the immune response to HBV vaccine, booster dose guidelines, and vaccine protocol recommendations, revealed that obesity and having a medical condition compromises the immune system to HBV vaccine (Hollinger, 1989). In a further development, a quantitative study on multilevel factors influencing HBV screening and vaccination among Vietnamese Americans in Atlanta, Georgia revealed that respondents who perceived chronic HBV infection as serious were more likely to intend to seek vaccination in the future (Frew et al., 2014).

Health behavior/lifestyle Correlates of HBV Vaccination

According to Hollinger et al. (1989), smoking cigarettes was associated with factors that compromise the immune system to the HBV vaccine response. Further, a systematic review on factors associated with HBV vaccination among men who have sex with men by Vet, de Wit, & Das (2017) found that non-alcohol intake was not associated with HBV vaccination. Unfortunately, not much research has been done on health behavior/lifestyle factors associated with HBV vaccination. Based on this, my study could serve as one of the studies that could bring light to health behavior factors associated with HBV vaccination among Asian adults in the United States.

Assumptions

In ensuring the validity of the study, the following assumptions were taken into consideration:

The selected sample that was considered shows a true representation of the population of the Asian adults aged ≥ 18 years in the United States. The cross-sectional secondary data that were obtained from the Inter-University Consortium for Political and Social Research (ICPSR) Website represented the Asian adults (≥ 18 years) living in the United States.

Missing data values in the data set were treated using IBM's SPSS (Statistical Package for Social Sciences) deletion function (IBM, 2016). Missing data has a high impact on quantitative research which can lead to biased estimates of parameters, loss of information, decreased statistical power, increased standard errors, and weakened generalizability of finding (Dong & Peng, 2013).

In determining the factors associated with HBV vaccination among Asian adult (≥ 18 years) in the United States, the selected variables of interest which are sociodemographic factors (age, marital status, gender, work experiences), health status factors (chronic disease, nonchronic disease), health behavior factors (smoking, alcohol intake, tobacco use, physical activity) were very important.

In the selection of a theory for the framework, the Andersen's behavioral model was the best choice in examining the association between sociodemographic factors (age, marital status, gender, work experiences), health status factors (chronic disease, nonchronic disease), health behavior factors (smoking, alcohol intake, tobacco use, physical activity), and HBV vaccination among Asian adult (≥ 18 years) in the United States. Most HBV related studies have applied Andersen's behavioral model (Blanas et al., 2015). The main purpose of Andersen's behavioral model as a framework is to discover conditions that either facilitate or impede the utilization of health services. The goal of the framework is to develop a behavioral model that provides measures of access to medical care. Andersen's behavioral model considers individual access to and use of health services to be a function of three characteristics which are the predisposing factors (social structure, health beliefs, demographic), enabling factor (personal/Family, community, possible additions), and need factors (perceived, evaluated).

Scope and Delimitations

Boundaries of The Study

Populations Included in the Study

Since findings on sociodemographic factors (such as age, marital status, gender, region, work experiences), health status factors (such as chronic disease, nonchronic disease) and health behavior factors (such as smoking, alcohol intake, tobacco use, physical activity) correlate are HBV vaccination among Asian adults in the United States, this study examines into the above research needs. Thus, the study population included Asian adults (≥ 18 years) living in the United States. Per the 2013 NHIS obtained from the ICPSR website, Asian is defined as a person from a one of the following countries: Asia, Asia Minor, China, Japan, Mongolia, North Korea, South Korea, Borneo, Brunei, Burma or Myanmar, Cambodia, Christmas Island, Hong Kong, Indonesia, Laos, Malaysia, Philippines, Singapore, Taiwan, Thailand, and Vietnam.

Populations Excluded from the Study

In this study, Asian adults who were not residing in the United States were excluded. This is because the cross-sectional secondary data that were obtained from the ICPSR Website was limited to only Asian adults living/residing in the United States as at the time of survey making it impossible to incorporate the views of Asian adults who are living in other countries. Given that, besides, respondents who were sick at the time of the survey were excluded from the study. Also, minors such as those below the ages of 18 years were excluded from the study. One potential limitation of the 2013 NHIS datasets was that citizenship/ immigration status was not captured during the data collection. This

issue could make it difficult to draw a specific implication that could be useful to a particular immigration status such as being either American citizens, green card holders or even people on a visa in terms of factors influencing HBV vaccination. Despite this shortfall, this study is still useful as it would provide baseline data/information for social change on factors associated with HBV vaccination among the Asian adults in the United States.

Theories and/or Conceptual Frameworks Not Investigated

The issues considered in this study are the association between sociodemographic, health status, health behavior, and HBV vaccination among Asian Adults in the United States. In line with this, there are a lot of frameworks and theories available on medical care. For instance, Aday & Andersen's (1974) framework for the access to medical care comprising predisposing (changeable/unchangeable), enabling (changeable and unchangeable) and need factors (perceived/evaluated) is well known in medical research. Even though the above framework appears to be related to this study, the study did not adopt it. This is because, the Aday & Andersen (1974) framework's although it captures how individual factors such as religion, age, sex and religion, health related factors influence an individual to seek medical care services, it excludes how health behavior factors influence individuals' ability to seek medical care. Since one of the specific objectives of this study was to look at how health behavior factors explain, Aday and Andersen's framework was not used in this study.

Generalizability or Transferability

The cross-sectional data were extracted from the survey conducted by the ICPSR website with a large representative sample size of 34,557 adults which could permit generalization. Also, the 2013 NHIS obtained from the ICPSR Website employed a probability sampling technique to recruit the study participants making alter for generalizations. Due to the quantitative nature of this study, findings from this study that seeks to examine the association between sociodemographic, health status, health behavior, and HBVvaccination among Asian Adults can be generalized. Evidence shows that findings or results from quantitative studies are generalizable (Tsang, 2014; Halcomb, 2019; Anguera, Blanco-Villaseñor, Losada, Sánchez-Algarra, & Onwuegbuzie, 2018; Creswell & Creswell, 2017). According to Dahlhamer, Galinsky, Joestl and Ward (2014), the 2013 NHIS dataset is sufficiently robust to support a wide array of analyses.

Section 2: Research Design and Data Collection

Introduction

The purpose of this study was to examine the association between sociodemographic factors (age, marital status, gender, work experiences), health status factors (chronic disease, nonchronic disease), health behavior factors (smoking, alcohol intake, tobacco use, physical activity), and HBV vaccination among Asian adults (≥ 18 years) in the United States. A detailed description of the nature of the study, research design and rationale, methodology, threats to validity, and ethical procedures are provided in detail in this section.

Looking at the nature of the study, binary logistic regressions would be employed to estimate factors associated with HBV vaccination among Asian adults (≥ 18 years) in the United States. The research design is a quantitative cross-section study with the cross-sectional data that was extracted from the survey conducted by the ICPSR Website with a large representative sample size of 34,557 adults which could permit generalization.

Research Design and Rationale

This study employed a quantitative research design with cross-sectional secondary data that was obtained from the ICPSR Website. The secondary cross-sectional data was analyzed to examine the association between sociodemographic factors (age, marital status, gender, region, work experiences), health status factors (chronic disease, nonchronic disease), health behavior factors (smoking, alcohol intake, tobacco use,

physical activity), and HBV vaccination among Asian adults (≥ 18 years) in the United States.

The rationale for using the cross-sectional approach was because it was more descriptive and ideal to be used to describe some features of the population by assessing the prevalence of an acute or chronic condition such as HBV. Cross-sectional data was used because the data being analyzed was collected at a defined time. The cross-sectional approach was used to look at a specific group (Asian adult population in the United States) to see if an activity or factors (sociodemographic factors, health status factors, and health behavior factors) is related to health effect (HBV) being investigated. If the factor or factors (sociodemographic factors, health status factors, and health behavior factors) is correlated with HBV vaccination, this will support the hypothesis that sociodemographic factors, health status factors, and health behavior factors may be associated with HBV vaccination among Asian adults in the United States.

Methodology Study Population.

In this study, the target population for the study was made of residents of the United States specifically both male and female Asian adults. Asian adults who were not residing in the United States were excluded. This is because the cross-sectional secondary data that were obtained from the ICPSR website was limited to only Asian Adults living/residing in the United States as at the time of survey making it impossible to incorporate the views of Asian adults who are living in other countries. Given that, besides, respondents who were sick at the time of the survey were excluded from the

study. Also, minors such as those below the ages of 18 years were excluded from the study as well as nonHispanic, Hispanic, Blacks, and Whites.

Sampling and Sample Procedures

This study will use cross-sectional data from a survey conducted by the ICPSR website with a large representative sample size of 34,557 adults which could permit generalization. Therefore, the sample size for this study is 34,557 adults. The 2013 NHIS obtained from the ICPSR website employed a probability sampling technique to recruit the study participants for generalizations. The NHIS used a stratifies multistage probability design sampling method for the data collection. Oversampling of the Black and Hispanic populations has been retained in 2006 to allow for a more precise estimation of the health characteristic in these growing minority populations. The new sample also oversampled the Asian population. The 34,557 were representatives made up of civilian and noninstitutionalized population from the 50 states and the District of Columbia. Questionnaires were provided in both English and Spanish to the eligible respondent. The Interview survey was to obtain information about the amount and distribution of illness, its effect in terms of disability and chronic impairments, and the kinds of health services people received. The 2006 NIHS contains the Household, Family, Person, Sample Adult, and Sample Child files from the basic module.

Sample Frame

The sample frame included household, marital status, sex/gender, race, age, Hispanic origin, healthcare access and utilization, health status, occupation, health conditions. The sampling status was tested for HBV.

Data Accessibility and Permission

In gaining access to data, I obtained access to ICPSR website by creating an account and also signing a user agreement and confidentiality. I was then able to access their data site for available data about to my research.

Instrumentation and Operational of Constructs

A secondary dataset was retrieved from the ICPSR website. The data were collected in 2013 with a document version date of May 29, 2014. This data was collected using questionnaires during the NIHS which is administered by the United States Department of Health and Human Services. With the data being 5 years old, this is the most recent data available. The ICPSCR data contains the dependent variables (hepatitis B vaccination) and the independent variables (age, marital status, gender, region, work experience, having chronic diseases, nonchronic diseases, smoking, alcohol intake, tobacco use, physical activity).

The dependent variable for the study is HBV vaccination and the independent variables are sociodemographic factors (age, marital status, gender, region, work experiences), health status factors (chronic disease, nonchronic disease), and health behavior factors (smoking, alcohol intake, tobacco use, physical activity. In this study, sociodemographic variables are defined as social, economic and demographic characteristics of an individual including gender, age, work experience, region, age and marital as operationalized in Table 1.

Table 2

Operationalization and Coding of Sociodemographic Variables

Variable	Operational Definition	Category	Code
Gender [Dichotomous]	Being a male or female	Male	1
		Female	2
Age [Ranked]	Number of years a respondent obtained at the last birthday	Under 1 year	1
		85+ years	2
Work experience [Nominal]	Whether or not the respondent has ever worked before	Yes	1
		No	2
		Refused	7
		Don't know	9
Region [Nominal]	Region affiliation of the respondent	Northeast	1
		Midwest	2
		South	3
		West	4
Marital status [Nominal]	Whether or not a respondent is married or not	Under 14 years	0
		Married- spouse in household	1
		Married- spouse not in the household	2
		Married- spouse in household unknown	3
		Widowed	4
		Divorced	5
		Separated	6
		Never married	7
		Living with a partner	8
		Unknown marital status	9

Gochman (1997) defined health behavior as any lifestyle or behavioral patterns, actions and habits that are linked with health maintenance, health restoration, and health improvement. Similarly, health behavior is any activity performed by a person to maintain or enhance health, preventing health promotions, or achieving a positive body image (Cockerham, 2014). In the view of the World Health Organization (2004), health behavior is termed as any action undertaken by individuals irrespective of actual or perceived health status, for the purpose of promote, protect or maintaining health,

whether or not such behavior is objectively effective towards that end. Thus, multiple sets of health behavior including smoking, alcohol use, diet, physical activity, sexual behaviors, physician visits, medication adherence, screening and vaccination (Conner & Norman, 2017). Based on these definitions and examples, the operational definition of health behavior is any activity that can promote (positive health behavior such as a physical activity) or worsen (negative health behavior such as alcohol intake, smoking) the health of any individual.

Table 3

Operationalization and Coding of Sociodemographic Variables

Variable	Operational definition	Category	Code
Physical activity [Nominal]	Whether or not a respondent has undertaken any physical activity for the past month	Yes No Refused Don't know	1 2 7 8, 9
Alcohol intake [Nominal]	Whether or not a respondent has consumed alcohol before	Yes No Refused Don't know	1 2 7 8, 9
Smokeless tobacco [Nominal]	Whether or not a respondent has used smokeless tobacco before	Yes No Refused Don't know	1 2 7 8, 9
Tobacco products [Nominal]	Whether or not a respondent has used tobacco products before	Yes No Refused Don't know	1 2 7 8, 9

Health status is a person's relative level of wellness and illness, taking into account the presence of biological or physiological dysfunction, symptoms, and functional impairment (American Thoracic Society, 2007). In like manner, health

related/status is defined as a state of health of an individual, group or population measured through people's subjective assessments of their health by one or more indicators of deaths and diseases in the population, such as longevity; or by using the incidence or prevalence of major diseases (hypertension, severe headache, asthma, cancer, ulcer, stomach problem, and heart problem, etc.) (WHO, 2004). In this study, health related factors refer to the presence or absence of either chronic or nonchronic diseases.

Table 4

Operationalization and Coding of Health Status Variables

Variable	Operational definition	Category	Code
Chronic diseases [nominal]	Whether or not a respondent was having a chronic disease	Yes No Refused Don't know	1 2 7 8 9
Nonchronic diseases [nominal]	Whether or not a respondent has been diagnosed with any non-chronic diseases	Yes No Refused Don't know	1 2 7 8 9

Data Analysis

SPSS application was used to analyze the data. The descriptive frequency was the first analysis to be done to quantitatively describe the characteristics of the data sets. The multivariate logistic regression method was used to determine the relative influence of the independent variables (age, marital status, gender, work experiences, chronic disease, nonchronic disease, smoking, alcohol intake, tobacco use, physical activity) on the dependent variable (HBV). It will also help to identify irregularities.

Statistical Power Calculation

The sample size for this study is 34,557 adults. I used cross-sectional secondary data from a survey conducted by ICPSR website. The sample size of 34,557 adults is large enough to permit any meaningful generalization. However, a power analysis was made. The results from the analysis shows that a sample size of 131 is needed for my study. A power calculation was run on the sample size using OpenEpi (https://www.openepi.com/Menu/OE_Menu.htm) which is a free, web-based, open-source, Operating system-independent series of programs for use in epidemiology, biostatistics, public health, and medicine, providing several epidemiologic and statistical tool for summary data (Dean et al., 2014). To this end, the OpenEpi version 3.01 by Dean, Sullivan, and Dean (2014) was employed in this study to calculate for the size power of the sampling frame in this study.

The OpenEpi has the ability for estimating sampling size for numerous studies including cross-sectional studies, cohort, randomized control trials, case-control and comparisons of two means (Sullivan et al., 2009). To estimate the sample size for this study, I chose the sample size option and from the drop-down options, I selected the Cohort/RCT option to input my figures. From the literature, I selected the Odd ratio (*OR*) contributed by one of my independent variables on the dependent variable to determine the sample size for my research. Studies report that older age was significantly associated with HBV vaccinating (Bowman et al.2014). Antigen et al., (2018) found out that age was associated with HBV vaccination. Marital status is also linked with HBV vaccination. According to Hollinger et al. (1989), smoking cigarettes was associated with

factors that compromise the immune system to the HBV vaccine response. The literature further indicates that females are 3.84 times more likely to vaccinate for HBV with a 95% *OR* (odd ratio) and CI 1.66, 8.92 (Abebaw, Aderaw, & Gebremichael, 2017). Based on the literature, I selected an *OR* of 3.84 to estimate the sample size to generate adequate power for this study. Besides, I used the 95% CI and an 80% power to determine the sample size, since the research hypothesis supporting the study is a two-sided significance level test.

Table 5

Sample Size Calculation Using OpenEpi for Cohort Studies.

Sample Size for cross-sectional study			
Two-sided significance level (1-alpha)			95
Power (1-beta, % chance of detecting):			80
Ratio of sample size, Unexposed/Exposed:			2
Percent of Unexpected with Outcome:			60
Percent of Exposed with Outcome:			85
Odds Ratio:			3.8
Risk/Prevalence Ratio:			1.4
Risk/Prevalence difference:			25
	Kelsey	Fleiss	Fleiss with CC
Sample Size - Exposed:	41	38	44
Sample Size - Nonexposed:	82	75	87
Total sample size:	123	113	131

The summary of the results of the sample size estimation using the OpenEpi Model is found in Table 5. Based on the review of the literature, the *OR* that would generate the maximum sample size for my study was selected. I chose the two-sided confidence level of 95% with the required power of 80% and a ratio of sample size, unexposed/exposed to be 2 as well as the percent of unexposed with outcome to be 60%.

Based on the literature reviewed, I chose the *OR* of 3.84 which provided the maximum size for this study. The results that a sample size of 131 is needed for my study.

Research Question(s) and Hypotheses

In this study, the research questions are:

Research Question 1: What is the relationship between sociodemographic factors (age, marital status, gender, region, work experiences) and HBV vaccination among the Asian adults (≥ 18 years) in the United States?

$H_0$1: There is no association between sociodemographic factors (age, marital status, gender, region, work experiences) and HBV vaccination among the Asian adults (≥ 18 years) in the United States.

H_a1: There is a statistically significant association between sociodemographic factors (age, marital status, gender, region, work experiences) and HBV vaccination among Asian adults (≥ 18 years) in the United States.

Research Question 2: What is the relationship between health status factors (chronic disease, nonchronic disease) and HBV vaccination among Asian adults (≥ 18 years) in the United States?

$H_0$2: There is no association between health status factors (chronic disease, nonchronic disease) and HBV vaccination among the Asian adults (≥ 18 years) in the United States.

H_a2: There is a statistically significant association between health status factors (chronic disease, nonchronic disease) and HBV vaccination among Asian adults (≥ 18 years) in the United States.

Research Question 3: What is the relationship between health behavior /lifestyle practices (smoking, alcohol intake, tobacco use, physical activity) and HBV vaccination among the Asian adults (≥ 18 years) in the United States?

$H_0$3: There is no association between health behavior /lifestyle practices (smoking, alcohol intake, tobacco use, physical activity) and HBV vaccination among the Asian adults (≥ 18 years) in the United States.

H_a3: There is a statistically significant association between health behavior /lifestyle practices (smoking, alcohol intake, tobacco use, physical activity) and HBV vaccination among the Asian adults (≥ 18 years) in the United States.

Statistical Tests

The IBM SPSS software version 21 was used to analyze the data. SPSS software is mostly used to analyze data in public health researches. Before data analysis was done, data was screened and verified to ensure quality control. Binary logistic regression was used to analyze the various hypotheses underpinning the study. The first hypothesis that no association between sociodemographic factors (age, marital status, gender, region, work experiences) and HBV vaccination among the Asian adults (≥ 18 years) in the United States, was tested and analyzed using binary logistic regression. The second hypothesis which states no statistically significant association between sociodemographic factors (age, marital status, gender, region, work experiences) and HBV vaccination among Asian adults (≥ 18 years) in the United States was also tested and subsequently analyzed by employing multivariate logistic regression. The last hypothesis which indicates no association between health behavior /lifestyle practices (smoking, alcohol

intake, tobacco use, physical activity) and HBV vaccination among the Asian adults (≥ 18 years) in the United States was also tested and further analyzed using multivariate logistic regression.

A binary logistic regression was performed, all the sociodemographic factors were put in a single model and compared with the dependent variable to determine which of them predicts HBV vaccination. The inclusion of all the sociodemographic variables in one model against the dependent variable enabled me to identify which of the sociodemographic variables play a major role in predicting HBVvaccination among the participants. The same process was executed for the other two hypotheses that were the health related and behavior/lifestyle variables. Odds ratios (ORs) with 95% CI would be reported at a significant level or probability value of 0.05 or less.

This approach of reporting and interpreting data was consistent with previous studies that employed logistic regression with odds ratios and 95% confidence intervals to report factors associated with clinical factors associated with HBV screening and vaccination in high risk adults (Ayoola, Larion, Poppers & Williams, 2019). Persistence to this, in a related study on prevalence and influencing factors of HBV among a rural residential population in Zhejiang Province, China; Yang et al (2017) used Odds ratios (ORs) with 95% CI at probability value of 0.05 or less as a significant factor associated with HBV vaccination.

Threats to Validity

Most social science researches face a threat to validity. Both internal and external validity are very important in analyzing the appropriateness, and meaningfulness of the

research study. Internal validity focuses on showing a difference that is due to the independent variables alone, whereas external validity results can be translated to the world at large (Yu & Ohlund 2010). A threat to validity could come from the data collection instrument and the analytical framework used to analyze data. If the results of the study are not deemed to be valid then they are meaningless to the study and also if the results do not measure what we want it to measure the results cannot be used to answer the research question, which is the main aim of the study.

Different factors affect internal validity and it is always important that these factors are controlled to help reduce its impact on validity. Participants' prior experience with research participation might have some form of influence on their response to the survey questions. Also, variables that were not accounted for but may have a hidden effect on the study results may have an impact on validity. These factors are called the confounding factors (Yu & Ohlund 2010). Also, the impact of time affects internal validity since participants change in some way such as growth or getting tired.

For external validity, the main criterion will be the process of generalization (Yu & Ohlund 2010). External validity is how well the outcome of the study can be expected to apply to other settings. Situational factors such as the time, location, researcher characteristics and how many measures were used can affect the generalization of the findings. Also, selection bias is usually the problem of differences between groups in a study that may relate to the independent variables is another factor that can impact external validity (Yu & Ohlund 2010).

I made sure that I used the right analytical framework to analyze the data to come out with a reliable result. In most predictors' studies, logistics regressions are normally used as an analytical tool. Therefore, I used binary logistic regression to analyze my data to ensure quality control and validity of the results.

Ethical Procedures

In preparing the data file, the National Center for Health Statistics (NCHS) removed direct identifiers and characteristics that might lead to the identification of data subjects. As an additional precaution, NCHS, under Section 308(d) of the Public Health Services Act (42 U.S.C 242m), the data collection made by the NCHS is not be used for any purpose other than statistical analysis and reporting. ICPSR member institutions and other users ordering data from ICPSR are expected to adhere to these restrictions.

Ethical issues are key in social science research. As a result, ethical issues were taken into consideration in the execution of this study. To this end, all ethical considerations concerning the Declaration of Helsinki were considered. Also, since this study used secondary data, permission was gained from the institutional research review committee before accessing data for the study.

Summary

This study adopted secondary cross-sectional data to examine the association between sociodemographic factors, health status factors, health behavior factors, and HBV vaccination among the Asian adult (≥ 18 years) in the United States. The dependent variable for the study is HBV vaccination and the independent variables are sociodemographic factors (age, marital status, gender, region, work experiences), health

status factors (chronic disease, nonchronic disease), and health behavior factors (smoking, alcohol intake, tobacco use, physical activity. The sample size for this study is 34,557 adults recruited through a probability sampling technique. Data for this study will be analyzed using logistic regressions embedded in SPSS application software version 21. The use of logistic regressions will help me to appropriately answer my research questions.

Section 3: Presentation of the Results and Findings

Introduction

The purpose of this quantitative cross-sectional study was to examine the association between sociodemographic factors (age, marital status, gender, work experiences), health status factors (chronic disease, nonchronic disease), health behavior factors (smoking, alcohol intake, tobacco use, physical activity), and HBV vaccination among Asian adults (≥ 18 years) in the United States. The secondary cross-sectional data was obtained from the ICPSR website. The 2013 NHIS obtained from the ICPSR website is the most current data collected on Asian population in the United States of America and HBV vaccination. The NHIS employed a probability sampling technique to recruit the study participants for generalizations. The NHIS used a stratifies multistage probability design sampling method for the data collection. The results from the statistical power calculation using OpenEpi confirmed that a sample size of 131 is needed for my study.

The section 1 of this study provided the foundation of the study and current literature on the various key variables including the literature search strategy. In section 2, I talked about the research design, data collection, methodology, data analysis with a statistical power calculation, threat to validity and ethical procedures. Section 3 includes the data analysis and also the discussion of the data collection and preparation process. Section 4 contains the interpretation of the results, how it is applicable and how it can contribute to social change.

This section of the study is devoted to the presentation of the results and findings of the study. To make the presentation of the results and findings easy, the section is divided into two parts. The first part considers data collection of secondary data set, time frame for data collection and discrepancies of the secondary data set, baseline descriptive and demographic characteristics of the sample.

Data Collection of Secondary Data Set

I retrieved a secondary dataset from ICPSR website. The secondary dataset which was a NHIS was collected by employing questionnaires. The data were collected by the United States Department of Health and Human Services. The ICPSCR data contains the dependent variables (HBV vaccination) and the independent variables (age, marital status, gender, region, work experience, having chronic diseases, nonchronic diseases, smoking, alcohol intake, tobacco use, physical activity). The dependent variable for the study is HBV vaccination and the independent variables are sociodemographic factors (age, marital status, gender, region, work experiences), health status factors (chronic disease, nonchronic disease), and health behavior factors (smoking, alcohol intake, tobacco use, physical activity. In this study, sociodemographic variables are defined as social, economic and demographic characteristics of an individual including gender, age, work experience, region, age and marital status.

Statistical Analysis Assumptions.

First, I generated a series of descriptive statistics that suitably characterizes the sample, including a frequency table reporting sample size and percentages of responses for each variable included in the study. A binary logistic regression was used to

determine and test if the independent variables (age, marital status, gender, region, work experience, having chronic diseases, nonchronic diseases, smoking, alcohol intake, tobacco use, physical activity) had any predictive influence on the dependent variable (Hepatitis B vaccination). I analyzed RQ1, RQ2, and RQ3 utilizing a binary logistic regression to determine whether the independent variables had any predictive influence on the dependent variable. The data analysis plan that was described in section two was the basis for conducting each analysis. The IBM SPSS software version 25 was used to perform the analyses for this study.

A logistic regression does not require a linear relationship between the dependent and independent variables, the error terms (residuals) do not need to be normally distributed, homoscedasticity is not required, and the dependent variable in logistic regression is not measured on an interval or ratio scale. However, some other assumptions still apply. The assumptions of the logistic regression analysis are that, (a) the binary logistic regression requires the dependent variables to be binary and the ordinal logistic regression requires the dependent variable to be ordinal, (b)the logistic regression requires that the observations be independent of each other i.e. they should not come from repeated measurements of match data (c) the logistic regression requires there to be little or no multicollinearity among the independent variables; i.e., independent variables should not be too highly correlated with each other, (d) logistic regression assumes linearity of independent variables and log odds which requires that the independent variables are linearly related to the log odds, and (e) the data for logistic

regression typically must contain a large sample. All the rules were met for this analysis based on the assumptions of the logistic regression analysis.

Timeframe for Data Collection.

The data were collected in 2013 with a document version date of May 29, 2014. Even though the dataset is 5 years old, it remains the most recent data available as far as this study is concerned. Table 1 below shows the variables and the number of cases as well as the number of missing values to each variable.

Baseline Descriptive and Demographic Characteristics of the Sample

The demographic, health related, lifestyle and prevalence of HBV vaccination are presented in Table 6. Concerning the demographic characteristics of the participants, the results indicated that 55.6% of the respondents were females whereas 44.4% were males. This result means that the majority of the respondents were females. With regards to region, 16.2% were in the Northeast, 20.4% in the Midwest, 25.9% in the west and 37.5% majority of participants in the south. On the age of the respondents, the results showed that 20.2% of the respondents were between the aged of 18-30 years, 17% were between 31-40 years , 16.4% were between 41-50 years, 17.7% were between 51-60 years , 14.8% were between 61-70 years, 8.9% were between 71-80years, and 5.2% were 80 years. This suggests that those between 18-30 years were more than the other age groups considered in this study. In relation to the marital status of the respondents, it was found that 43.0% of the respondents were married with 57.0% of the respondents not married. The analysis has shown that the participants who are not married outnumbered their counterparts who are married in relation to marital status. With regard to the work experience, 64.3% of the

participants had work experience and 35.5% did not have work. The result indicates the majority of the respondents have a work experience and for that matter are capable of affording the cost of HBV vaccination.

On the health-related variables, 49.9% of the respondents indicated that they had no chronic disease with 49.8% having chronic disease. Given this finding, I conclude that there is an almost equal prevalence of chronic and non-chronic diseases among the participants.

On the lifestyle characteristics of the participants, 81.9% of the respondents indicated that they do not smoke, and 18.0% participants smoking. Also, 76.0% indicated that they had not used tobacco products, and 23.9% states they had used tobacco products. It was noted that 66.2% did physical activity and 41.2% of the participants had not undertaken physical activity respectively. About 62.2% of the respondents responded that they had taken alcohol and 37.6% had not taken alcohol. Results further showed that 29.2% of the participants had been vaccinated for hepatitis B and the remaining 70.8% had not.

Table 6

Demographic, Health-Related, Lifestyle Factors and Prevalence of Hepatitis B Vaccination Among Asian Adult Population in the United States (n=31,832)

Variable	Category	*N*	%	Valid %	Cumulative %
Hepatitis B Vaccine	No Hepatitis B vaccine	22537	70.8	70.8	70.8
	Hepatitis B vaccine	9295	29	29.2	100
	Total	31832	100	100	
Missing		0	0		
Total		**31832**	**100**		
Age	18 - 30 years	6417	20.2	20.2	20.2
	31- 40 years	5402	17.0	17.0	37.1
	41-50 years	5223	16.4	16.4	53.5
	51-60 years	5625	17.7	17.7	71.2
	61-70 years	4697	14.8	14.8	86.0
	71-80 years	2825	8.9	8.9	94.8
	81 or above	1643	5.2	5.2	100
	Total	100	100	100	
Missing		0	0		
Total		**31832**	**100**		
Marital Status	Not Married	18148	57.0	57.0	57.0
	Married	13684	43.0	43.0	100
	Total	100	100	100	
Missing		0	0		
Total		**31832**	**100**		
Gender	Male	14132	44.4	44.4	44.4
	Female	17700	56.6	55.6	100
	Total	31832	100	100	
Missing		0	0		
Total		**31832**	**100**		
Region	Northeast	5146	16.2	16.2	16.2
	Midwest	6500	20.4	36.6	36.6
	South	11941	37.5	37.5	74.1
	West	8245	25.9	25.9	100
	Total	31832	100	100	
Missing		0	0		
Total		**31832**	**100**		
Work Experience	No work	11314	35.5	35.6	35.6
	Worked	20475	64.3	64.4	100
	Total	31789	99.9	100	

(table continues)

Table 6 (continued)

Variable	Category	*N*	%	Valid %	Cumulative %
Missing		43	0.1		
Total		**31832**	**100**	**100**	
Chronic Disease	Non-Chronic Disease	15893	49.9	50.1	50.1
	Chronic Disease	15854	49.8	49.9	100
	Total	31747	99.7	100	
Missing		85	0.3		
Total		**31832**	**100**		
Smoking	No smoking	26071	81.9	82.0	82.0
	Smoking	5729	18.0	18.0	100
	Total	31800	99.9	100	
Missing		32	0.1		
Total		**31832**	**100**		
Alcohol Intake	No Alcohol	11975	37.6	37.7	37.7
	Alcohol	19808	62.2	62.3	100
	Total	31783	99.8	100	
Missing		49	0.2		
Total		**31832**	**100**		
Tobacco Use	No Tobacco use	24192	76.0	76.1	76.1
	Tobacco use	7610	23.9	23.9	100
	Total	31802	99.9	100	
Missing		30	0.1		
Total		**31832**	**100**		
Physical Activity	No Physical Activity	10235	32.2	32.7	
	Physical Activity	21067	66.2	67.3	100
	Total	31302	98.3	100	
Missing		530	1.7		
Total		**31832**	**100**		

Discrepancies of the Secondary Dataset.

The main discrepancy of the secondary dataset is the missing values in some of the variables considered in this study. The cross-sectional secondary data that was obtained from the ICPSR website is a large data set, so the missing data were dropped by using a common approach called the listwise or case deletion. Listwise or case deletion is simply omitting those cases with missing data and analyzing the remaining data (c). It is a

frequently used method in handling missing data. A listwise deletion was used as a reasonable strategy because the data is large enough, and power is not an issue. Also, the assumption of MCAR (Missing Completely at Random) is satisfied. MCAR means there is no relationship between the missing data and any values (Gomer, 2019). Listwise deletion is known to produce unbiased estimates and conservative results (Lang, & Little 2018). This will help in a successful data management and also to draw an accurate inference about the data values for the purpose of this research study. There were no missing values for gender, age, marital status, region, and HBV vaccine. Chronic disease had missing values of (n = 85, 0.3%), work experience (n = 43, 0.1%), smoking status (n = 32, 0.1%), alcohol intake (n = 49, 0.2%), tobacco use (n = 30, 0.1%), and physical activity (n = 530, 1.7%).

I had two variables I could potentially use to measure HBV vaccination, HBV Vaccine and Doses of HBV vaccine received: because the doses of HBV vaccine received had high percentage of missing values and HBV vaccine had sufficient number of cases and no issue with missing values, I decided to only use HBV vaccine (yes, no) for the analysis. For my research question I needed chronic and nonchronic disease, and because multiple variables (ever been told you have hypertension, ever been told you have heart condition / disease, ever been told you have stroke, ever been told you have asthma, ever been told you have ulcer, ever been told you have cancer, and ever been told you have diabetes) measuring chronic disease were available and with 0.1% of missing values each, I decided to create a new variable chronic disease (yes for chronic, no for non- chronic). A new variable (physical activity) was created by combining two

variables (frequency of vigorous activity and the frequency of moderate activity) which both had a small number of missing values and were both coded per day, per week, per month, and per year.

Also, I created a new variable (tobacco use) by combining the variables (ever smoked tobacco products other than cigarettes and ever used smokeless tobacco products). Both variables had a small number of missing cases and both were coded yes and no; thus, new variable tobacco use will have yes and no values as well. In creating the new variables, I recoded each variable to new variables to have "1" as yes and "0" as no. After that, I computed the new variables to create another new variable, then later recoded the new variable to a different new variable to have "1" as yes and "0" as no. I consulted a tutor skilled in quantitative statistics for support with using the SPSS statistical software

Table 7

New Variables

New Variables	Question from the survey	Codes and Values from the dataset	Operationalization Codes and Values
Chronic Disease.	Ever been told you have Hypertension.	1 – Yes 2 – No	**IF** "Yes" on any of the variables (1) **THEN** Yes (chronic disease)
	Ever been told you have heart condition / disease.	1 – Yes 2 – No	
Yes (Chronic Disease)	Ever been told you have stroke.	1 – Yes 2 – No	**IF** "No" on all of the variables (0). **THEN** No (no chronic disease)
No (Nonchronic Disease)	Ever been told you have asthma.	1 – Yes 2 – No	
	Ever been told you have cancer.	1 – Yes 2 – No	
	Ever been told you have diabetes.	1 – Yes 2 – No	
Tobacco Use	Ever smoked tobacco products, other than cigarettes.	1 - Yes 2 – No	**IF** "Yes" on any of the variables (1), **THEN** Yes (Tobacco use)
Yes (Tobacco use)	Ever used smokeless tobacco products.	1 - Yes 2 - No	**IF** "No" on all of the variables (0). **THEN** No (no tobacco use)
No (No tobacco use)			
Physical Activity	Frequency of Vigorous activity.	0 - Never 1 - Per Day 2 - Per Week 3 - Per Month 4 - Per Year	**IF** "Per Day, Per Week. Per Month, or Per Year" on any of the variables (1) **THEN** Yes (Physical exercise)
Yes (Physical Activity)	Frequency of Moderate Activity	0 - Never 1 - Per Day 2 - Per Week 3 - Per Month 4 - Per Year	**IF** "Never" on all of the variables (0). **THEN** No (no physical exercise)
No (No Physical activity)			

Statistical Results

Logistic Regression Analysis for Research Question 1

Research Question 1: What is the relationship between sociodemographic factors (age, marital status, gender, region, work experiences) and HBV vaccination among the Asian adults (≥ 18 years) in the United States?

$H_0$1: There is no association between sociodemographic factors (age, marital status, gender, region, work experiences) and HBV vaccination among the Asian adults (≥ 18 years) in the United States.

H_a1: There is a statistically significant association between sociodemographic factors (age, marital status, gender, region, work experiences) and HBV vaccination among Asian adults (≥ 18 years) in the United States.

Logistic regression was used to examine the influence of the independent sociodemographic factor variables (gender, marital status, work experience, region, and age) on the dependent variable (HBV vaccination) among the Asian adult population in the United. The logistic regression model was a good fit model for this study because it is able to examine the relationship between the variables that is one dependent variable and two or more independent variables (Statistical Solution, 2018). The use of binary logistic regression was used to determine whether the predictor or independent variables had any predictive influence on the dependent variable (HBV vaccination). The results of the logistic regression analysis are presented in Table 3. The logistic analysis was performed to test whether there is a relationship between sociodemographic factors (age, marital

status, gender, region, work experiences) and HBV vaccination among the Asian adults (≥ 18 years) in the United States.

The outcome of interest was (HBV vaccination). The possible predictor variables were: [age, marital status, gender, work experiences]. The Hosmer-Lemeshow goodness-of-fit was Significant ($p = .000 < 0.05$) indicating the model is not correctly specified or the model is not a good fit to the data. Additionally, I used the omnibus tests of model coefficients to do another test of model fitness. The significance of the Omnibus Tests of Model Coefficients Chi-square of less than 0.05 shows (P .000 <0.05) that the results in the model are statistically significant (see Table 3). The Cox & Snell R Square = .083, Nagelkerke R Square = .119, and the [-2 log likelihood = 35632.592].

The model resulted the IVs (marital status, and work experience) not significant ($p > 0.05$), however, the IVs (gender, and age) were found to be significant with ($p < 0.05$). Controlling for marital status, and work experience, the predictor variable gender in the logistic regression analysis was found to contribute to the model. The unstandardized B = (.367), SE = (.026), Wald – (195.834), $p < 0.05$. The estimated odds ration favored an increase of 44.0%, Exp (B) = 1.443, 95% CI (1.371, 1.519) for every unit increase in gender. Controlling for marital status, and work experience, the predictor variable age in the logistic regression analysis was found to contribute to the model. The unstandardized B = (-.381), SE = (.008), Wald – (2292.475), $p < 0.05$. The estimated odds ratio favored a decrease nearly 32%, Exp (B) = .683, 95% CI (.673, .694) for every unit increase age.

The results of the analysis showed that there was a statistically significant association between sociodemographic factors (age, marital status, gender, work experiences) and HBV vaccination among the Asian adults (≥ 18 years) in the United States. The null hypothesis of no association between sociodemographic factors (age, marital status, gender, region, work experiences) and HBV vaccination among the Asian adults (≥ 18 years) in the United States can be rejected in favor of the alternative statistics of a statistically significant association between sociodemographic factors (age, marital status, gender, region, work experiences) and HBV vaccination among Asian adults (≥ 18 years) in the United States.

Table 8

Logistic Regression on Sociodemographic Factors Associated with Hepatitis B Vaccination Among Asian Adult Population in the United States. (n = 31832)

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Gender	-.367	.026	195.834	1	.000	1.443	1.371	1.519
Marital status	-.005	.026	.043	1	.835	.995	.945	1.047
Age in range	-.381	.008	2292.475	1	.000	.683	.673	.694
Work experience	-.029	.027	1.160	1	.281	.971	.922	1.024
Constant	.115	.037	9.840	1	.002	1.122		

a. Variable(s) entered on step 1: Age in range, Marital status, Gender, Work experience.

Also, for RQ 1another analysis was run based on region (northeast, midwest, south, and west) seen in table 4. The outcome of interest was (hepatitis B vaccination). The possible predictor variables were: [age, marital status, gender, region, work experiences]. The Hosmer-Lemeshow goodness-of-fit was Significant (p = > 0.05: for northeast p =

.121 > 0.05, midwest p = .021> 0.05, south p =.571 > 0.05, and west p =.001 < 0.05) indicating the model is correctly specified or the model is a good fit to the data. Additionally, I used the omnibus tests of model coefficients to do another test of model fitness. The significance of the Omnibus Tests of Model Coefficients Chi-square of less than 0.05 shows (P .000 < 0.05) for all four regions, showing that the results in the model are statistically significant (see Table 4). The Cox & Snell R Square is (northeast = .079, Midwest = .086, south = .089, and west = .077) and Nagelkerke R Square (northeast = .113, Midwest = .122, south = .126, and west = .111) and the -2 log likelihood (northeast 5718.345, Midwest = 7332.603, south = 13308.819, and west = 9257.754).

The model resulted the IVs (marital status, and work experience) not significant (p > 0.05), however, the IVs (gender, and age) were found to be significant with (p < 0.05) for the northeast region. Controlling for marital status, and work experience, the predictor variable gender in the logistic regression analysis for the northeast region was found to contribute to the model. The unstandardized B = (.379), SE = (.065), Wald – (33.829), p < 0.05. The estimated odds ration favored an increase of 46.0%, Exp (B) = 1.461, 95% CI (1.286, 1.661) for every unit increase in gender. Controlling for marital status, and work experience, the predictor variable age in the logistic regression analysis for the northeast region was found to contribute to the model. The unstandardized B = (-.373), SE = (.020), Wald – (347.434), p < 0.05. The estimated odds ratio favored a decrease nearly 31%. The Exp (B) = .689, 95% CI (.662, .716) for every unit increase age.

The model resulted the IVs (marital status, and work experience) not significant (p > 0.05), however, the IVs (gender, and age) were found to be significant with (p < 0.05) for

the midwest region. Controlling for marital status, and work experience, the predictor variable gender in the logistic regression analysis was found to contribute to the model. The unstandardized B = (.343), SE = (.058), Wald – (35.383), $p < 0.05$. The estimated odds ration favored an increase of 41.0%, Exp (B) = 1.409, 95% CI (1.258, 1.577) for every unit increase in gender. Controlling for marital status, and work experience, the predictor variable age in the logistic regression analysis for the midwest region was found to contribute to the model. The unstandardized B = (-.384), SE = (.017), Wald – (486.998), $p < 0.05$. The estimated odds ratio favored a decrease nearly 32%, Exp (B) = .681, 95% CI (.658, .705) for every unit increase age.

The model resulted the IVs (marital status, and work experience) not significant ($p > 0.05$), however, the IVs (gender, and age) were found to be significant with ($p < 0.05$) for the south region. Controlling for marital status, and work experience, the predictor variable gender in the logistic regression analysis for the south region was found to contribute to the model. The unstandardized B = (.381), SE = (.043), Wald – (78.438), $p < 0.05$. The estimated odds ration favored an increase of 46.0%, Exp (B) = 1.463, 95% CI (1.345, 1.592) for every unit increase in gender. Controlling for marital status, and work experience, the predictor variable age in the logistic regression analysis for the south region was found to contribute to the model. The unstandardized B = (-.396), SE = (.013), Wald – (912.934), $p < 0.05$. The estimated odds ratio favored a decrease nearly 32%, Exp (B) = .673, 95% CI (.656, .691) for every unit increase age.

The model resulted the IV (marital status) not significant ($p > 0.05$), however, the IVs (gender, age, and work experience) were found to be significant with ($p < 0.05$) for the

west region. Controlling for marital status, the predictor variable gender in the logistic regression analysis for the west region was found to contribute to the model. The unstandardized B = (.357), SE = (.051), Wald – (48.384), $p < 0.05$. The estimated odds ration favored an increase of 43.0%, Exp (B) = 1.430, 95% CI (1.293, 1.581) for every unit increase in gender. Controlling for marital status, the predictor variable age in the logistic regression analysis for the south region was found to contribute to the model. The unstandardized B = (-.363), SE = (.016), Wald – (545.681), $p < 0.05$. The estimated odds ratio favored a decrease nearly 30%, Exp (B) = .696, 95% CI (.675, .717) for every unit increase age. Controlling for marital status, the predictor variable work experience in the logistic regression analysis was found to contribute to the model. The unstandardized B = (-.150), SE = (.053), Wald – (8.140), $p < 0.05$. The estimated odds ration favored a decrease of 14.0%, Exp (B) = .860, 95% CI (.776, .954) for every unit increase in work experience.

The results of the analysis showed that there was a statistically significant association between sociodemographic factors (age, marital status, gender, region, work experiences) and HBV vaccination among the Asian adults (≥ 18 years) in the United States. The null hypothesis of no association between sociodemographic factors (age, marital status, gender, region, work experiences) and HBV vaccination among the Asian adults (≥ 18 years) in the United States was rejected in favor of the alternative statistics of a statistically significant association between sociodemographic factors (age, marital status, gender, region, work experiences) and HBV vaccination among Asian adults (≥ 18 years) in the United States.

Table 9

Logistic Regression on Sociodemographic Factors Associated with Hepatitis B Vaccination Among Asian Adult Population in the United States. (n = 31832)

Region		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
								Lower	Upper
Northeast	Gender	.379	.065	33.829	1	.000	1.461	1.286	1.661
	Age in Range	-.373	.020	347.434	1	.000	.689	.662	.716
	Marital Status	-.050	.065	.586	1	.444	.951	.837	1.081
	Work Experience	.032	.067	.228	1	.633	1.033	.905	1.178
	Constant	.049	0.93	.272	1	.602	1.050		
Midwest	Gender	.343	.058	35.383	1	.000	1.409	1.258	1.577
	Age in Range	-.384	.017	486.998	1	.000	.681	.658	.705
	Marital Status	.036	.057	.396	1	.529	1.037	.927	1.160
	Work Experience	-.035	.059	.350	1	.554	.966	.861	1.084
	Constant	.159	.080	3.991	1	.046	1.173		
South	Gender	.381	.043	78.438	1	.000	1.463	1.345	1.592
	Age in Range	-.396	.013	912.934	1	.000	.673	.656	.691
	Marital Status	-.032	.043	.572	1	.450	.968	.891	1.053
	Work Experience	.032	.044	.527	1	.468	1.033	.947	1.126
	Constant	.116	.060	3.689	1	.055	1.123		
West	Gender	.357	.051	48.384	1	.000	1.430	1.293	1.581
	Age in Range	-.363	.016	545.681	1	.000	.696	.675	.717
	Marital Status	.031	.051	.357	1	.550	1.031	.933	.717
	Work Experience	-.150	.053	8.140	1	.004	.860	.776	.954
	Constant	.121	.072	2.793	1	.095	1.128		

a. Variable(s) entered on step 1: Gender, Age range, Marital status, Work Experience

Logistic Regression Analysis for Research Question 2

Research Question 2: What is the relationship between health status factors (chronic disease, nonchronic disease) and HBV vaccination among Asian adults (≥ 18 years) in the United States?

$H_0$2: There is no association between health status factors (chronic disease, nonchronic disease) and HBV vaccination among the Asian adults (≥ 18 years) in the United States.

H_a2: There is a statistically significant association between health status factors (chronic disease, nonchronic disease) and HBV vaccination among Asian adults (≥ 18 years) in the United States.

Logistic regression was used to examine the influence of the independent health status factor variable (chronic disease) on the dependent variable (HBV vaccination) among the Asian adult in the United. The use logistic regression was used to determine whether the predictor or independent variable (chronic disease) had any predictive influence on the dependent variable (HBV vaccination). The results of the logistic regression analysis are presented in Table 4. The logistic analysis was performed to test whether there is a relationship between health status factors (chronic disease) and HBV vaccination among the Asian adults (≥ 18 years) in the United States.

The outcome of interest was (HBV vaccination). The possible predictor variable (chronic disease). The Hosmer-Lemeshow goodness-of-fit was Significant (p = .000 < 0.05) indicating the model is not correctly specified or the model is not a good fit to the data. Additionally, I used the omnibus tests of model coefficients to do another test of model fitness. The significance of the Omnibus Tests of Model Coefficients Chi-square of less than 0.05 shows (P .000 <0.05) that the results in the model are statistically significant (see Table 5). The Cox & Snell R Square = .004, Nagelkerke R Square = .006, and the -2 log likelihood = 35632.592.

The predictor variable chronic disease was tested a priori to verify there was no violation of the assumption of the linearity regression logit in the logistic regression analysis was found to contribute to the model. The unstandardized B = (-.287), SE = (.025), Wald – (133.812), p = .000 < 0.05. The estimated odds ration favored a decrease of 25.0%, Exp (B) = .751, 95% CI (.715, .788) for every unit increase in chronic disease.

The results of the analysis showed that there is a statistically significant association between health status factor (chronic disease) and HBV vaccination among the Asian adults (≥ 18 years) in the United States. The null hypothesis of no association between health status factor (chronic disease) and HBV vaccination among the Asian adults (≥ 18 years) in the United States was rejected in favor of the alternative statistics of a statistically significant association between health status factor (chronic disease) and HBV vaccination among Asian adults (≥ 18 years) in the United States.

Table 10

Logistic Regression on Health Status Factors Associated with Hepatitis B Vaccination Among Asian Adult Population in the United States. (n = 31832)

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I for EXP(B)	
							Lower	Upper
Chronic disease	-.287	.025	133.812	1	.000	.751	.715	.788
Constant	-.746	.017	1928.262	1	.000	.474		

a. Variable(s) entered on step 1: Chronic disease (Hypertension, heart disease, Stroke, asthma, ulcer, diabetes).

Logistic Regression Analysis for Research Question 3

Research Question 3: What is the relationship between health behavior /lifestyle practices (smoking, alcohol intake, tobacco use, physical activity) and HBV vaccination among the Asian adults (≥ 18 years) in the United States?

$H_0$3: There is no association between health behavior /lifestyle practices (smoking, alcohol intake, tobacco use, physical activity) and HBV vaccination among the Asian adults (≥ 18 years) in the United States.

H_a3: There is a statistically significant association between health behavior /lifestyle practices (smoking, alcohol intake, tobacco use, physical activity) and HBV vaccination among the Asian adults (≥ 18 years) in the United States.

Logistic regression was used to examine the influence of the independent health behavior factors variables (smoking, alcohol intake, tobacco use, and physical activity) on the dependent variable (HBV vaccination) among the Asian adult in the United States. The use of binary logistic regression was used to determine whether the predictor or independent variables had any predictive influence on the dependent variable (HBV vaccination). The results of the logistic regression analysis are presented in Table 6. The logistic analysis was performed to test whether there is a relationship between health behavior factors variables (smoking, alcohol intake, tobacco use, and physical activity) and HBV vaccination among the Asian adults (≥ 18 years) in the United States.

The outcome of interest was (HBV vaccination). The possible predictor variables were: [smoking, alcohol intake, tobacco use, and physical activity]. The Hosmer-Lemeshow goodness-of-fit was not Significant ($p = .509 > 0.05$) indicating the model is correctly specified. Additionally, I used the omnibus tests of model coefficients to do another test of model fitness. The significance of the Omnibus Tests of Model Coefficients Chi-square of less than 0.05 shows (P 0.000 <0.05) that the results in the

model are statistically significant (see Table 6). The Cox & Snell R Square = .019 and Nagelkerke R Square = .027 and the -2 log likelihood = 37133.071.

The model resulted the IVs (smoking and alcohol intake) not significant ($p > 0.05$), however, the IVs (tobacco use and physical activity) were found to be significant with ($p < 0.05$). Controlling for smoking and alcohol intake, the predictor variable tobacco use in the logistic regression analysis was found to contribute to the model. The unstandardized B = (.204), SE = (.029), Wald – (50.350), p = .000 < 0.05. The estimated odds ration favored an increase of 23.0%, Exp (B) = 1.227, 95% CI (1.159, 1.298) for every unit increase in tobacco use. Controlling for smoking and alcohol intake, the predictor variable physical activity in the logistic regression analysis was found to contribute to the model. The unstandardized B = (.623), SE = (.029), Wald – (473.273), p = .000 < 0.05. The estimated odds ratio favored an increase nearly 86%, Exp (B) = 1.864, 95% CI (1.762, 1.972) for every unit increase in physical activity.

The results of the analysis showed that there was a statistically significant association between health behavior /lifestyle practices (smoking, alcohol intake, tobacco use, physical activity) and HBV vaccination among the Asian adults (≥ 18 years) in the United States. The null hypothesis of no association between health behavior /lifestyle practices (smoking, alcohol intake, tobacco use, physical activity) and HBV vaccination among the Asian adults (≥ 18 years) in the United States was rejected in favor of the alternative statistics of a statistically significant association between health behavior /lifestyle practices (smoking, alcohol intake, tobacco use, physical activity) and HBV vaccination among Asian adults (≥ 18 years) in the United States.

Table 11

Logistic Regression on Health Behavior Factors Associated with Hepatitis B Vaccination Among Asian Adult Population in the United States. (n = 31832)

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I for EXP(B)	
							Lower	Upper
Smoking Status	.012	.033	.141	1	.707	1.012	.949	1.080
Alcohol Intake	-.010	.026	.149	1	.699	.990	.941	1.042
Tobacco Use	.204	.029	50.350	1	.000	1.227	1.159	1.298
Physical Activity	.623	.029	473.273	1	.000	1.864	1.762	1.972
Constant	-1.368	.030	2090.263	1	.000	.255		

a. Variable(s) entered on step 1: Smoking Status, Alcohol intake, Tobacco Use, Physical Activity.

Summary and Transition

Section 3 presented the results provided by the analytical strategies used to analyze research questions one through three. An alpha level of 0.05, $p < .001$, which suggested that the null hypotheses in all research question should be rejected. In answering the research questions, a binary logistic regression was conducted to predict a relationship between the dependent variable (HBV vaccination) and the independent variables (age, marital status, gender, region, work experience, having chronic diseases, nonchronic diseases, smoking, alcohol intake, tobacco use, physical activity) for all research questions. The SPSS version 25 was used to conduct the descriptive analysis.

Research Question 1 tested the association between sociodemographic factors (age, marital status, gender, region, and work experiences) and HBV vaccination among the Asian adults in the United. The results from the logistic regression suggested that there is a statistically significant association between sociodemographic factors (age, marital status, gender, region, and work experiences) and HBV vaccination among the

Asian adult population in the United. The null hypothesis was rejected in favor of the alternative hypothesis.

Research Question 2 tested the association between health status factors (chronic disease, nonchronic disease) and HBV vaccination among the Asian adult in the United. The results from the logistic regression suggested that there is a statistically significant association between health status factors (chronic disease, nonchronic disease) and HBV vaccination among the Asian adult in the United. The null hypothesis was rejected in favor of the alternative hypothesis.

Research Question 3 tested the association between health behavior factors (smoking, alcohol intake, tobacco use, physical activity) and HBV vaccination among the Asian adult in the United. There results from the logistic regression suggested that there is a statistically significant association between health behavior factors (smoking, alcohol intake, tobacco use, physical activity) and HBV vaccination among the Asian adult in the United. The null hypothesis was rejected in favor of the alternative hypothesis.

In section 4 which is the final section, the interpretation of the results and findings from the analysis conducted in this section will be discussed. The literature used in this study will be the basis for the interpretation of the results. Also, the implication to positive social change will be discussed, limitation of the study will be addressed and recommendation for future research will be made.

Section 4: Application to Professional Practice and Implications for Social Change

Introduction

The primary purpose of this quantitative cross-sectional study was to examine the association between sociodemographic factors (age, marital status, gender, work experiences), health status factors (chronic disease, nonchronic disease), health behavior factors (smoking, alcohol intake, tobacco use, physical activity), and HBV vaccination among Asian adult (≥ 18 years) in the United States. In section 4 of the study, I interpreted the research findings and discussed the limitation of the study, recommendation, implication for professional practice and social change, and a conclusion. Knowing the factors that impacts vaccination against HBV vaccination can assist in providing information in responding to HBV by increasing the number of people getting vaccinated especially among the Asian adult in the United States who are considered a high-risk population.

Interpretation of Findings

Logistic regression was the statistical test used to analyze the variables in the dataset. The total number of the participants analyzed in the dataset is 31, 832. The results indicated that 55.6% of the respondents were females and 44.4% were males. There were more participants between 18-30 years than any other age groups considered in this study. Results further showed that 29.2% of the participants had been vaccinated for hepatitis B and the remaining 70.8% had not.

Research Question 1 tested the association between sociodemographic factors (age, marital status, gender, region, and work experiences) and HBV vaccination among

the Asian adults in the United States. The results from the logistic regression suggested that there is a statistically significant association between sociodemographic factors (age, marital status, gender, region, and work experiences) and HBV vaccination among the Asian adult in the United States. The independent variables (IVs) marital status ($p = .835$) and work experience ($p = .281$) were found not to be statistically significant but the predictor variables gender ($p = .000$) and age ($p = .002$) were found to be statistically significant. The null hypothesis was rejected in favor of the alternative hypothesis.

The finding of the study was consistent with a previous study by Akosionu et al. (2016), who found that gender difference has a significant association with HBV vaccination. Also Tan et al. (2020), found that there is a relationship between employment especially in the health sector and HBV vaccination. Lu et al. (2018) found age significantly associated with HBV vaccination coverage. Raven et al. (2018) found older age and flexibility in location of vaccine delivery were factors associated with HBV vaccination. For the northeast, midwest, and south regions, the variables marital status and work experience were not significant ($p > 0.05$) while gender, and age as predictor variables were found to be significant ($p < 0.05$). The west region, however, had the IV marital status as not significant ($p > 0.05$). However, the IVs gender, age, and work experience were found to be significant ($p < 0.05$) making it consistent with Morisco et al. (2017) study who found as association between low socioeconomic district of residence and HBV vaccination.

Research Question 2 tested the association between health status factors (chronic disease, nonchronic disease) and HBV vaccination among the Asian adults in the United

States. The results from the logistic regression suggested that there is a statistically significant association between health status factors (chronic disease, nonchronic disease) and HBV vaccination among the Asian adults in the United States with $p = .000$. The null hypothesis was rejected in favor of the alternative hypothesis. Li et al. (2016), found that knowledge and feeling well/having no health issues had a significant association with HBV vaccination and Dimitrov et al. (2019), confirmed that both kidney function and nutritional status of patients are important factors to explain the success of vaccination against HBV in chronic kidney disease (CKD) patients before dialysis. This makes their study findings consistent with my study findings.

Research Question 3 tested the association between health behavior factors (smoking, alcohol intake, tobacco use, physical activity) and HBV vaccination among the Asian adults in the United States. There results from the logistic regression suggested that there is a statistically significant association between health behavior factors (smoking, alcohol intake, tobacco use, physical activity) and HBV vaccination among the Asian adults in the United. The model resulted the IVs smoking ($p = .707 > 0.05$) and alcohol intake ($p = .699 > 0.05$) not significant, however, the predictor variable tobacco use ($p = .000 < 0.05$) and physical activity ($p = .000 < 0.05$) were found to be significant with. The null hypothesis was rejected in favor of the alternative hypothesis. Masserey et al. (2019) found an association between sociocultural factors and HBV vaccination uptake among adolescents making it consistence with my findings.

Limitations of the Study

A limitation to my study was Asian American being a broad study population. The study population of the Asian American adults in the United States is considered a too broad population of study. The data set can be shown as a separated group since the Asian American population are made up of various ethnic groups with the six largest being Chinese American, Filipino Americans, Indian Americans, Vietnamese Americans, Korean Americans, and Japanese Americans (Lopez et al., 2017). Most data set on the Asian population is put as a whole because the group is so diverse. Asian American population do not only speak dozens of languages, they also hail from many different cultural and ethnic backgrounds and only bound together because they claim racial / ethnic roots from the vast continent Asia (Gao, 2018). It will be better to have data sets on Chinese, Indian and Filipino Americans, Pakistani or Laotian Americans among other Asian groups to ensure specific research for each population.

The use of secondary data is also limitation to this study. The that the 2013 National Health Interview Survey data set obtained from the Inter-University Consortium for Political and Social Research (ICPSR) Website was limited to only Asian adults living/residing in the United States as at the time of survey making it impossible to incorporate the views of Asian adults who are living in other countries. In view of that, besides, respondents who were sick as at the time of the survey were excluded from the study. Also, minors such as those below the ages of 18 years were excluded from the study. These minors who turned adult at the time of the study end up being excluded from the data set.

Another limitation of the study was that citizenship/ immigration status was not captured during the 2013 NHIS datasets collection. This issue could make it difficult to draw a specific implication that could be useful to a particular immigration status such as being either American citizens, green card holders or even people on a visa in terms of factors influencing HBV vaccination. Knowing citizenship/ immigration status may provide factors to consider in future quantitative analysis. Lu et al. (2018) found a significant association duration of United States residence or travel status and HBV vaccination.

Recommendations

This quantitative cross-sectional study using secondary data is to examine the factors associated with HBV vaccination among the Asian adults in the United States. Other factors such as immigrant status, beliefs, health insurance, and educational achievement not used in this study that also pose a challenge to HBV vaccination. Future research study needs to be done to examine those factors and present findings. It is important to know whether immigrant status, beliefs, health insurance, and educational achievement, are associated with HBV vaccination among the Asian population.

Also, future research should target specific Asian Americans in the United States to improve HBV vaccination since Asian Americans is a broad population for research. Future researchers should also take into consideration the use of primary data to help solve the limitation of using only available data set which maybe too old but yet the most recent. The 2013 NHIS obtained from the ICPSR website used for the study is old but yet

the most recent data set available for analysis. This limited the data to only Asian adults living/residing in the United States as at the time the survey was conducted.

I recommend that a longitudinal research design be used for further studies on the factors associated with HBV vaccination focusing on the Asian American population in the United States. There have been several researches that has been conducted using different methods with mixed results but a longitudinal study unlike a cross-sectional study may be conducted over many years and not at a point in time. Also, longitudinal studies are able to establish a cause and effect relationship in a study (Carauna, Roman, Hernandez, & Solli (2015).

Implications for Professional Practice and Social Change

In fact, HBV related liver cancer is the leading cause of cancer deaths among Asian Americans (CDC, 2016). HBV vaccination is very important in the eradication of HBV disease as stated in the WHO Strategy on the Elimination of Viral Hepatitis as a public health threat by 2030 especially among the Asian American population in the United States. It is important for public health advocates, policy makers, health professional, and the community to educate the public on the risk of hepatitis B. The findings showed that sociodemographic factors (age, marital status, gender, work experiences), health status factors (chronic disease, nonchronic disease), health behavior factors (smoking, alcohol intake, tobacco use, physical activity). In ensuring a positive social change, individuals should be mindful of their health and also engage in healthy behaviors such as abstaining from smoking, alcohol intake, tobacco use, embark on physical activities and other healthy lifestyle especially as they advance in age.

The identification of factors that is associated with HBV vaccination will ensure a positive social change by helping to increase the rate of HBV vaccination and prevent HBV disease. The findings of this study provide some important factors associated with HBV vaccination. The study can help provide ways to increase HBV vaccination especially among the Asian population in the United States. This study can be added to the body of knowledge about factors associated with HBV vaccination among the Asian population in the United States which may help provided positive social change. Also, the study can provide positive social change by guiding the improvement or the implementation of sound interventions programs to promote flexibility and HBV vaccination increase among the Asian adults (≥ 18 years) in the United States.

Public initiatives including education and financial relief targeting specific population groups should be considered to increase the uptake of HBV vaccination and ensure a positive social change. According to Tan et al. 2020, knowledge and cost were the top facilitators and barriers to HBV vaccination respectively. There is the need for enhanced targeted educational interventions about HBV vaccination and the participation of local medical staffs and the media offering information. Also, Healthcare providers should offer vaccinations to their patients or refer them to vaccination sites available.

Conclusion

According to the CDC, HBV is common worldwide especially in many parts of Asia and the Pacific Islands. Left untreated one in four people living with HBV develop serious liver problems, even liver cancer (CDC, 2016). After tobacco use, chronic hepatitis B (CHB) viral infections are the most important cause of cancer globally in that

one out of three individuals have been infected with the HBV (Chen, & Dang 2015). In fact, HBV related liver cancer is the leading cause of cancer deaths among Asian Americans (CDC, 2016).

The findings of this quantitative cross-sectional study revealed that there is an association between sociodemographic factors (age, marital status, gender, work experiences), health status factors (chronic disease, nonchronic disease), health behavior factors (smoking, alcohol intake, tobacco use, physical activity), and HBV vaccination among Asian adults in the United States. It is important for the community, families, and individuals to understand the importance and benefits of taking actions to prevent HBV through vaccination. The understanding of sociodemographic factors, health status factors, and health behavior factors can be used by public health advocates and other researchers to develop programs to increase HBV vaccination especially among the Asian population in the United States.

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