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Predictors of Cervical Cancer Screening Among Hispanic Women in the United States

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Walden University

College of Health Sciences

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Benedicta Ilouno

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Walden University
2015

Abstract

Predictors of Cervical Cancer Screening among Hispanic Women in the United States

by

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MSN, University of Phoenix, 2009

BSN, University of Phoenix, 2006

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Public Health

Walden University

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Abstract

Minority women groups in the United States have the highest incidence and mortality rates of cervical cancer. Hispanic women have the highest incidence rate and the second highest mortality rate of the disease. Researchers have examined the lower rates of cervical cancer screening among Hispanic women, as compared to other groups of U.S. women, but researchers have not examined the extent to which socioeconomic status, acculturation, and sexual activity impact Hispanic women's compliance with screening. The purpose of this study was to examine the association between compliance with cervical cancer screening and acculturation, socioeconomic status, and sexual activity among U.S. Hispanic women. The framework for investigating the extent of association between these identified barriers and willingness to comply with screening was the behavioral model for vulnerable populations. Chi-square tests and logistic regression were used to analyze data from the National Health Interview Survey for 2011, 2012, and 2013, focusing on U.S. Hispanic women ages 21 - 65 ($N = 739$). The findings from this study revealed that educational level was significantly associated with U.S. Hispanic women's cervical cancer screening; however, no statistically significant associations were found for socioeconomic status, acculturation, and sexual activity and screening rates for this group. Findings from this study can better inform researchers and others of the lower rate of screening for cervical cancer among U.S. Hispanic women. The findings will also promote positive social change by targeting U.S. Hispanic women and other minority women groups for programs that promote cervical cancer screening.

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Dedication

I give thanks to God for his grace throughout this journey. I dedicate my dissertation to my beloved late father Peter for instilling in me at a very young age the value of education and reminding me that my gender should not be a barrier to attaining the highest level of any career of my choice. To my husband George, our lovely children: Georgette, George Jr, Valentine and Georgia who was only three months old when I commenced my quest for further education, you are my guardian angel, words cannot explain the patience, love and support from all of you. To my dear mother Philomena and mother in-law Christiana for their prayers and encouragement through the years. My late maternal grandmother Elizabeth (Nne), who always reminded me of how proud she was of my educational pursuit and for her continuous prayers for my success in all my endeavors until she took her last breath in December, 2014.

Finally, to all the women who have lost their lives through cervical cancer and those still battling this preventable and curable disease. Hopefully, an increased awareness on the importance of screening may decrease the incidence and mortality of the disease both in the United States and worldwide.

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Chapter 1: Introduction to the Study

Introduction

Cervical cancer is a leading cause of death among Hispanic and other minority women in the United States. Globally, cervical cancer is the fourth most common cancer and the fourth leading cause of cancer-related mortality among women (World Health Organization [WHO], 2014). Annually, there are approximately 528,000 new diagnoses of the disease and about 266,000 deaths worldwide (WHO, 2014). Cervical cancer mortality rates have declined by approximately 49% in the United States since the 1980s, due to increased Pap screening, however, the incidence rate among Hispanic women remains the highest in the United States mainly due to poor compliance with cervical cancer screening (National Cancer Institute, n.d.). Rates of cervical cancer among Hispanic women and other minority groups remain high when compared to non-Hispanic white women (Center for Disease Control and Prevention [CDC], 2014; National Cancer Institute, n.d.). This may be attributed to the fast rate of population growth among Hispanics in the United States, lower income, reduced access to healthcare services and lower cancer screening rates (CDC 2014).

Cervical cancer screening by Papanicolaou (or, Pap) test remains an effective and vital tool for effective detection of any abnormalities in the cervix which could result in cervical cancer without early treatment (CDC, 2014; National Cancer Institute, n.d.). However, poor compliance with cervical screening may predispose a woman to a higher risk for cervical cancer (CDC, 2014; National Cancer Institute, n.d.; Tracy, Lydecker, & Ireland, 2010). Hispanic women continue to record a lower rate of cervical cancer

screening due to poor knowledge about the benefits of routine cervical cancer screening, low socioeconomic status and limited access to cervical cancer screening facilities (CDC, 2014). In the United States annually, about 12,109 new cases of cervical cancer are diagnosed with approximately 4,092 deaths from the disease, and about \$1.3 billion was spent on cervical cancer-related care in 2014 (American Cancer Society, n.d.; CDC, 2014; National Cancer Institute, n.d.). Early detection of abnormal and precancerous lesions by Pap testing could significantly reduce both the morbidity and mortality rates of the disease (CDC, 2014; Martinez-Donate et al., 2013). Compliance with routine cervical cancer screening services by Hispanic women could lead to early diagnosis and treatment of precancerous lesions and subsequent reduction in the mortality of the cervical cancer among this group (CDC, 2014; Martinez-Donate et al., 2013).

The purpose of this study was to examine the extent to which acculturation, socioeconomic status, and sexual behavior affect compliance with cervical cancer screening among Hispanic women in the United States. Better understanding of how cervical cancer screening, acculturation, socioeconomic, and sexual activity affect compliance with screening might provide policy makers, public health providers, and others with assistance on designing programs and initiatives that could increase screening rates and decrease cervical cancer incidence rates among Hispanic and other minority women groups. The findings of this study may lead to lowering the age for first Pap smear from 21 years to 18 years, which may help in reducing the morbidity and mortality rates of cervical cancer in the Hispanic population and other vulnerable groups.

In this chapter, I will examine predictors of cervical cancer screening among Hispanic women in the United States. Afterward, I will describe the topic, provide further background, and convey the problem statement and purpose of the study. The research questions and the hypothesis will also be discussed, followed by the theoretical framework, assumptions, limitations, and the significance of the study.

Background of Study

Cervical cancer is a preventable malignant lesion that starts to grow in a woman's cervix, which is the lower tube-shaped part of the uterus (also referred to as the neck) and which is connected to the vagina of the female reproductive system (CDC, 2014; Ellis, 2011). The cervix contains layers of the following normal cells: squamous lines the outer part of the cervix, while glandular and metaplastic cells lines the inner portion of the cervix (CDC, 2014; Ellis, 2011; Kumar, Abba, Fausto, & Mitchell, 2007). The cervix can be infected by Human papillomavirus (HPV), which is acquired during sexual activity. HPV is a causative agent for most cervical cancers (CDC, 2014; Hariri et al., 2011). HPV attacks the cervix by slow invasion of the cells lining the cervix and, if not detected early, could result in invasive cervical cancer (ICC) and mortality (CDC, 2014; Hariri et al., 2011). Approximately 50% of sexually active individuals will be exposed to HPV at some point during their life time (CDC, 2014; Hariri et al., 2011). Cervical cancer is preventable by adherence to safe sexual activity, immunization with HPV vaccine, and compliance with routine Pap smears; HPV is treatable if found during screening in early or precancerous stage (American Cancer Society, n.d.; Borne et al., 2010; CDC, 2014). The aim of routine cervical cancer screening by Pap smear is for early detection and

treatment of abnormal cervical changes that may lead to cervical cancer (Duggan et al., 2012). In the United States, it is recommended that women from ages 21-65 be routinely screened for cervical cancer (American Cancer Society, n.d.; Borne et al., 2010; CDC, 2014). According to the National Cancer Institute (n.d.), cervical dysplasia is common among women in their 20s and 30s, while sensitivity to human papillomavirus is higher among women ages 30 to 69.

Precancerous lesions and dysplasia of the cervix can be detected by routine Pap testing (CDC, 2014; Duggan et al., 2012). In the United States, the incidence and mortality rates of cervical cancer has been reduced by approximately 80% in the last 3 decades due to increased rates of cervical cancer screening (CDC, 2014; Duggan et al., 2012; Martinez-Danote et al., 2013). However, in the United States, Hispanic women recorded the highest incidence rates of cervical cancer and mortality rates when compared to non-Hispanic, White women (CDC, 2014; Martinez-Danote et al., 2013). In Latin American countries, cervical cancer is the second most common cancer among women with an incidence rate that is four times higher and five times higher in mortality when compared to rates in the United States (Soneji & Fukui, 2013). The disproportion in the burden of cervical cancer among Hispanic women can be attributed to low compliance with routine Pap smear testing, poor follow-up with abnormal Pap testing which may be due to low acculturation, limited knowledge about the consequences of poor compliance with screening, poor income level, health insurance issues, immigration status, and language barriers (CDC, 2014; Duggan et al., 2012). The gap in knowledge among Health practitioners and others exists because the extent to which the predictors

(acculturation, socioeconomic status, and sexual activity) affect cervical cancer screening remain unknown. This study was needed to explore the impact of the above predictors on cervical cancer screening among Hispanic women. The findings from this study may help researchers better understand the extent to which the predictors of cervical cancer affect compliance with cervical cancer screening.

Problem Statement

Cervical cancer is the fourth most common type of cancer among women worldwide, with 528,000 new cases annually and approximately 70% of the disease burden in underdeveloped countries (Bray, Ren, Masuyer, & Ferlay, 2013; WHO, 2013). In the last decade in the United States, the incidence rate of cervical cancer has been on the decline. However, Hispanic women continue to record persistent high rates of the disease (CDC, 2014; Duggan et al., 2012; Horner et al., 2011). The persistent high incidence rate of cervical cancer among Hispanic women in the United States is a public health concern because it is a reflection of the disparities in access to cervical cancer screening and treatment (CDC, 2014). The high rate of cervical cancer also implies that a significant percentage of Hispanic women in the United States are not screening for the vaccine-preventable HPV Types 16 and 18 because they are three times less likely to access screening for cervical cancer (CDC, 2014; HRSA, 2013; Louie, Sanjose, & Mayaud, 2009). Hispanic women in the United States are twice as likely as non-Hispanic women in the United States to be diagnosed with preventable and curable cervical cancer and are less likely to use the available screening tests for the cervical cancer (Duggan et al., 2012). This may be attributed to reduced income, poor access to cancer screening

facilities, and limited knowledge about the cervical cancer prevention such as immunization with doses of HPV vaccine (CDC, 2014).

Cervical cancer is the most common HPV-related disease, and HPV Types 16 and 17 have been identified in most cases of cervical cancer (CDC, 2014). HPV infection is the most common sexually transmitted disease in the United States with approximately 79 million people cases and 14 million new cases of HPV annually (CDC, 2014). HPV is prevalent among young and sexually active Hispanic women ages 19-30 (24.3%; Hariri et al., 2011; Reiter et al., 2013). Some of the identified barriers to cervical cancer screening are acculturation, family income, educational level, age, and personal barriers such as embarrassment, fear, and pain while predisposing factors to HPV infection are unprotected sexual intercourse and high risk sexual behaviors such as sexual promiscuity (Byrd, Chavez, & Wilson, 2007; CDC, 2014; Dunne et al., 2007; Emam et al., 2012; Hariri et al., 2011).

However, the extent to which some of the identified barriers impact cervical cancer screening among Hispanic women has not been thoroughly explored. Responding to this gap in knowledge, my purpose in conducting this research was to determine to what extent the high incidence of cervical cancer among U.S. Hispanic women may be due to their sexual activity, socioeconomic status, or acculturation. Because research suggests that early and routine cervical cancer screening help in reducing rates of cervical cancer among Hispanic women (CDC, 2014), I also wanted to better understand the factors leading to low cervical cancer screening rates among this group.

Purpose of Study

In this quantitative study, I used a cross-sectional design to examine the predictors of cervical cancer screening among Hispanic women in the United States. I examined the association between cervical cancer screening and acculturation, socioeconomic status, and sexual activity, which may affect compliance with screening among U.S. Hispanic women. If policy makers, public health providers, and others know more about the extent to which acculturation, socioeconomic status, and sexual activity impact cervical cancer screening, they may be better able to design programs and initiatives that could potentially increase screening rates and decrease cervical cancer incidence and mortality rates among Hispanic and other minority women groups in the United States.

Research Questions and Hypotheses

RQ1: To what extent does socioeconomic status, as measured by family income, have an impact on cervical cancer screening among U.S. Hispanic women?

H_01 : Socioeconomic status, as measured by family income, has no impact on cervical cancer screening among Hispanic women in the United States.

H_11 : Socioeconomic status, as measured by family income, does have an impact on cervical cancer screening among Hispanic women in the United States.

RQ2: To what extent does sexual activity, as measured by marital status, have an impact on cervical cancer screening among Hispanic women in the United States?

H_02 : Sexual activity, as measured by marital status, has no impact on cervical cancer screening among Hispanic women in the United States.

H₁₂: Sexual activity, as measured by marital status, does have an impact on cervical cancer screening among Hispanic women in the United States.

RQ3: To what extent does acculturation, as measured by English language proficiency and educational level, have an impact on cervical cancer screening among Hispanic women in the United States?

H₀₃: Acculturation, as measured by English language proficiency and educational level, has no impact on cervical cancer screening among Hispanic women in the United States.

H₁₃: Acculturation, as measured by English language proficiency and educational level, does have an impact on cervical cancer screening among Hispanic women in the United States.

Theoretical Framework

I used the behavioral model for vulnerable populations as my framework for testing the impact of acculturation, socioeconomic status, and sexual activity on the willingness of individuals to participate in certain programs such as cervical cancer screening. The model is useful for predicting cervical cancer screening rates and related health outcomes among U.S. Hispanic women (Shiavo, 2007).

According to Babitsch, Gohl, and Lengerke (2012), the behavioral model for vulnerable populations is divided into two domains: traditional and vulnerable. The vulnerable domains focused on social structure and enabling resources. The model was expanded by researchers for the examination of the main constructs of predisposing, enabling, and needing with the two domains of traditional and vulnerable. Predisposing

traditional and vulnerable domains are individual factors such as age, gender, education, occupation, ethnicity, family status, acculturation, immigration status, literacy, attitudes, values, and knowledge related to health and health services (Babitsch et al., 2012).

Enabling traditional and vulnerable domains include factors that may promote or hinder the use of health services such as income, wealth, social support, means of transportation, public benefits, or other perceived barriers to health access such as clinic waiting time and policies (Babitsch et al., 2012). Necessary factors of the domains include perceived need for health care services such as how individuals view and experience their general health and their overall level of functioning, including preventive services, and symptoms of diseases. It also includes evaluated health needs of the general population and also their application to the vulnerable population (Babitsch et al., 2012).

Nature of Study

I used a cross-sectional design and analyzed secondary data from the National Health Interview Survey (NHIS) for the years 2011, 2012, and 2013. I also used a nonexperimental quantitative method because it allowed me to include closed-ended questions and numerically measure responses; it also enabled me to statistically test the association between the variables (Aschengrau, & Seage, 2008; Creswell, 2009). In this study, I investigated the impact of sexual activity based on marital status, socioeconomic status based on family income, and acculturation based on language proficiency and educational level on screening rates for cervical cancer among Hispanic women in the United States. I used chi-square analysis and logistic regression to ascertain the association between the dependent and independent variables.

Definition of Terms

Acculturation: A process of cultural and psychological change that occurs when an individual (usually an immigrant) adopts the beliefs, practices, values, behaviors, and attitudes of a particular culture (Sam, & Berry, 2010; Siegel, Naishadham, & Jemal, 2012). These changes include language, clothing, learning, and food (Sam & Berry, 2010). Because level of education can affect language comprehension and usage and subsequently affect individuals' reporting of their health status as well as their compliance with preventive measures (Lee, O'Neill, Ihara & Chae, 2013), I analyzed language used for interview and educational level in the NHIS dataset.

Access to health care: The timely use of personal health services and health care providers for the achievement of best results in health outcomes. Individuals achieve this when they identify and gain access to health care clinics for health care needs. In doing so, they may improve physical, and psychosocial well-being and improve quality of life, life expectancy, prevent illnesses, deformity, and death from preventable diseases (Healthy People, 2020).

Cervical cancer: A slow growing lesion that starts in the cells that lines the cervix at the transformation zone; it is usually asymptomatic but can be detected with routine Pap testing (American Cancer Society, 2014; NCI, 2014)

Cervical cancer screening: A method for preventing cervical cancer where a Pap test is used to identify precancerous lesions before they become an invasive cervical cancer (American Cancer Society, 2014; NCI, 2014).

Cervical lesion: An area of the cervix that shows abnormal changes in the tissues (WHO, 2014)

Decennial Census. A census of population and housing, which is conducted by the U.S. Census Bureau in every year that ends in zero. The decennial census is based on Article 1, Section 2 of the U.S. Constitution which requires a census every 10 years for the purpose of allocating the funds by the U.S. House of Representatives.

Dysplasia: Abnormal cellular changes in the cervix which are mostly caused by the human papillomavirus virus (American Cancer Society, 2014; NCI, 2014).

Educational level: Highest level of education completed by an individual (U.S. Census Bureau, 2014).

English proficiency: The ability of an individual to speak fluently and clearly in an acquired language such as the English language (Crystal, 2003; Smith, 2005).

Hispanic/ Latino: The race or ethnic designation for an individual, culture, or nation that is historically linked to Spain and countries colonized by Spain, most especially Latin American countries such as Mexico, Puerto Rico, and Cuba, located in Central, and South America (U.S. Census Bureau, 2012).

Human papillomavirus (HPV): The most common sexually transmitted virus that is capable of causing diseases such as cervical cancer, genital warts, and others in the affected individual (CDC, 2014; Hariri et al., 2011)

Income level: An economic measure that is applied to an individual's aggregate earnings across a larger group in a city, state, region, or country. It can be used to

ascertain the economic trend at any point in time in a city, state, region, or country such as the United States (U.S. Census Bureau, 2014).

Invasive cervical cancer (ICC): Cancer of the cervix that has invaded the cells in the depth of the cervix by growing beyond the cells on the outer lining of the cervix; it most often results in mortality (NCI, 2014).

Pap test: A procedure that involves the collection and identification of cells from a woman's cervix through the use of a microscope in a laboratory (American Cancer Society, 2014; NCI, 2014).

Precancerous: The earliest abnormal cells usually identified after Pap testing using a microscope in the laboratory. Precancerous cells may result in invasive cervical cancers if not timely treated (American Cancer Society, 2014).

Sexual activity: Ability of an individual to engage in different intimate sexual acts or behaviors with a partner, or partners, by oral, penile, anal, and vaginal routes (Alters & Schiff, 2012).

Socioeconomic status: An aggregate measurement of an individual's work history, economic, and social status which is used to draw comparisons with others in a society (National Center for Educational Statistics, 2008).

Transformation zone: The part of the cervix where squamous and glandular cells, which line the cervix, meet. Most of the abnormal cellular changes that lead to cervical cancer (i.e., precancerous changes) begin in this zone (American Cancer Society, 2014; NCI, 2014).

Assumptions

First, I assumed that the use of self-reported data yielded valid and reliable data. Secondly, I assumed that the administration of the questionnaires for the study was devoid of any type of bias and that the participants' responses to the questions were honest. I also assumed that respondents' knowledge and attitude about compliance with screening varies based on their ethnicity and that this was especially true among minority groups. Finally, I assumed that Hispanic participants in the study included both those who were born in the United States as well as those who had migrated to the United States

Scope and Delimitations

I limited my sample to non-institutionalized Hispanic women in the United States who participated in the National Health Interview Survey. My decision to use Hispanic women stems from the fact that this group has the highest incidence rate of cervical cancer and the second highest mortality rate of the disease, when compared to other women (National Cancer Institute, n.d.). Including only this segment of the U.S. Hispanic female population may limit the generalizability of study findings. Furthermore, use of questionnaires may compromise the study's internal and external validity because respondents may not disclose personal information. There is a possibility that the participants may have provided responses that they perceived to be socially acceptable, instead of responses that reflected their actual perception, attitudes, and behaviors towards cervical cancer screening. Their doing so may have compromised to the study's internal validity. Due to difficulties in translating some technical terms from English to

Spanish, some participants may not have comprehended all questions on the questionnaire, thus posing a threat to internal and external validity. Threats to external validity can also occur from the voluntary participation of the study participants. According to Pinzon-Perez, Perez, Torres, and Krenz (2005), the values and perceptions of volunteers in research studies may be different from the general population.

Limitations

My use of secondary data poses some limitations. The makers of the NHIS may not have included undocumented Hispanic immigrants (who may have a higher incidence rate of the disease and lower compliance with screening due to low socioeconomic status and other factors) as respondents, thus affecting the generalizability of my study findings. In using the NHIS dataset, I was restricted to the predetermined questions it asked. If I had compiled the questions on my own, I would have based the questions on the constructs of the behavioral model for vulnerable populations. Furthermore, the participants' comprehension of the questionnaires based on language barriers and translation may have affected their response. According to Fang, Ma, and Tan (2011), language barrier and poor use of linguistically ethnic and racial friendly materials affects compliance with preventing measures such as screening and feedbacks from minority groups with English as a second language.

Significance of Study

In researching to what extent identified barriers (socioeconomic status, acculturation, and sexual activity) impact cervical cancer screening rates among Hispanic women in the United States, I hope to help fill a gap in research on this topic. I hope that

my findings might prove useful to policy makers, public health providers, and other governmental agencies in better promoting guidelines and program interventions aimed at increasing U.S. Hispanic women's compliance with cervical cancer screening. I hope that my research leads to positive social change by addressing inequalities in access to health care (specifically, to cervical cancer screening programs) among minority groups such as U.S. Hispanic women. .

Summary

The continued high incidence of cervical cancer among Hispanic women is a significant public health concern. I evaluated the impact of socioeconomic status, sexual activity, and acculturation on U.S. Hispanic women's compliance with screening for cervical cancer (CDC, 2014). I hope that my findings inform subsequent researchers examining the extent to which certain predictors affect compliance with cervical cancer screening.

In Chapter 2, I will review literature from various studies about cervical cancer screening among U.S. minorities, focusing mostly on Hispanic women. Doing so will help me to establish the theoretical foundation of the study. The discussion in Chapter 2 provides support for the assertion that Hispanic women have the highest incidence rate of cervical cancer, and the second highest mortality rate for the disease. I will also further examine the lack of scrutiny given factors such as acculturation, socioeconomic status, and sexual activity in accounting for lower cervical cancer screening rates among my study population.

Chapter 2: Literature Review

Introduction

Cervical cancer is the fourth most common cause of cancer-related deaths among women in the United States (CDC, 2014; Duggan et al., 2012; Martinez-Danote et al., 2013). Most new diagnoses of cervical cancer, both in the United States and internationally, occur in young adult women between the ages of 35-44 (Duggan et al., 2012; Fernandez et al., 2009; Martinez-Danote et al., 2013). The incidence and mortality rates of cervical cancer among Hispanic women in the United States (11.8 per 100,000) is higher than that among non-Hispanics White women (7.8 per 100,000), Black or African American women (10.1 per 100,000), and Alaskan Indians and Native American women (also 10.1 per 100,000) (Duggan et al., 2012; Fernandez et al., 2009; Martinez-Danote et al., 2013). Annually, in the United States, approximately 12,109 women are diagnosed with cervical cancer; 4,092 of these women die as a result of the disease (CDC, 2013; Jemal et al., 2013; Martinez-Danote et al., 2013).

There are significant disparities in the screening for cervical cancer among minority groups such as Hispanic women when compared to non-Hispanic white women. Routine cervical cancer screening test using Pap smears is critical for reducing the incidence and mortality rate of cervical cancer. However, Hispanic women have the lowest rate of Papanicolaou smears when compared to other demographic groups. Although 79.6% of non-Hispanic White women and 81.5% of African American women have the test, only 75% of Hispanic women do (American Cancer Society, 2011).

Addressing this disparity may decrease the incidence and mortality rate for cervical cancer among this group.

Human papillomavirus infection is the most common sexually transmitted disease both in the United States and worldwide (Dunne et al., 2013). An estimated 80% of U.S. women between the ages of 16-26 are infected each year with HPV. Approximately 50% of all sexually active U.S. women will be infected with HPV at some point in their life (Dunne et al., 2013; Hariri et al., 2011). According to WHO (2014), approximately 70% of cervical cancers and other precancerous lesions of the cervix are from an infection with HPV Types 16 and 18 acquired during sexual intercourse. The two genotypes have been identified on most abnormal Pap smears (Dunne et al., 2013; Hariri et al., 2011). HPV infection is viral in nature and usually resolves spontaneously without any treatment. However, chronic HPV infection may progress to precancerous lesions and subsequent invasive cancer of the cervix (WHO, 2014). Cancer of the cervix is the most common HPV-related disease (Dunne et al., 2013; Hariri et al., 2011; WHO, 2014).

Early detection of cervical cancer by routine screening will reduce the high incidence and mortality rate of the disease (CDC, 2013; Jemal et al., 2013; Martinez-Danote et al., 2013). Cervical cancer has significant financial, psychological, and physical impacts on affected women. In the United States, the estimated annual cost for cervical cancer is \$1.3 billion (Jemal et al., 2013). Several researchers have asserted that an increase in cervical cancer screening will significantly decrease both the incidence and mortality rates of the disease, most especially among minority groups (Jemal et al., 2013; Martinez-Danote et al., 2013). In reviewing of the published literature on this topic, I

sought to better understand the impact these barriers influence cervical cancer screening among minority groups such as Hispanic women.

Literature Search Strategy

I conducted a systematic literature review to learn more about existing research on the identified barriers to cervical cancer screening among Hispanic and other minority women groups. I used the following keywords for searching publications in Google Scholar: *Hispanic women, acculturation, Latino, cervical cancer, cervical cancer screening, immigrants, minorities and cervical cancer screening, socioeconomic status, marital status, and income*. (I excluded non-peer-reviewed articles from my review). I accessed the following databases: Pub Med, ProQuest, EBSCO host, CINAHL, Medline, Cochrane, Science Direct, and Academic Search Complete. I also searched electronic peer-reviewed academic journals on education, health, and behavioral sciences in addition to academic textbooks and news outlets. Based on my research questions, I was particularly interested in assessing the impact of family income on cervical cancer screening, the relationship between low socioeconomic status and compliance with cervical cancer screening, the impact of acculturation on cervical cancer screening, and the impact of sexual activity on cervical cancer screening.

Theoretical Foundation

In some studies, authors offered theoretical perspectives on health behavior, while others did not offer any theoretical perspective. Theoretical frameworks included the behavioral model for vulnerable population (Gonzalez et al., 2012; Schiavo, 2007), health belief model (Carpenter, 2010; Schiavo, 2007), social cognitive theory (Fernandez et al.,

2009; Mark, Donaldson, & Campbell, 2011), health investment model (McDonald, & Kennedy, 2007), the PRECEDE/PROCEED model (Aldiabat & Navenec, 2013; Wen et al., 2010), and the transtheoretical model (Armitage, 2009; Tung, Nguyen, & Tran, 2008). In this study, I used the behavioral model for vulnerable population as the theoretical framework for my study because the factors that lead to the vulnerability of Hispanic women and other minority groups might affect their health status and their use of healthcare services such as cancer screening services (Aday, 2003; Gonzalez et al., 2012; Schiavo, 2007).

The behavioral model for vulnerable population model was developed by a group of authors and researchers in the late 1960s to assist researchers in better understanding the lower use of health services by vulnerable and marginalized individuals and groups in the population (Aday, 2003; Babitsch et al., 2012). The model implied that utilization of healthcare services is functional predisposition by the people using the services but determined by certain factors which may enable or become an impediment to the utilization of these services and the need for people to care for themselves (Aday, 2003; Babitsch et al., 2012).

The model has been revised, updated, and expanded over the years with the inclusion of elaborate measures of health services that are more specific to certain disease conditions and illnesses. The revised model also features certain revolving changes in personal practices such as use of healthcare services, aimed at maintaining and improving the health status of the population to achieve a better health outcome for the marginalized and vulnerable population (Aday, 2003; Babitsch et al., 2012; Gelberg et al., 2000).

According to Aday (2003), vulnerable populations are usually groups that are at risk for neglect, discrimination, and even harm due to their inability to maintain a certain social status which may lead to possible gaps in health care services. These groups are also prone to poor maintenance of physical, social, and psychological health, and unable to meet their needs for vital health services due to ethnicity, race, gender, and/or other factors related to their status which might put them at risk for discrimination (Babitsch et al., 2012; Kilborne et al., 2006; Shi & Stevens, 2011).

According to Aday (2003), the behavioral model for vulnerable populations is divided into two domains: traditional and vulnerable. Traditional domain focuses on the vulnerable population such as minority groups, homeless, and others vulnerable individuals in the population. Traditional domain is divided into

- Predisposing domain with such demographic characteristics as age, gender, marital status, health beliefs, and social (ethnicity, education, employment, and family size)
- Enabling domain includes family, personal resources (source of healthcare, health insurance status, income), community resources (residence, region), health services resources such as patient volume distribution, for example: patient-physician ratio, hospital-bed-population ratio, and cost of financing healthcare services, entry structure and protocol of caring for the population (Aday, 2003; Shi & Stevens, 2011; Worthington, McLeish, & Fuller-Thomson, 2012).

- Needs domain includes perceived self-need and evaluated self-need based on the overall health status of the population.
- Personal health practices of traditional domain include the use of available health services, diet, exercise, self-care, tobacco, drug use, and use of health care services (Aday, 2003; Gelberg et al., 2000).

Vulnerable domain focuses on the social structure and enabling resources and includes

- Predisposing vulnerable domain accounts for acculturation, immigration status, literacy, childhood characteristics (e.g., foster care, placement in group homes, children with history of abuse and neglect, debilitating parental illnesses or conditions, housing or homelessness), amenities in housing (e.g., running water, sewers or sewage disposal, electricity, the absence of lead in housing paint, unsafe structures, heat and air-conditioning,, and transportation), history of unlawful conduct leading to jail or probation, mental illness, coping skills, cognitive and developmental issues, drug abuse, and alcoholism (Aday, 2003; Gelberg et al., 2000).
- Enabling vulnerable domain accounts for personal and family resources (e.g., public benefits, availability and use of information resources, social services, and crime rate in the community).
- Need vulnerable domain: accounts for perceived needs that are relevant to the vulnerable populations (e.g., tuberculosis, sexually transmitted

diseases, premature and low-birth weight babies, HIV/AIDS; Aday, 2003; Gelberg et al., 2000).

In spite of the effectiveness of cervical cancer screening in the United States, compliance with, and use of screening services, remains low among Hispanic women (Gonzalez et al., 2012). Many researchers have used the behavioral model for vulnerable population's framework to determine the predictors of access to health care service usage and outcomes among vulnerable populations (Gelberg et al., 2000). Gonzalez et al. (2012) hypothesized that age and language (their proxy for acculturation) predict cervical cancer screening as the predisposing domain and preventive services such as cervical cancer screening predict screening under the need for care domain while factors such as income and health plan status are the strongest predictors for enabling domain. In contrast, Fernandez and Morales (2007) identified the following predictors to health care use by vulnerable groups: ethnicity, language, socioeconomic, and demographic factors. However, Fernandez and Morales noted that the model conceptualizes the use of health care as an outcome of the interplay between the predisposing, enabling, and need factors of the vulnerable population. But other researchers maintained that application of the model is very useful for better understanding of utilization of health available health services such as cervical cancer screening among the vulnerable population (Baker, Bazargan, Bazargan-Hejazi, & Calderon, 2005; Fernandez & Morales, 2007; Hogan et al., 2012; Owusu et al., 2005; Stein, Anderson, Robertson, & Gelberg, 2012).

Methodologies Used in Previous Studies

Researchers have used quantitative and qualitative designs to study compliance with cervical cancer screening among the minority groups. Lucas (2014) and Ross et al. (2008) Studies reviewed revealed that participants were recruited by non-probability sampling and a purposeful convenience sampling method, also multistage sampling for better accessibility to the target population. Soneji and Fukui (2013) used an interviewer-administered questionnaire on demographic and health surveys from the U.S. Agency for International Development (USAID). These researchers analyzed the data using multivariate logistic regression to ascertain any existing relationship between the variables. Drolet et al. (2013) used data from the Canadian Community Health Survey, a cross-sectional population-based survey, to obtain the health status, determinants of health, and use of health care by the minority groups using interviewer-administered questionnaire. Plummer et al. (2011) conducted a cohort study using a nested case-control sample to match the identified variables and using a multistage model to ascertain cervical cancer incident rates; logistic regression was used for analysis. Duggan et al. (2012) conducted a randomized controlled trial using a culturally sensitive video interview in Spanish language to foster comprehension of the questions and better collection of information. They coded data using a binary variable and Chi square test of 2 x 2 tables. Gonzalez et al. (2012) used a telephone interview and mail-in questionnaire, both in English and Spanish, to assess the determinants of compliance with screening, using logistic regression to analyze their findings. Similarly, Wang et al. (2008) conducted several cross-sectional studies across non-Hispanic white women and different

minority groups to ascertain the reason for the disparities in screening by telephone interview with the digital dialing method in different languages; analysis was by logistic regression. The response rate revealed that ascertaining the extent of disparities in screening and health care services accessibility will improve compliance with screening.

Literature Review Related to Key Variables and/or Concepts

Overview of Cervical Cancer

The cervix or the neck of the uterus is the narrow lower portion part that connects to the vagina in the female reproductive system. It consists of different types of normal cells such as squamous (lines the outer portion or ectocervix), glandular and metaplastic or endocervical cells (lines the inner portion or endocervix) (Ellis, 2011; Kumar, Abba, Fausto, & Mitchell, 2007). Cancer of the cervix occurs in the form of abnormal cells as a result of the acquisition of genetic mutation by healthy cells. These abnormal cells gradually grow and multiply such that they accumulate to form a tumor. The cells also migrate and spread to other tissues in the body in form of metastasis. About 90% of cervical cancer occurs as squamous cell cancer approximately and 10% as adenocarcinoma Diagnosis of cervical cancer is by biopsy of an abnormal lesion after an abnormal result from cervical cancer screening (National Cancer Institute, 2014). Cervical cancer that is caused by HPV types 16 and 18 can be prevented with routine screening and HPV vaccination; and treated successfully in the early stages, but can also result in mortality in advanced stage (CDC, 2014; Dunne & Park, 2013; National Cancer Institute, 2014). Women affected by the disease usually do not show any symptoms in early stages, however, in advanced stages they may present with the following symptoms:

vaginal bleeding, bleeding and pain during intercourse, loss of appetite, weight loss, tiredness, abnormal vaginal discharge, back and pelvic pain (Kumar et al., 2007; National Institute of Health, 2008).

Predisposing Causes of Cervical Cancer

An infection with human papillomavirus is the greatest predisposing factor for cervical cancer. HPV types 16 and 18 account for approximately 75% of the cases of the disease, while types 31 and 45 have been identified in about 10% of the diagnoses worldwide (Gadducci, Barsotti, Cosio, Domenici, & Genazzai, 2011; Jemal et al., 2013). HPV infection is the most commonly sexually transmitted disease both in the U.S. and globally; approximately 50% of all sexually active individuals will be exposed to the infection at some point in their life time (CDC, 2014; Gadducci et al., 2011; Jemal et al., 2013). Women with multiple sexual partners and unprotected intercourse are at a higher risk of contacting the infection (CDC, 2014). There are about 180 types of the infection, with about 40 types affecting the reproductive system, of which 15 types are classified as high risk (CDC, 2014; Gadducci et al., 2011). According to a study on smoking and cervical cancer by Fonseca-Moutinho (2011), smoking interferes with the incidence and prevalence of HPV infection, and has a link with the occurrence of intraepithelial neoplasm and invasive cervical cancer. Furthermore, there appears to be a relationship between smoking and confounders such as systemic, emotional stress, contraception, and dietary habit (Fonseca-Moutinho, 2011; Gadducci et al., 2011). Other risk factors include infection with human immunodeficiency virus, prolonged use of oral contraceptives for

five years or more, hormone replacement therapy, multiple birth of three or children, and multiple sexual partners (CDC, 2014; Gadducci et al., 2011).

HPV vaccination has been identified as an important cervical cancer prevention strategy, but the compliance with the immunization remains low among Hispanic women. According to the National Cancer Institute (2011), the steady decrease in cases of cervical cancer in the past decades can be attributed to improved screening for cervical cancer HPV vaccination from ages 9 to 26. Other preventive measures are smoking cessation, sexual abstinence, avoidance of sexual promiscuity, condom use, and avoidance of prolonged use of oral contraceptive (National Cancer Institute, 2011). According to the American Cancer Society (2014), sexually active women and women from age 21 to 29 regardless of any sexual activity should have Pap test for cervical cancer screening every 3 years, and should only be tested for HPV DNA if a Pap smear is abnormal.

Other guidelines for cervical cancer screening include

- women ages 30 to 65 should be tested for both Pap test and HPV DNA every 5 years
- women who are 65 years and above with history of three consecutive normal Pap tests or, two consecutive normal Pap smear and HPV DNA test in the past 5 years and no history of abnormal Pap smear in the last 10 years, could stop routine screening, but those with history of abnormal test should continue with routine screening; women with a history of high risk abnormal screening should be screened more often; women with gynecological surgeries such as total

hysterectomy that involved the removal of the uterus and cervix for treatment other than cervical cancer may stop routine screening. However, women who had hysterectomy with the cervix intact should continue with routine screening for cervical cancer (American Cancer Society, 2012; American Congress of Obstetrics and Gynecology, 2014; Duggan et al., 2013; Karjane & Chelmow, 2013; National Cancer Institute, 2011).

Cervical Cancer Among Hispanic Women

According to the U.S. Census Bureau (n.d.), Hispanics refers to individuals from Mexico, Cuba, Puerto Rico, South or Central America, or any other Spanish descendant. The Hispanic population is the fastest and largest growing minority group in the United States (U.S. Census Bureau, n.d.). The incidence rate of cervical cancer among Hispanic women in the United States is 50% (11.8 per 100,000) higher than the non-Hispanic women (7.2 per 100,000), while the death rate is 70% higher than the non-Hispanic women (Siegel, Ma, Zou, & Jemal, 2014; Siegel, Naishadham, & Jemal, 2012). The incidence rates of cervical cancer is different across geographical regions and place of birth, Hispanic women in Mexico, Central and South America have three times higher incidence and mortality rates for cervical cancer than Hispanic women in the United States (Siegel et al., 2012). Among Hispanic women in the U.S., the highest incidence and mortality are in regions with the highest concentration of immigrants such as the Midwest, moreover, first generation of Hispanic immigrant women from Mexico have very high prevalence of HPV infection than women from Mexico who were born in the United States mainly because awareness of cervical cancer screening rates is also lower;

awareness of HPV infection and its association with cervical cancer is also lower among this group (Drewry, Garces-Palacio, & Scarinci, 2010; Gelman, Nikolajski, Schwarz, & Borero, 2011; Siegel et al., 2012). There also other factors in the environment and the host that may influence the chronic HPV infection which could result in cervical cancer such as HIV/AIDS. Hispanic women have three times higher incidence of HIV/AIDS than non-Hispanic White women. Varying differences in socioeconomic status also affect access and utilization of health services among Hispanic women. Hispanic women have lower compliance with Pap test when compared to non-Hispanic White women (Siegel et al., 2012). In a study conducted by Dewry et al (2010), the researchers examined the awareness and knowledge of the HPV among Hispanic immigrants with the goal of ascertaining the impact of demographics, access and utilization of health care services, the researchers conducted a randomized control trial between 2007-2009 with 543 Hispanic immigrants who are residents of Birmingham, Alabama using a questionnaire administered by an interviewer. The results indicated that 47% of the participants have awareness about HPV. Participants from age 40-50 years have higher likelihood of HPV awareness when compared to participants ages 19-29 (OR = 2.54; 95% CI=1.34-4.78). Furthermore, the association of Pap test within the past year and awareness (OR=1.82, 95% CI=1.14-2.90), the mean knowledge score for participants have awareness about HPV at 7.5 out of 11. The researchers noted lack of knowledge about HPV vaccination and treatment for HPV infection. Researchers applied multivariate analysis and noted the following results about Pap tests and participant knowledge of HPV information: participants who had Pap test within the past (OR=4.10; 95% CI=1.93, 8.69), Knowledge

of HPV information sources (OR= 1.38; 95% CI=1.09, 1.75). The researchers also noted that participants aged 30-50 have more likelihood of HPV knowledge than participants aged 19-29 (OR=2.64; 95% CI=1.35, 5.17 and OR =4.46; 95% CI=1.53, 12.98). The researchers concluded that less than 50% (less than half) of the women in the study had knowledge of HPV; age and pap test within the last year were significant factors with their awareness and knowledge of HPV (Dewry et al., 2010). According to Gelman et al. (2011), minority women have very low knowledge about HPV and its association with cervical cancer. In a study that examined HPV awareness in the general population and identification of the existence of gaps related to race and ethnicity (Gelman et al. 2011); the researchers used data that was collected between 2007 and 2008 of 4088 women by the National Survey of Family Growth. The researchers used multivariate logistic regression analysis to ascertain if there is any independent effect of on HPV awareness that can be associated with race and ethnicity after controlling for sociodemographic and clinical confounders. A stratified multivariate model was used for the assessment of the association between HPV awareness with race and ethnicity among the women in the study based on their age. The results indicated that both Hispanic and African American women have less likelihood of any knowledge about HPV when compared to white women (OR=0.39, 95% CI=0.29-0.54 and OR=0.39, 95% CI=0.29-0.54). Among African American women ages 15-18 and Hispanic women ages 19-26, the knowledge and awareness of HPV was very low (OR=0.17, 95% CI=0.07-0.43 & 0.18, 95% CI=0.11-0.30), when compared to white women in the same age group. The researchers concluded that minority women such as Hispanic and African American women have a

very low level of knowledge and awareness about HPV when compared to white women (Gelman et al., 2011).

Hispanic Immigrant Population in the United States

The population of immigrants from Latin America and increased growth of the Hispanics in the U.S. are significant developments in the increase in the population of the United States because they constitute about 16% of the population (Department of Homeland Security, n.d.; U.S. Census Bureau, n.d.). The population of Hispanics in the U.S. grew from about 6 million in 1960 to an estimated 50 million in 2005 (Department of Homeland Security n.d., U.S. Census Bureau, n.d.). Furthermore, the growth in Hispanic immigrant population can also be attributed to regional and national economic development. In addition there is a complexity in migration of individuals of Hispanic origin because immigration is deeply rooted in expanding the U.S. territorial and economic sectors (Department of Homeland Security, n.d.). According to the U.S. Census Bureau (n.d.), as of July 1, 2013, there are approximately 54 million Hispanics in the U.S., constituting 17% of the overall population and the largest ethnic minority in the country; 35.6% were born outside the U.S. It is projected that the population will increase to approximately 128.8 million by 2060 and constituting 31% of the population (Department of Homeland Security, n.d.; U.S. Census Bureau, n.d.) Women constitute about 48% (26.1 million) of the Hispanic population in the U.S. with more than 30% of the population lacking health insurance coverage (CDC, 2014; Department of Homeland Security, n.d.; U.S. Census Bureau, n.d.). The subgroups that constitute the Hispanic population are individuals from: Mexico: 64%, Puerto Rico: 9.4%, El Salvador: 3.8%,

Cuban: 3.7%, Dominican Republic: 3.1%, Guatemala: 2.3%, others of Hispanic origin: 13.7% (CDC, 2014; U.S. Census Bureau, n.d.). The increase in the growth of the population of Hispanic women is a significant demographic trend because it highlights the importance of ascertaining their health needs and accessibility to health care delivery (Escarce, Morales, & Rumbaut, 2006).

Cervical Cancer Screening Practices among Minority Women

According to the U.S. Census Bureau (n.d.), in 2012, the population of minority women is approximately 59 million. The table below (Table 1) has the breakdown according to race/ethnicity. There is an existing disproportion in the incidence and mortality rates of cervical cancer screening and cervical cancer among minority women (Fang, & Tan, 2011; Ho & Dinh 2011; Wang et al., 2008). Several studies have examined participation in cervical cancer screening among minority women in the U.S. to ascertain predictors of screening, however, none of the studies have examined the extent these predictors of screening are affecting compliance.

Table 1

Population of Minority Women in 2012

Race/Ethnicity	All Ages	Younger Than 5 Years	5-17 Years	18-24 Years	25-64 Years	65 Years and Older
Asian	8,195,552	451,233	1,209,959	767,007	4,855,093	912,260
African American	20,244,322	1,359,590	3,679,910	2,310,386	10,681,846	2,212,590
Hispanic or Latino	26,098,137	2,526,802	6,084,694	3,056,409	12,632,056	1,798,176
American Indian or Alaskan Native	1,171,327	84,787	229,466	134,763	609,111	113,200
Native Hawaiian or other Pacific Islanders	257,862	19,331	49,431	31,819	137,752	19,529
Other Races, Not Hispanic	3,059,558	455,050	946,888	382,413	1,113,195	162,012

Note: U.S. Census Bureau, 2012 Summary File, tables PCT12H-PCT120

African American women have the second highest incidence rate for cervical cancer when compared to Hispanics (highest incidence rate) and non-Hispanic white women, and the highest mortality (Jemal, Center, DeSantis, & Ward, 2010). American

Indians/Alaskan Native have higher rate of cervical cancer when compared to non-Hispanic white women (Wong et al., 2011). However, in a observational population-based study about cancer rates among Alaskan Native (AN) women, researchers noted that when compared to non-Hispanic white women, there are no significant difference between cervical cancer rates among the two groups, in fact, they observed a marked decline in cervical cancer rates (Day, Lanier, Bulkow, Kelly, & Murphy, 2010).

According to the U.S Census Bureau (2014), the Asian American population is approximately 14.7 million (5%), 9.7 million (80%) is represented by: Chinese, Asian Indians, Filipinos, Vietnamese, Koreans. There are significant disparities in screening rates of cervical cancer among minorities across ethnic and racial groups. Women of Asian American descent have the lowest rates of cervical screening when compared to the rest of the groups which may be attributed to limited knowledge about the importance of cervical cancer screening, cultural practices and beliefs, psychosocial factors, and limited access to health care services. The group has a higher incidence and mortality rate of cervical cancer when compared to non-Hispanic white women (Fang, Ma, & Tan, 2011). Ho and Dinh (2011), reviewed factors that are associated with compliance in screening for cervical cancer among Southeast Asian American women from Vietnam, Cambodia, and Hmong. The researchers noted that acculturation, age, marital status, lack of awareness about screening and cervical cancer, psychological (apprehension) about screening, socioeconomic status, limited access to health care services, and the characteristics of the clinician contributed to very low participation with cervical cancer screening. Wang et al. (2008), in their study on disparities in cervical cancer screening

between Asian American and non-Hispanic white women, conducted a cross-sectional study after controlling for confounders such as demographic and access to health care services, to examine if the differences in ethnicity/race in participation in cervical cancer screening are based on cultural beliefs. The results revealed that Asian American women had a significantly lower rate (70%) of participating in Pap smear than non-Hispanic white women (81%; $p = 0.001$). However, Vietnamese women had an alarming lower rate of 55% due to cultural beliefs when compared to the other groups of Asian American women. Asian American women with less cultural beliefs have more likelihood of participating in screening (OR=1.08; 95% CI=1.00-1.16; $P < 0.05$). Vietnamese American women have the highest risk of cervical cancer and the lowest rate of screening. Ma et al. (2012), conducted a study on 1450 Vietnamese American women from thirty community-based organization to ascertain if demographics, acculturation, access to healthcare services, awareness, knowledge, and cultural beliefs are linked to previous history screening. The researchers concluded that there is a significantly low level knowledge and awareness about cervical cancer screening and HPV. Table 2 below shows the percentage of compliance with Pap smear for both non-Hispanic white women and minority groups.

Table 2

Ethnicity/Race and of U.S women ages 18 years and above who had a Pap Smear in the last 3 Years by Percentage between 2000 and 2010

Ethnicity/Race	2000	2005	2008	2010
Non-Hispanic White	81.3%	77.7%	74.9%	83.4%
Black or African American	85.1%	81.1%	80.1%	85.0%
Hispanics	76.8%	75.2%	69.4%	78.7%
Asian	66.4%	64.1%	65.1%	75.4%
American Indians/ Alaskan Natives	77.0%	75.5%	75.4%	78.7%

Note: CDC (2012)

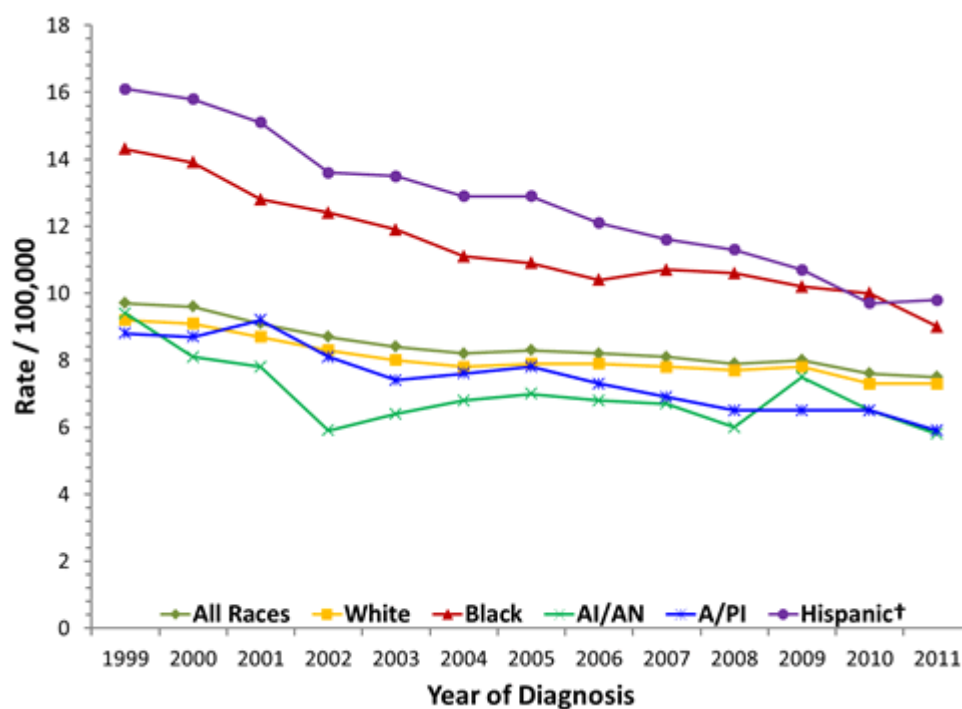


Figure 1. Incidence of Cervical Cancer by Ethnicity/Race from 1999–2011.

According to the CDC (2014), the combined data from the National Program of Cancer Registries as submitted to CDC and from the Surveillance, Epidemiology and End Results program as submitted to the National Cancer Institute in November 2014 (CDC allows the use of the above figure for educational purposes). Figure 1 shows the high incidence rate of cervical cancer among Hispanic women when compared with the other ethnic women groups in the United States.

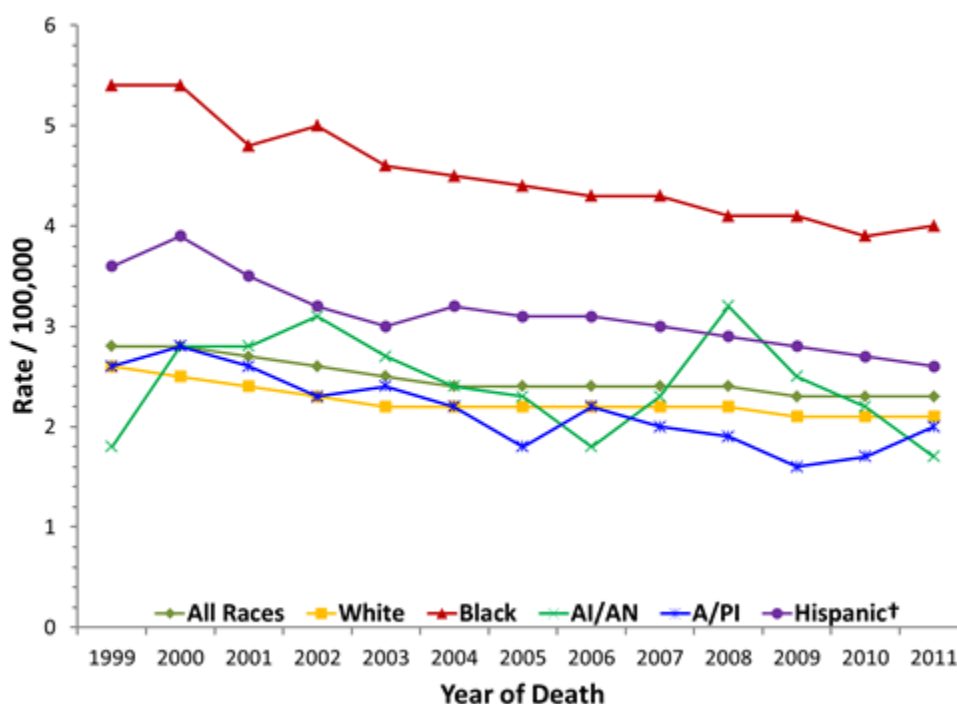


Figure 2. Cervical Cancer Mortality by Ethnicity/Race in U.S from 1999–2011. Source: U.S. Mortality Files, National Center for Health Statistics, CDC 2014 (CDC allows the use of the above figure for educational purposes). According to CDC (2014), Hispanic women have the second highest mortality rate for cervical cancer. Figure 2 shows the mortality rate of cervical cancer among Hispanic women when compared to other ethnic women groups in the United States.

Socioeconomic Status & Cervical Cancer Screening

Disparities in socioeconomic status influence compliance with screening among Hispanic and other minority women (Soneji & Fukui, 2013). Poverty evidenced by lack of health insurance are key determinants to compliance with clinician's visit and access to preventive healthcare services among Latin American women (Soneji & Fukui, 2013).

Simard et al. (2012) also found that the increased rate of cervical cancer mortality due to poor compliance with routine Pap testing can be attributed to widening disparities among minority women group in the United States. The researchers concluded that elimination of socioeconomic disparities could decrease cervical cancer rate. Lee et al. (2013), in a study conducted on Korean women and impact of socioeconomic disparity in cervical cancer screening between 1998-2010, found that socioeconomic disparities negatively impacted participation in screening because women with low level of education and lower income per household had the least likelihood of complying with screening when compared with well educated women with very high household income. Fernandez et al. (2009) also noted that there is an association between unemployment, low income level and less than 12 years of education with low rate of cervical cancer screening among Hispanic women in the United States. The finding in this research study was supported by the report from the CDC (2014) on contributing factors to health care disparities in cancer prevention. The report measured low socioeconomic status based on an individual's social (level of education), financial (gross annual income) and employment (gainful employment). The researchers noted that low socioeconomic status regardless of health insurance status, persons of lower educational level and lower income are least likely to participate in screening than persons with higher education and higher income from employment. The researchers also found that individuals with lower education and lower income have less likelihood of accessing health care services. Gonzalez et al. (2012) noted that factors such as lower income level, lower educational level, and lack of health insurance coverage have resulted in very low cervical cancer screening rates

among Latino women. Kim et al. (2013) supported the finding of the association between lower educational level, lower income and participation with screening in a research study that evaluated the socioeconomic status and the trends in mortality of cervical cancer. The researchers noted that mortality from preventable cervical cancer could be decreased by participation with routine cervical cancer screening. However, they evaluated low socioeconomic status based on the following markers: income, level of education attained, marital status, and geographical location of residence. They observed that the highest cervical cancer mortality was among women who attained the lowest level of education, had lower income, and unmarried women.

Acculturation and Cervical Cancer Screening

Acculturation or assimilation is comprised of a process of adopting the beliefs, practices, values, behaviors, and attitudes of a particular culture by immigrants from different countries (Siegel, Naishadham, & Jemal, 2012). Acculturation can be quite complex because of its positive and negative influence on the health status of the immigrant population. Assimilation of Hispanic immigrants could determine their access to health care and preventive services, engaging in behaviors such as smoking, substance abuse, violence, alcoholism, poor nutrition, and lack of physical exercise which may result in significant challenges in cancer control (Siegel et al., 2012). The effect of acculturation on the health status of immigrants can be attributed to multiple indicators such as English language proficiency, length of stay in the United States, language used at home or work, change in diet, educational level, change in health status, sociodemographic effect, age, gender, race/ethnicity, and marital status (Lee, O'Neill,

Ihara, & Chae, 2013). However, for the purpose of this research study, the focus will be on the language used for interview and educational level based on the available data from the NHIS. Level of education can affect the degree of language comprehension and usage which can be associated with reporting of health status and compliance with preventive measures (Lee et al., 2013). Hispanic women in the United States have lower cervical cancer screening rates when compared to non-Hispanic white women (Duggan et al., 2012; Paskett et al., 2010; Gonzalez et al., 2012). This could be attributed to no health insurance due to financial constraints, lack of access to healthcare services, acculturation, low socioeconomic status, psychological factors (perceived vulnerability), and perceived link of high risk sexual behavior with Pap test (Byrd, Chavez, & Wilson, 2007; Duggan et al., 2012; Paskett et al., 2010). Gonzalez et al. (2012) in a study that supported the findings in this research study identified lack of health insurance, poor access to health care services, language barrier, compliance, and utilization of screening services as some of the factors for low cervical cancer screening among Hispanic women. According to Martinez-Donate et al. (2013), acculturation evidenced by sociocultural, language such as low proficiency in English language, legal factors relating to immigration status, and structural barriers have affected compliance with screening for cervical cancer by Latino women. Fernandez et al. (2009) noted that recent immigration, language barriers and low acculturation are some of the factors affecting Pap testing among Hispanic women. Lee and Vang (2010) found that illiteracy and lack of proficiency in the English language are significant barriers to utilization of cervical cancer screening services. English language, as a measure of acculturation, was a factor with compliance to cervical cancer screening

and access to health care among immigrant women because Asian women who are fluent in English language complied with screening services and a much higher rate than those without English proficiency (Lee, Nguyen, & Tsui, 2011). Cervical cancer screening rates vary based on educational level. Women who have the most education tend to be more compliant with routine cervical cancer screening than women with less schooling (CDC, 2014).

Sexual Activity and Cervical Cancer Screening

Unprotected sexual intercourse at any age predisposes a woman to sexually transmitted diseases such as HPV infection. Age of first sexually intercourse is a significant factor to exposure to sexually transmitted diseases (Bourne et al., 2010). According to Plummer, Peto, and Franceschi (2011), sexual activity at a very young age is a significant risk factor for cervical cancer because initial sexually transmitted infection such as HPV infection occurs after first sexual activity. Borne et al. (2010) also noted that women had their first sexual intercourse at less than 15 years of age are at a higher risk for sexually transmitted disease than those from ages 15-and above. In a study about lesbians and compliance with cervical cancer screening, Tracy, Alison, and Ireland (2010), noted that lesbians are at a higher risk for cervical cancer because of their engagement in some modifiable risk factors for the disease such as smoking and obesity when compared to the rest of the women in the population. Furthermore, lesbians have higher risk of exposure to HPV infection from their partner, but have low participation in Pap test. Drolet et al. (2013) noted in their study on sociodemographic characteristics of women with greater sexual activity and cervical cancer screening those women with low

socioeconomic status with report of greater sexual activity had very low cervical cancer screening rates. However, according to cervical cancer screening guidelines, women who are less than 21 years of age should not be screened regardless of the age of their first sexual activity (ACOG, 2014; Karjane & Chelmow, 2013; Paskett et al., 2010). This underscores the risk identified by Borne et al. (2010) and Plummer et al. (2011) of the HPV infection risk associated with sexual intercourse at a very young age. However, Limmer, LoBiondo, and Daines (2014) identified marital status as a predictor for adherence to Pap smear screening. The researchers maintained that married women tend to comply with preventive health services such as Pap smear screening when compared to single women.

Summary

The literature review provided insight about predictors of cervical cancer screening, such as acculturation, socioeconomic status, and sexual practices, among Hispanic women. The review also offered several strategies that might increase participation in screening by addressing these predictors and challenges. Hispanics represent the fastest growing minority population and largest minority group in the United States. However, the literature reviewed was consistent in low compliance with cervical cancer screening but revealed limited studies about the extent to which predictors such as sexual activity, acculturation, and socioeconomic status impact screening and access to health care services. The study attempted to fill the gap in the literature by identifying the extent to which these factors impact cervical cancer screening. Chapter 3 will provide a discussion of the methodology for this research.

Chapter 3: Research Methods

Introduction

My purpose in conducting this study was to examine predictors of cervical cancer screening among Hispanic women in the United States. I examined the association between the cervical cancer screening and acculturation, socioeconomic status, and sexual activity in an effort to better explain compliance with screening in the target population. In this chapter I will describe the research design of the study along with the rationale, methodology, population, sampling procedures (i.e., sample selection, size, and power analysis), and procedures used for recruiting respondents. I will also discuss the study instruments and operationalization of constructs, my data analysis plan, threats to validity and reliability that arose from my use of the NHIS dataset, and ethical considerations.

Research Design and Rationale

Data for this cross sectional study were obtained from NHIS for the years 2011, 2012, and 2013. I used a quantitative, nonexperimental, approach to investigate the impact of the independent variables (acculturation, socioeconomic status, and sexual activity) on the dependent variable (cervical cancer screening; Aschengrau & Seage, 2008; CDC, 2014; Creswell, 2009). A quantitative method was appropriate for investigating the relationship between the variables and testing of the hypothesis, as well as obtaining a generalized sample of the population. According to Moballeghi and Moghaddam (2008), a quantitative method uses numerical observations to examine causal relationships. In using quantitative methods the researcher scrutinizes causal

relationships or associations by manipulating factors that may influence variables of while controlling other variables that may affect the outcome of the experiment (Moballeghi & Moghaddam, 2008). By using a nonexperimental quantitative method, I was able to determine the type of association or relationship between acculturation, sexual activity, and socioeconomic status and how the participants complied with cervical cancer screening.

According to Creswell (2012), nonexperimental approaches provide the researcher with more contextual and explanatory information about research outcomes, which may be helpful for improving and/or formulating future interventions. By using this descriptive approach, I was able to investigate the independent variables and how they influenced the dependent variable, as well as explain the health behaviors and attitudes of the participants in the study towards compliance with cervical cancer screening. The nonexperimental design allowed me to draw a conclusion about the attitude and health behavior of the participants towards cervical cancer screening. Harcourt et al. (2014) used a similar design in studying the predictors of breast and cervical cancer screening behavior among immigrant women and concluded that health behavior was significantly affected by ethnicity and years of residence in the United States.

Methodology

Population

The participants for this study were Hispanic women between the ages of 21 – 65 living in the United States who were respondents in the NHIS for the years 2011, 2012,

and 2013. I chose this age group using guidelines for cervical cancer screening by Pap smear (CITE). According to the guidelines, women between the ages of 21 to 65 should be routinely screened for cervical cancer by Pap smear every 3 years. (They recommend that women aged 30 –65 be screened every 5 years when the previous screening was a combination of Pap smear and HPV testing [ACOG, 2014; CDC, 2014].)

The NHIS is a cross-sectional survey; the enrollment of the participants was based on the initial sample design which followed a stratified multistage area probability designs of the NHIS for the estimation of the overall population because the design permitted a representative sample of all households and noninstitutionalized groups. The sampling technique though complex was cost-effective with the goal of improving the reliability of the following domains: race/ethnicity and geographical location (CDC, 2012; Parsons et al., 2014). The present sampling plan was implemented in 2006. Redesignation of the plan is done every after each decennial census for better representation of any changes in population (CDC, 2012). The survey is conducted annually; sample assignment usually reflects the all the regions and quarters in the United States The households for the interview are further assigned based on the thirteen weeks of each quarter.

I analyzed the NHIS's findings on Hispanic women because they have a high incidence of cervical cancer and they have the second highest mortality rate of the disease among this group (CDC, 2014; Duggan et al., 2012; Horner et al., 2011). The population of Hispanic women in the United States is estimated at 14.4 million; about 48% of these women were born in the United States, while 52% were born outside the country (U.S.

Census Bureau, n.d.). According to the U.S. Census Bureau (n.d.), 55% of Hispanic women reported speaking English in their homes and being fluent in the English language. Approximately, 73% of immigrant Hispanic women reported that they are not fluent in English language and do not speak the English language at home.

Sampling and Sampling Procedures

The makers of the NHIS used a stratified multistage sample design for estimating the general population. The NHIS redesigns the sampling method every decade to ensure an up-to-date reflection of the general population. The survey is usually conducted annually; sample assignment usually reflects all the regions and quarters in the United States. The sample of for this research study included Hispanic women respondents from the NHIS study who were between the ages of 21-65 for the years 2011, 2012, and 2013. My rationale for choosing this population is because this group has the highest incidence rate and the second highest mortality rate for cervical cancer in the country (CDC, 2014; Duggan et al., 2012; Horner et al., 2011). Knowing more about the extent to which socioeconomic status, sexual activity, and acculturation affect the cervical cancer screening could contribute to the body of literature. It might also aid in the development of policies and interventions that may improve compliance with cervical cancer screening and possibly decrease both the incidence and mortality rates of the disease among Hispanic women.

Power Analysis

As shown in Table 3, I completed a power analysis to determine the minimum sample size for the research study based effect size, statistical power level, and the probability level (p-value, alpha level and/or error rate).

The result of the analysis was based on one-tailed hypothesis (minimum total sample size), minimum sample size for each group, two-tailed hypothesis (minimum total sample size) and the minimum sample size per group.

Table 3

Sample Size Calculations – Simple Random Sampling (Design Effect and Clusters = 1)

Frequency				Total	
	2011	2012	2013		
Population	610	633	822	2,065	
Expected frequency	50%	50%	50%		
Confidence limits	5%	5%	5%		
Effect size	1.0	1.0	1.0		
Cluster	1	1	1		
The Statistical	80%	130	131	138	399
Power level	90%	188	190	204	582
	95%	236	240	263	739
	99%	319	325	368	1012
Level of probability (p-value, alpha level/or error rate)	0.05	0.05	0.05		

Data Collection Method

Procedure for Accessing the Data Set

For over five decades, the NHIS has been a primary source of health data on the U.S population. The dataset is free to the public with easy online access through the NHIS website (<http://www.cancer.nhis.gov>, or <http://www.cdc.gov/nchs/nhis.htm>). Interviewers who are employees of the U.S government and who are trained using specifications of the NCHS collect data through in-person household interviews. The questionnaires they administer include a Computer Assisted Personal Interviewing (CAPI) mode because of the quality of the data and timeliness it provides (CITE). The CAPI assists the interviewer in determining the response range and checking the error range and any data transcription error; it also improves storage of data and eliminates the printing and mailing cost (CDC, 2014; Kissinger et al., 2010).

Instrumentation

I also used the Integrated Health Interview Series (IHIS), a comprehensive free public data repository of the NHIS which is managed by the Minnesota Population Center at the University of Minnesota and funded by the by the National Institute of Child Health and Human Development (NICHD; Davern, Blewett Lee, Boudreaux, & King, 2012; Integrated Health Interview Series, 2010; Johnson, Blewett, Ruggles, Davern, & King, 2008). The data is harmonized with comprehensive documentation about the health of the population in the U.S.

Instrumentation and Operationalization of Constructs

The use of measurement in a public health research study allows the researcher to assign numbers to an observation and quantify different aspects of a phenomenon (Kimberlin & Winterstein, 2008). Measurement includes operationalizing constructs as variables (dependent and independent), developing and applying instruments, and testing of the variables.

Validity and reliability are the key indicators used to measure instruments. Validity implies to the extent of measures of the intended phenomenon using an instrument, it assesses the degree to which it measures the instrument is expected to measure while reliability implies to the extent to which the measurement provides a consistency in the result of the assessment of the same phenomenon over time (Kimberlin & Winterstein, 2008). Instruments used for measurement must be reliable; however, an instrument may be reliable but not valid.

After selecting questionnaires from the NHIS for analysis, I operationalized my variables based on the constructs of the behavioral model for vulnerable populations.

Dependent Variable

Cervical cancer screening was the dependent variable for this study. Pap smear is the recommended screening test for cervical cancer. According to the American Congress of Obstetricians and Gynecologists (ACOG; (2014), regardless of risk factors or a women's sexual behavior, screening should start at 21 years of age. Women from ages 21-29 should have a Pap smear every 3 years while women ages 30-65 should have a Pap smear every 3 years and be tested for HPV every 5 years. However, women who are at

high risk for cervical cancer (e.g., women with a history of abnormal Pap smears, are HIV positive, have a condition that may compromise their immunity, or who have been exposed to diethylstilbestrol prior to their birth) should be screened more frequently. ACOG recommends that some women who are 65 and older not have a cervical cancer screening. This group includes women who have had at least three consecutive negative Pap smear results or two consecutive negative Pap smear with negative HPV in the previous 10 years. Please see Table 5 for the questions assigned to variables and measurements.

Independent Variables

Acculturation, socioeconomic status, and sexual activity (independent variables) will be measured based on the following domains: predisposing factors such as socioeconomic status measured by family income, sexual activity, and enabling factors such as acculturation measure by English language proficiency. According to Babitsch et al. (2012), accessing and utilization of health care services is based on how functionally predisposed the users of the services are to the services, their understanding of the importance of self-care, and the factors that may impede their access and utilization of the services. According to Shah, Zu, Wu, and Potter (2006), there is an inverse correlation between poor screening for cervical cancer and acculturation levels because low acculturation is associated with poor access and utilization of cervical cancer screening services. Table 4 provides a summary of variables and their level of measurement and Table 5 provides questions assigned to variables and measurements.

Table 4

Summary of Variables and Level of Measurement

Independent Variable	Level of Measurement	Dependent variable	Level of measurement
Socioeconomic status	Ordinal (interval)	Cervical cancer screening	Continuous
Acculturation(behavior)	Nominal (continuous)		
Sexual activity (behavior)	Nominal (continuous)		

Table 5

Questions Assigned to Variables and Measurements

Type of Variable	Question(s)	Response(s) with Options	Data Type
Cervical Cancer Screening (dependent variable)	Have you had any Pap smear in the last 12 months?	Yes: No: Not ascertained: Don't know:	Continuous
Socioeconomic status (independent variable)	What was your total family income from all sources: le 0-\$35,000, \$35,000-\$74,999, \$75,000 or more?	1: 0-\$35,000 2: \$35,000-\$74,999 = <\$75,000 or more	Continuous
Acculturation	What is your	1 = proficient in English 2 =	Continuous

(independent variable)	<p>language of proficiency?</p> <p>What is your highest level of education?</p>	<p>proficient in Spanish 3 = proficient in English and Spanish</p> <p>4 = Other</p> <p>no formal education or attended Grades 1 through 5, 2 = attended Grades 6 through 12, 3 = GED/high school graduate/ some college / college graduate, associate degree, Bachelors/Masters/Doctoral</p>	Ordinal
Sexual activity (independent variable)	<p>Are you married and sexually active? Married and not sexually active? Widowed and sexually active? Divorced and sexually active? Separated and sexually active? Never married and</p>	<p>1 = married and sexually active, 2 = married and not sexually active, 3 = widowed and sexually active, 4 = divorced and sexually active, 5 = Separated and sexually active 6 = Never married and sexually active 7 = Living with a partner and sexually active 8 = Unknown marital status and sexually active.</p>	Continuous

	sexually active? Living with a partner and sexually active? Unknown marital status and sexually active?		
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Data Analysis

Analysis Plan

Analysis of data was done using SPSS version 21.0 for Windows. Tabulation of descriptive statistics was performed for the following demographics: cervical cancer screening, acculturation, socioeconomic status, and sexual activity. Statistical tests were based on an alpha level ($\alpha = .05$) for statistical significance. A decision to reject the null hypothesis was based on the following:

- *P*-value less than or equal to the alpha level, reject the null hypothesis and accept the alternative hypothesis
- *P*-value greater than the alpha level, retain the null hypothesis and reject the alternative hypothesis.

Statistical Analysis for Research Question 1

The first research question for this study was:

RQ1: To what extent does socioeconomic status, as measured by family income, have an impact on cervical cancer screening among Hispanic women in the United States?

Ho1: Socioeconomic status, as measured by family income, has no impact on cervical cancer screening among Hispanic women in the United States.

Ha1: Socioeconomic status, as measured by family income, does have an impact on cervical cancer screening among Hispanic women in the United States.

Testing for any association between the extent to which socioeconomic status, as measured by family income, impacts cervical cancer screening was conducted using the Chi-square test for independence and logistic regression. Logistic regression was used to ascertain the significance of results obtained and to decide whether to reject or retain the null hypothesis based on the stated alpha level of 0.05.

Statistical Analysis for Research Question 2

The second research question for this study was:

RQ2: To what extent does sexual activity, as measured by marital status, have an impact on cervical cancer screening among Hispanic women in the United States?

Ho2: Sexual activity, as measured by marital status, has no impact on cervical cancer screening among Hispanic women in the United States.

Ha2: Sexual activity, as measured by marital status, does have an impact on cervical cancer screening among Hispanic women in the United States.

Testing for any association between the extent to which sexual activity impact cervical cancer screening was conducted using the Chi-square test for independence and logistic regression. Logistic regression was used to ascertain the significance of results obtained and for the determination of whether to reject or retain the null hypothesis based on the stated alpha level of 0.05.

Statistical Analysis for Research Question 3

The third research question for this study was:

RQ3: To what extent does acculturation, as measured by English language proficiency and educational level, have an impact on cervical cancer screening among Hispanic women in the United States?

Ho3: Acculturation, as measured by English language proficiency and educational level, has no impact on cervical cancer screening among Hispanic women in the United States.

Ha3: Acculturation, as measured by English language proficiency and educational level, does have an impact on cervical cancer screening among Hispanic women in the United States.

Testing for any association between the extent to which sexual activity impacts cervical cancer screening was conducted using the Chi-square test for independence and logistic regression. Logistic regression was used to ascertain the significance of results obtained and for the determination of whether to reject or retain the null hypothesis based on the stated alpha level of 0.05.

This researcher is aware that an improvement in data quality could be enhanced by cleaning the data prior to entering the data because unclean data could affect the

reliability and correctness of the study. Data cleaning involves application of strategies aimed at preventing errors by identifying and correcting errors for the purpose of minimizing their effect on the result of a research study (Van den Broeck, Cunningham, Eeckels, & Herbst; 2005; Osborne, 2013). The nature and source of raw data is a significant determinant of the status of any data. Data can be cleaned by the application of combination of different algorithms by repeating of screening cycles, diagnosis, and minimizing any data abnormalities through careful editing (in three phases: screening, diagnostic and treatment) to achieve a better result (Van den Broeck et al., 2005; Wu, 2013).

Threats to Validity

Threats to validity for a non-experimental study was primarily based on measurements because secondary data minimizes the threat but does not provide the research the exact measures for investigations (Smith et al., 2010). However, this study investigated the extent at which the socioeconomic status, sexual activity, and acculturation affected compliance with cervical cancer screening among Hispanic women using NHIS data from 2012, 2012, and 2013. The NHIS was a cross-sectional study which may be prone to recall bias because the participants were asked questions regarding their cervical cancer screening including the intervals. These participants may have provided responses that could be considered socially-acceptable; they may even have provided responses that may appear as over-reporting. According to Morema et al. (2014), self-reporting for screening may not be very accurate because it may not be authenticated. The accuracy of self-reports should be interpreted in the assessment of

screening rates and screening gaps because wide-spread over-reporting could result in low prevalence. Validating the self-report of the vulnerable population could reveal inequities that may even be greater than expected. Screening validity in women who are socially disadvantaged (based on race/ethnicity, health literacy status, income, English proficiency, and birth based on migration status) could be quite problematic in a study due to the likelihood of higher socially desirable response among participants with limited health literacy and minorities (Lofters, Moineddin, Hwang, & Glazier, 2013). According to Lofters et al. (2013), minority groups such as Hispanic and African American women have the tendency to over-report screening at a significantly disproportionate level when compared to non-Hispanic White women. Nonetheless, the benefits of self-reporting cannot be dismissed because self-reporting is an integral aspect of a survey data collection especially with large sample size (Olesen, Butterworth, Jacomb, & Tait, 2012). Stanton et al. (2012) recommended that validity of studies using self-reporting should be based on a combination of sensitivity and specificity of selected indicators, and also knowledge of the population to be surveyed on the basis of prevalence because low prevalence could result in over-estimation even with high specificity. The NHIS questionnaire used for this non-experimental study was conducted based on self-report of the participants which may have threatened the internal validity in form of selection and bias in measurement (Smith et al., 2010). Threats to the external validity may have resulted from generalizing the study result based on a size of the population especially in very large population which the NHIS was conducted (CDC, 2014; Smith et al., 2010). The validity of the measurement procedures may have

threatened the statistical conclusion of the study. Factors such as an inflation of type I error, effect size, utilization of appropriate sampling procedure, insufficient statistical power, and any assumptions of the statistical test may also have affected the statistical conclusion validity. It is pertinent that the study design was articulated so as to minimize threats to both the internal validity and statistical conclusion validity (Cohen & Swerdlik, 2004; Cook, Campbell, & Day, 1979; Shadish, Cook, & Campbell, 2006).

This study used the NHIS, an established database with sample that represented the non-institutionalized population and principal source of data of health information sponsored by the Centers for Disease Control and Prevention through the National Center for Health Statistics (NCHS). Pre-tested standardized questionnaires were administered by highly trained personnel which further limits threats to the validity of the survey (CDC, 2014).

Ethical Procedures

The Division of Health Interview Statistics, National Center for Health Statistics was contacted and verified that all data is free online access for the general public and that no special permission was needed to use this data.

Human Subjects Protection

This research study used secondary data from NHIS, a division of the CDC; hence accessibility to human participants was not necessary. There was no accessibility to any personal or identifying information that may constitute bias or any conflict of interest by this researcher. Furthermore, information obtained by the NHIS was done anonymously for the protection of the participants. This researcher did not make any attempt

throughout the study to obtain any personal or identifying information. This research study was submitted to the Institutional Review Board (IRB) at Walden University for approval. The data usage was strictly for the purpose of analysis with the approval of the Institutional Review Board (IRB) at Walden University, approval number 05-21-15-0292670.

Ethical Concerns

The use of secondary data for the study did not require any processes or recruitment materials and did not require any intervention activity. Furthermore the content of the survey was anonymous. Personnel used for data collection were employees of the United States government trained by the U.S Census Bureau based on stipulated procedures and protocols of the NCHS. These employees were obligated to sign statements that guarantee the maintenance of confidentiality of the data (CDC, 2014).

Treatment of Data

The data used was anonymous and this researcher did not attempt to obtain any identifying information. All documents and reports were strictly and professionally utilized to accord respect for the participants in the original survey conducted by the NHIS. This researcher maintained utmost integrity and professionalism throughout the study analysis and no attempt was made to falsify, tamper, modify, or alter any data used in the study. Data was safely stored in a personal computer in a locked cabinet and will remain so for a period of 5 years; this researcher was the only one with access to this data. The data will be destroyed when the 5 year period has elapsed.

Summary

This chapter presented the research design and methodology used for a non-experimental quantitative study using data from National Health Interview Survey, a free online public data repository of the National Center for Health Statistics, a division of the Centers for Disease Control and Prevention. The study focused on data that was used to answer research questions based on ascertaining the extent to which the socioeconomic status, acculturation, and sexual activity may affect compliance with cervical cancer screening among Hispanic women. Data obtained from this study may assist in filling the gap in the literature about the extent to which socioeconomic status, acculturation, and sexual activity affect cervical cancer screening. I discussed some pertinent aspects of the research such as the study design, sampling, methodology, instrumentation, process of data analysis, limitations, and ethical considerations for this study. In Chapter 4, I present the results from my data analysis.

Chapter 4: Results

Introduction

The purpose of this cross-sectional quantitative research study was to examine the predictors of cervical cancer screening among Hispanic women in the United States by examining the association between the dependent variable, cervical cancer screening, and the extent to which the independent variables, acculturation, socioeconomic status, and sexual activity, affect compliance with screening in the target population.

The research questions and hypotheses for this study were as follows:

RQ1: To what extent does socioeconomic status, as measured by family income, have an impact on cervical cancer screening among Hispanic women in the United States?

Ho1: Socioeconomic status, as measured by family income, has no impact on cervical cancer screening among Hispanic women in the United States.

Ha1: Socioeconomic status, as measured by family income, does have an impact on cervical cancer screening among Hispanic women in the United States.

RQ2: To what extent does sexual activity, as measured by marital status, have an impact on cervical cancer screening among Hispanic women in the United States?

Ho2: Sexual activity, as measured by marital status, has no impact on cervical cancer screening among Hispanic women in the United States.

Ha2: Sexual activity, as measured by marital status, does have an impact on cervical cancer screening among Hispanic women in the United States.

RQ3: To what extent does acculturation, as measured by English language proficiency and educational level, have an impact on cervical cancer screening among Hispanic women in the United States?

Ho3: Acculturation, as measured by English language proficiency and educational level, has no impact on cervical cancer screening among Hispanic women in the United States.

Ha3: Acculturation, as measured by English language proficiency and educational level, does have an impact on cervical cancer screening among Hispanic women in the United States.

In this chapter I discuss my protocol for data collection and analysis and present the results of my investigation.

Data Collection

I analyzed secondary data obtained from the NHIS from 2011, 2012, and 2013 to investigate the extent to which the independent variables, socioeconomic status, acculturation, and sexual activity, affect the dependent variable – cervical cancer screening among Hispanic women in the United States. I analyzed NHIS findings for these years, restricting my focus to respondents who were U.S. Hispanic women between the ages of 21–65. I chose this age group based on the latest guidelines for cervical cancer screening by Pap smear that recommended that women between the ages of 21-65 should be routinely screened for cervical cancer by Pap smear every three years (American Cancer Society, 2012; American Congress of Obstetrics and Gynecology, 2014; & National Cancer Institute, 2011). The sample size for the study was 739

Hispanic women in the United States. The data used in this study was randomly collected from Hispanic women in the United States. Therefore, I believe that the sample was representative of the population of interest. Table 6 illustrates the various Hispanic sub-groups that participated in the study.

Table 6

Ethnic Breakdown of U.S. Hispanic Female Respondents to NHIS, 2011-2013

	Frequency in Percentage		
	2011	2012	2013
Multiple Hispanic	2.6%	1.7%	1.5%
Cuban American	5.2%	3.9%	3.5%
Dominican Republic	4.3%	3.0%	4.0%
Central/South American	16.2%	20.9%	16.3%
Other Spanish	3.1%	3.2%	2.2%
Total	236	240	263

I analyzed the association between cervical cancer screening and the following independent variables: socioeconomic status (measured by family income), acculturation (measured by English language proficiency and educational level), and sexual activity (measured by marital status). In the pages that follow I will explain how I operationalized

my variables. Table 7 provides information about Pap smear testing of the study participants. In 2011, 50.7% of the participants had a Pap smear while 48.7% did not ($n = 236$). In 2012, 48.7% of the participants had a Pap smear while 48.5% did not ($n = 240$). In 2013, 90.4% of the participants had a Pap smear while 7.9% did not ($n = 263$). :

Table 7

Respondents with Pap Smear Test in the Past 12 Months

Response	Frequency in Percentage		
	2011	2012	2013
Yes	50.7%	48.7%	90.4%
No	48.5%	48.5%	7.9%
Not ascertained	0.5%	2.2%	1.1%
1. Don't Know	0.3%	0.6%	0.6%
	N=236	N=243	N=263

The study participants' mean age was 39.4 years with a standard deviation of 11.9 years. The youngest age of the study participants was 21 years while the oldest age was 65 years old.

In running my analyses, I assigned participants to the following age groups: 21-25 years old, 26-30 years old, 31-35 years old, 36-40 years old, 41-45 years old, 46-50 years old, 51-55 years old, 56-60 years old, and 61-65 years old. In 2011, 72.4% of participants were between the ages of 21-45, while 27.25% were between the ages of 46-65. In 2012, participants who were between the ages of 21-50 years represented 82.5% of the study

participants while those between the ages of 51-65 years represented 17.5% of the study participants. In 2013, participants who were between the ages of 21-50 years represented 81.4% of study participants while those between the ages of 51-65 years represented 18.6% of the study participants. Table 8 provides information on the age distribution of the study participants.

Table 8

Age Distribution of Hispanic Sub-groups

Age range	Frequency			X ²	p-value
	2011	2012	2013		
Mean age	39.2±11.9yrs	39.4±11.7yrs	39.5±12.0	0.16	(d.f.2) 0.92
21-29	29.7%	26.5%	28.9%		
30-65	70.3%	73.5%	71.1%		
Number of participants	236	240	263		

I assessed participants' socioeconomic status based on annual family income. In 2011, 79.2% of participants earned less than \$35,000 a year, and 17.4% earned \$35,000-\$74,999 while 3.4% earned \$75,000 or more ($N = 236$). In 2012, 82.6% of the participants earned less than \$35,000 a year, and 13.5% earned \$35,000-\$74,999 while 3.9% earned \$75,000 or more ($N = 240$). In 2013, 80.4% of the participants earned less than \$35,000, and 16.7% earned \$35,000-\$74,999 while 2.9% earned \$75,000 or more. Table 9 provides information on the family income of the study participants.

Table 9

Respondents' Family Income

	Frequency		
	2011	2012	2013
\$0 - \$34,999	79.2%	82.6%	80.4%
\$35,000 - \$74,999	17.4%	13.5%	16.7%
\$75,000 and above	3.4%	3.9%	2.9%
	N =236	N=240	N=263

I analyzed acculturation using English language proficiency and educational level. I found that the vast majority of respondents for all study years reported being proficient in English. In 2011, 90.6% of the study participants were proficient in English, 5.9% were proficient in Spanish, and 3.3% were proficient in both English and Spanish while those who responded as other was 0.2% ($N = 236$). In 2012, 92.4% of the study participants were proficient in English, 4.4% were proficient in Spanish, and 1.9% were proficient in both English and Spanish while those who responded as other was 1.3% ($N = 240$). In 2013, 93.4% of the study participants were proficient in English, 4.1% were proficient in Spanish, and 1.8% were proficient in both English and Spanish while 0.6% were proficient in other languages ($N = 263$). Table 10 provides information about the language used by the study participants during the interview.

Table 10

Language used in the Interview by the Respondents

Language	Frequency		
	2011	2012	2013
English	90.6%	92.4%	93.4%
Spanish	5.9%	4.4%	4.1%
English & Spanish	3.3%	1.9%	1.8%
Other	0.2%	1.3%	0.6%
Total	N=236	N=240	N=263

I analyzed acculturation using participants' educational level (ranging from no formal education to post graduate degree). In 2011, the combined percentage of participants who had no received no formal education and those who attained grades 1-5, was 1.5%. Twenty-seven percent of participant's attained grades 6-12 while 71.5% attained a GED or high school diploma or Associate or Bachelors, Masters, or doctoral degree. Table 11 below provides information about the educational level of the study participants.

Table 11

Respondents' Highest Level of School Attended

Educational Level	Frequency		
	2011	2012	2013
No formal education/			
Grade 1-5	1.5%	5.5%	5.3%
Grade 6-12	27.0%	24.0%	23.2%
GED/HS/College graduate/			
Associate degree, Bachelors,			
Masters/Doctoral	71.5%	71.5%	71.5%
No. of participants	N=236	N=240	N=263

I paired participants' sexual activity with marital status. I found that, in 2011, 49% of the participants were married and sexually active, 2.8% were married and not sexually active, 2.1% were widowed and sexually active, 10.8% were divorced and sexually active, 6.1% were separated and sexually active, 19.2% had never been married and were sexually active, and 9.7% were living with partners and sexually active. A small number (0.3%), who did not report a marital history or current status, reported that they were sexually active ($N = 236$). In 2012, 49.7% of the participants were married and sexually active, 1.6% were married and not sexually active, 2.1% were widowed and sexually active, 10.0% were divorced and sexually active, 6.5% were separated and sexually active, 19.2% were never married and sexually active, 10.9% were living with

partners and sexually active, while 0.0% have unknown status ($n=240$). In 2013, 47.7% of the participants were married and sexually active, 2.2% were married and not sexually active, 1.1% were widowed and sexually active, 10.2% were divorced and sexually active, 6.3% were separated and sexually active, 22.5% were never married and sexually active, 9.9% were living with partners and sexually active, while 0.1% have unknown status and sexually active ($n=263$). Table 12 provides information on respondents' marital history and status and sexual activity.

Table 12

Respondents' Marital Status

	Frequency		
	2011	2012	2013
Married-sexually active	49.0%	49.7%	47.7%
Married-not sexually active	2.8%	1.6%	2.2%
Widowed-sexually active	2.1%	2.1%	1.1%
Divorced-sexually active	10.8%	10.0%	10.2%
Separated-sexually active	6.1%	6.5%	6.3%
Never married-sexually active	19.2%	19.2%	22.5%
Living with partner –			
Sexually active	9.7%	10.9%	9.9%
Unknown marital status-			
Sexually active	0.3%	0.0%	0.1%
Total	N=236	N=240	N=263

Results

Preliminary Analysis

A Chi-square test of independence was conducted for the determination of the association between the study participants that were screened for cervical cancer and the following independent variables: socio-economic status measured by family income, acculturation measured by English language proficiency and educational level, and sexual activity measured by marital status. Following is the outcome of this analysis.

Socio-economic status. A Chi-square test for independence was used to test research question one.

RQ1: To what extent does socioeconomic status, as measured by family income, have an impact on cervical cancer screening among Hispanic women in the United States?

H_01 : Socioeconomic status, as measured by family income, has no impact on cervical cancer screening among Hispanic women in the United States.

H_{a1} : Socioeconomic status, as measured by family income, does have an impact on cervical cancer screening among Hispanic women in the United States.

In 2011, data for N=236 participants were analyzed. Of those, 79.2% (n=187) of the study participants had a family income between 0-\$34,999; 50.2% (n=94) of participants gave a yes response to participation in cervical cancer screening. Next, 17.3% (n=41) of the study participants had a family income between \$35,000 - \$74,999; 48.7% (n=20) of participants responded with a yes to screening. Lastly, 3.3% (n=8) of the participants had income level of \$75,000 and above; 75% (n=6) of participants responded

with a yes to cervical cancer screening. Overall in 2011, a total of 50.8% (n=120) of participants responded with a yes for cervical cancer screening. The result of the Chi-square test in 2011 indicated that family income was not significantly associated with cervical cancer screening ($p=0.99$). The null hypothesis could not be rejected.

In 2012, data for N=240 participants were analyzed. Of those, 82.5% (n=198) study participants had a family income between 0 - \$34,999; 53.0% (n=105) of participants gave a yes response to participation in cervical cancer screening. Next, 13.8% (n=33) of study participants had a family income between \$35,000 - \$74,999; 36.3% (n=12) of participants responded with a yes to cervical cancer screening. Lastly, 3.8% (n=9) of study participants had an income level of \$75,000 and above; none of the participants responded with a yes to cervical cancer screening. Overall in 2012, a total of 48.75% (n=117) of participants responded with a yes to cervical cancer screening. The result of the Chi-square test in 2012 indicated that family income was not significantly associated with cervical cancer screening ($p=0.66$). The null hypothesis could not be rejected.

In 2013, data for N=263 participants were analyzed. Of those, 80.2% (n=211) of study participants had a family income between 0 - \$34,999; 89.5% (n=189) study participants gave a yes response to participation in cervical cancer screening. Next, 16.7% (n=44) of study participants had a family income between \$35,000 - \$74,999; 19.9% (n=42) of participants responded with a yes to cervical cancer screening. Lastly, 3.04% (n=8) participants had an income level of \$75,000 and above; 87.5% (n=7) of participants responded with a yes to cervical cancer screening. Overall in 2013, a total of

90.5% (n=238) of study participants responded with a yes to cervical cancer screening. The result of the Chi-square test in 2013 indicated that family income was not significantly associated with cervical cancer screening ($p=0.46$). The null hypothesis could not be rejected.

Sexual activity. A Chi-square test for independence was used to analyze research question two.

RQ2: To what extent does sexual activity, as measured by marital status, have an impact on cervical cancer screening among Hispanic women in the United States?

H_02 : Sexual activity, as measured by marital status, has no impact on cervical cancer screening among Hispanic women in the United States.

H_a2 : Sexual activity, as measured by marital status, does have an impact on cervical cancer screening among Hispanic women in the United States.

In 2011, data for N=236 participants were analyzed. Of those, 49.15% (n=116) of study participants were married and sexually active; 50% (n=58) of the participants gave a yes response to participation in cervical cancer screening. Of the 3.0% (n=7) of study participants who were married and not sexually active: 57.1% of participants responded with a yes to cervical cancer screening. Only 2.1% (n=5) of participants were widowed and sexually active, 40.0% (n=2) of those participants responded with a yes to cervical cancer screening. Of the 10.6% (n=25) of participants who were divorced and sexually active; 60.0% (n=15) of the participants responded yes to cervical cancer screening. Of the 5.9% (n=14) of study participants who were separated and sexually active, 50% (n=7) of participants responded yes to cervical cancer screening. Of the 19.06% (n=45) of study

participants who were never married and sexually active, 51.1% (n=23) of participants responded yes to cervical cancer screening. Of the 9.74% (n=23) of study participants who were living with a partner and sexually active; 43.5% (n=10) of participants responded yes to cervical cancer screening. One participant of unknown marital status responded with a yes to cervical cancer screening. Overall in 2011, 50.84% (n=120) of study participants responded yes to cervical cancer screening. The result of the Chi-square test in 2011 indicated that marital status was not significantly associated with cervical cancer screening ($p=0.59$). The null hypothesis could not be rejected.

These were analysis/deductions of the tables already presented above.

In 2012, data for n=240 participants were analyzed. Of those, 49.5% (n=119) of study participants who were married and sexually, 47.0% (n=56) of participants gave a yes response to participation in cervical cancer screening. Of the 1.7% (n=4) of study participants who were married and not sexually active, 25.0% (n=1) of participant responded with a yes to cervical cancer screening, of the 2.08% (n=5) of participants who were widowed and sexually active, 60.0% (n=3) of participants responded with yes to cervical cancer screening. Of the 10.0% (n=24) of participants who were divorced and sexually active; 50.0% (n=12) of participants responded yes to cervical cancer screening. Of the 6.7% (n=16) of study participants who were separated and sexually active, 43.7% (n=7) of participants responded yes to cervical cancer screening. Of the 19.2% (n=46) of study participants who were never married and were sexually active, 56.5% (n=26) of participants responded yes to cervical cancer screening. Of the 10.8% (n=26) of study participants who were living with a partner and were sexually active; 46.1% (n=12) of

participants responded yes to cervical cancer screening. Overall in 2012, a total of 48.7% (n=117) of the participants responded with a yes to cervical cancer screening. The result of the Chi-square test in 2012 indicated that marital status was not significantly associated with cervical cancer screening ($p=0.61$). The null hypothesis could not be rejected.

In 2013, data for n=263 participants were analyzed. Of those, 47.5% (n=125) of study participants who were married and sexually active; 87.2% (n=109) of participants gave a yes response to participation in cervical cancer screening. Of the 2.3% (n=6) of study participants who were married and not sexually active, 100.0% (N=6) of participants responded with a yes to cervical cancer screening. Of the 1.5% (N=4) of participants who were widowed and sexually active, 75.0% (n=3) of participants responded with a yes to cervical cancer screening. Of the 10.3% (n=27) of participants who were divorced and sexually active; 100% (n=27) of participants responded yes to cervical cancer screening. Of the 6.5% (n=17) of study participants who were separated and sexually active; 94.1% (n=16) of participants responded with a yes to cervical cancer screening. Of the 22.4% (n=59) of study participants who were never married and sexually active, 83.0% (n=49) of participants responded with a yes to cervical cancer screening. Of the 9.9% (n=26) of study participants who were living with a partner and sexually, 100.0% (n=26) of participants responded yes to cervical cancer screening. There was one participant with unknown status who responded yes to cervical cancer screening. Overall in 2013, a total of 90.5% (n=238) of participants responded with a yes to cervical cancer screening. The result of Chi-square test in 2013 indicated that marital

status was not significantly associated with cervical cancer screening ($p=0.40$). The null hypothesis could not be rejected.

Acculturation. I also used a Chi-square test for independence to analyze research question three.

RQ3: To what extent does acculturation, as measured by English language proficiency and educational level, have an impact on cervical cancer screening among Hispanic women in the United States?

H₀₃: Acculturation, as measured by English language proficiency and educational level, has no impact on cervical cancer screening among Hispanic women in the United States.

H_{a3}: Acculturation, as measured by English language proficiency and educational level, does have an impact on cervical cancer screening among Hispanic women in the United States.

In 2011, data for $n=236$ participants were analyzed. Of those 90.7% ($n=214$) of study participants who were proficient in the English language, 50.9% ($n=109$) of participants gave a yes response to participation in cervical cancer screening. Of the 5.9% ($n=14$) of study participants who were proficient in the Spanish language, 50.0% ($n=7$) of participants responded with a yes to cervical cancer screening, while of the 3.4% ($n=8$) of participants who were proficient in both the English and Spanish languages, 50.0% ($n=4$) of participants responded with a yes to cervical cancer screening. Overall in 2011, a total of 50.8% ($n=120$) of participants responded with a yes to cervical cancer screening. The result of Chi-square test in 2011 indicated that language proficiency was not significantly

associated with cervical cancer screening ($p=0.70$). The null hypothesis could not be rejected.

In 2012, data for $n=240$ participants were analyzed. Of those 92.5% ($n=222$) of study participants who were proficient in the English language, 49.0% ($n=109$) of participants gave a yes response to participation in cervical cancer screening. Of the 4.6% ($n=11$) of study participants who were proficient in the Spanish language, 36.4% ($n=4$) of participants responded with a yes to cervical cancer screening. Of the 1.7% ($n=4$) of participants who were proficient in both the English and Spanish languages, 100.0% ($n=4$) of participants responded with a yes to cervical cancer screening. There were 3 participants who spoke other languages but none participated in cervical cancer screening. Overall in 2012, a total of 48.7% ($n=117$) of participants responded with a yes to cervical cancer screening. The result of Chi-square test in 2012 indicated that language proficiency was not significantly associated with cervical cancer screening ($p=0.51$). The null hypothesis could not be rejected.

In 2013, data for $n=263$ participants were analyzed. Of those, 93.5% ($n=246$) study participants who were proficient in the English language, 91.1% ($n=224$) of participants gave a yes response to participation in cervical cancer screening. Of the 4.2% ($n=11$) of study participants who were proficient in the Spanish language, 81.8% ($n=9$) of participants responded with a yes to screening. Of the 1.9% ($n=5$) of participants who were proficient in both the English and Spanish languages, 100.0% ($n=5$) of participants responded with a yes to cervical cancer screening. There was one participant who spoke other languages who had no response. Overall in 2013 a total of 90.5% ($n=238$) of

participants responded yes to cervical cancer screening. The result of the Chi-square test in 2013 indicated that language proficiency was not significantly associated with cervical cancer screening ($p=0.45$). The null hypothesis could not be rejected.

A Chi-square test was also used to answer the second part of research question three to ascertain the association between cervical cancer screening and acculturation based on educational level. In 2011, data for $n=236$ participants were analyzed. Of those, 1.3% ($n=3$) of study participants in the category of no formal education to those who completed grades 1-5; 100.0% ($n=3$) of participants gave a yes response to participation in cervical cancer screening. Of the 27.1% ($n=64$) of study participants who completed grades from 6-12, 50.0% ($n=32$) of participants responded with a yes to cervical cancer screening, while of the 71.6% ($n=169$) of participants who completed from GED/College and above, 52.7% ($n=89$) of participants responded with a yes to cervical cancer screening. Overall in 2011 a total of 50.8% ($n=120$) of participants responded with a yes to cervical cancer screening. The result of Chi-square test in 2011 indicated that educational level was not significantly associated with cervical cancer screening ($p=0.66$). The null hypothesis could not be rejected.

In 2012, data for $n=240$ participants were analyzed. Of those, 5.4% ($n=13$) of study participants in the category no formal education to those who completed grades 1-5; 46.2% ($n=6$) of participants gave a yes response to participation in cervical cancer screening. Of the 24.2% ($n=58$) of study participants who completed grades from 6-12, 48.3% ($n=28$) of participants responded with a yes to cervical cancer screening, while of 71.3% ($n=171$) of participants of those who completed from GED/College and above,

48.5% (n=83) of participants responded with a yes to cervical cancer screening. Overall in 2011, a total of 48.8% (n=117) of participants responded yes to cervical cancer screening. The result of Chi-square test in 2012 indicated that educational level was not significantly associated with cervical cancer screening ($p=0.60$). The null hypothesis cannot be rejected.

In 2013, data for n=263 participants were analyzed. Of those 5.3% (n=14) of study participants in the category no formal education to those who completed grades 1-5; 92.9% (n=13) of participants gave a yes response to participation in cervical cancer screening. Of the 23.2% (n=61) of study participants who completed grades from 6-12, 90.2% (n=55) of participants responded with a yes to cervical cancer screening, while of the 74.5% (n=188) of participants who completed from GED/College and above, 90.2% (n=170) of participants responded with a yes to cervical cancer screening. Overall in 2013, a total of 90.5% (n=238) of participants responded with a yes to cervical cancer screening. The result of Chi-square test in 2013 indicated that educational level was not significantly associated with cervical cancer screening ($p=0.96$). The null hypothesis could not be rejected. Table 13 provides information on Chi-square testing of the variables.

Table 13

Chi Square Test of Independent and Dependent Variables

Pap Smear Test in the past 12 Months									
Participants N=739	2011			2012			2013		
No. of Participants	Yes	No	P-value	Yes	No	P-value	Yes	No	P-value
Age									
21-29	24.6%	29.4%	0.70	22.7%	26.3%	0.56	60.5%	48.0%	0.19
30-65	75.4%	70.6%		77.3%	73.7%		39.5%	52.0%	
Total Income in the Past 12 Months									
\$0 - \$34,999	78.4%	78.5%		90.1%	92.7%		79.3%	71.5%	
\$35,000 - \$74,999	16.6%	19.1%	0.99	9.9%	7.3%	0.66	17.5%	19.6%	0.46
\$75,000 – and above	5.0%	2.4%		0.0%	0.0%		3.2%	8.9%	
Educational Level									
No formal education/grade 1-5	2.9%	4.9%		5.1%	4.5%		5.2%	7.1%	
Grade 6 - 12	26.6%	23.4%	0.66	23.6%	25.6%	0.60	23.3%	16.1%	0.96
GED/HS/College/Associate/ Bachelors/Masters/Doctoral	70.5%	71.6%		71.3%	69.9%		71.5%	76.8%	
Marital Status (Sexual Activity)									
Married – sexually active	48.2%	48.8%		47.9%	52.2%		46.6%	62.5%	
Married – not sexually active	3.5%	1.9%	0.59	1.3%	1.9%		2.5%	0.0%	
Widowed – sexually active	0.9%	3.9%		2.2%	2.4%	0.61	1.6%	1.8%	0.40
Divorced – sexually active	12.5%	8.9%		10.2%	9.6%		11.5%	8.9%	
Separated – sexually active	5.9%	6.4%		6.0%	7.0%		6.7%	3.6%	
Never married – sexually active	19.2%	6.3%		22.0%	15.0%		20.5%	1.6%	
Unknown marital status – sexually active	0.6%	10.6%		0.0%	0.0%		0.2%	0.0%	
Language used for Interview									
English	91.0%	90.1%		93.0%	92.3%		93.9%	85.7%	
Spanish	5.7%	5.9%	0.70	3.2%	5.4%	0.51	3.9%	10.7%	0.45
English and Spanish	3.3%	4.0%		3.8%	2.3%		2.2%	3.6%	

Logistic Regression Analysis

Analysis for logistic regression was conducted to ascertain the extent of the relationship between cervical cancer screening (dependent variable) and socioeconomic status based on family income, sexual activity based on marital status, and acculturation based on language proficiency and educational level (independent variables).

Data Analysis by Year: 2011. Upon analysis of the 2011 data, the Hosmer and Lemeshow (model of goodness fit test) showed that the covariates (independent variables) fit the data ($\chi^2 = 2.162$; $df=8$; $P=0.976$), which correctly explains the 51.8% of

the variation of the study participants who were screened for cervical cancer. The odds ratio for educational level was (OR 1.005, 95% CI: 1.001 – 1.010, $p = 0.023$) and language proficiency (2.46, 95% CI 0.475-12.756, $p=0.055$); both education and language proficiency predicted cervical cancer screening among Hispanic women at a statistically significant level. However, the odds ratio for family income (OR 1.057, 95% CI 0.860-1.399, $p=0.937$) indicated that the relationship between family income and cervical cancer screening among Hispanic women was not statistically significant. Further, the logistic regression full model was not statistically different from constant, $X^2(1) = 2.11$, $p > 0.05$. Table 14 provides the results of the logistic regression analysis.

Table 14

Hosmer and Lemeshow test for 2011

Year	Step	X ²	df	Sig.				
2011	1	2.162	8	0.976				
Classification Table								
Observed				Predicted				
Pap smear Screening in the past 12 months				Pap smear screening in the past 12 months				
Yes				74.1%				
No				29.0%				
Overall percentage				51.8%				
Variables in the	Equation - 2011							
	B	S.E	Wald	df	Sig	Exp(B)	95% CI	
					Lower		Upper	
Step 1								
Family income	.097	.103	6.228	13	.937	1.057	.860	1.300
Educational level	.005	.002	5.144	4	.023	1.005	1.001	1.010
Language	.900	.840	9.261	4	0.055	2.46	.475	12.756
Constant	.109	.075	2.117	1	.146	.897		

Full Model ($X^2(3)$, $N=236$) =13; p -value=0.89

Based on the results in Table 14, educational level and language proficiency are associated with cervical cancer screening.

Data Analysis by Year: 2012. Hosmer and Lemeshow (model of goodness fit test) showed that the covariates (independent variables) fit the data ($X^2=3.28$; $df=8$, $p=0.745$), which correctly explains the 71.8% of the variation of the study participants who were screened for cervical cancer. The odds ratio for educational level was (OR 2.765, 95% CI: 6.221-2.017, $p=0.021$); both education and language proficiency predicted cervical cancer screening among Hispanic women at a statistically significant level. However, similar to the results for 2012, family income (OR 3.652, 95% CI 2.170-1.687, $p=0.846$) did not predict cervical cancer screening as the relationship was not statistically significant. The logistic regression full model was not statistically different from constant, $X^2(1) = 3.887$, $p\text{-value} > 0.05$. Table 15 provides the results of the logistic regression analysis.

Table 15

Hosmer and Lemeshow test for 2012

Year	Step	X^2	df	Sig.				
2012	1	3.28	8	0.745				
Classification	Table							
Observed				Predicted				
Pap smear Screening in the past 12 months				Pap smear screening in the past 12 months				
Yes				79.4%				
No				31.60%				
Overall percentage				71.8%				
Variables in the	Equation - 2012							
	B	S.E	Wald	df	Sig	Exp(B)	95% CI	
					Lower		Upper	
Step 1								
Family income	.068	.214	8.324	13	.846	3.652	2.170	1.687
Educational level	.024	.036	7.654	4	.017	2.765	6.221	2.017
Language	.840	.950	9.162	4	0.021	7.46	.475	16.562
Constant	.709	.085	3.887	1	.478		.780	

Full Model ($X^2(3)$, $N=240$) =13; $p\text{-value}=0.79$

Based on the results in Table 15, educational level and language proficiency are associated with cervical cancer screening.

Data Analysis by Year: 2013. In 2013, Hosmer and Lemeshow (model of goodness fit test) showed that the covariates (independent variables) fit that data ($X^2=6.15$; $df=8$; $P=0.352$), which correctly explains the 75.1% of the variation of the study participants who were screened for cervical cancer. The odds ratio for educational level was (OR 3.872, 95% CI: 3.231-2.121, $p=0.042$) and language proficiency (8.110, 95% CI 0.0675-6.321, $p=0.011$); both education and language proficiency predicted cervical cancer screening among Hispanic women in the United States at a statistically significant level. However just as in years 2011 and 2012, the odds ratio for family income (OR 5.666, 95% CI 1.580-1.687, $p=0.945$) indicated that there was no statistically significant relationship between family income and cervical cancer screening. Likewise, the logistic regression full model was not statistically different from constant, $X^2(1) = 4.221$, $p > 0.05$.

Table 16 provides the results of the logistic regression analysis.

Table 16

Hosmer and Lemeshow test for 2013

Year	Step	X^2	df	Sig.				
2013	1	6.15	8	0.352				
Classification	Table							
Observed				Predicted				
Pap smear Screening in the past 12 months				Pap smear screening in the past 12 months				
Yes				84.6%				
No				25.7%				
Overall percentage				75.1%				
Variables in the	Equation - 2013							
	B	S.E	Wald	df	Sig	Exp(B)	95% CI	
					Lower		Upper	
Step 1								
Family income	.018	.426	6.132	16	.945	5.666	1.580	1.687
Educational level	.031	.354	4.452	4	.042	3.872	3.231	2.121
Language	.760	.992	8.520	4	0.11	8.110	.675	6.321

Constant	.912	.097	4.221	1	.688	.961
Full Model ($X^2(3)$, $N=263$) =16; p-value=0.98						

Summary

Chapter 4 provided information about data collection from NHIS in 2011, 2012, and 2013. Analysis of the results of my investigation of the extent of the relationship between cervical cancer screening (dependent variable) among Hispanic women in the United States and the independent variables, socioeconomic status (measured by family income), sexual activity (measured by marital status), and acculturation (measured by language proficiency and level of education). Chi-square tests were used to ascertain the association between the dependent variable and independent variables in 2011, 2012, and 2013. The results revealed that there was no association between socioeconomic status, sexual activity, and cervical cancer screening among Hispanic women in the United States. The results however, revealed that there was an association between language proficiency, educational level, and cervical cancer screening among Hispanic women in the United States. Chapter 5 will provide a discussion on interpretation of findings based on the peer-reviewed literature, significance of findings, limitations of the research study, recommendations, and conclusions.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

My purpose in conducting this quantitative cross-sectional study was to examine the predictors of cervical cancer screening among Hispanic women in the United States by examining the association between cervical cancer screening and acculturation, socioeconomic status, and sexual activity. In this chapter I will discuss important findings from my study, which I believe support the use of the behavioral model for vulnerable populations as a framework for explaining the rate of cervical cancer screening among U.S. Hispanic women. As previously noted, researchers developed the behavioral model for vulnerable populations to better understand vulnerable and marginalized individuals' use of health services (Aday, 2003; Babitsch et al., 2012). The model implies that use of these services is a functional predisposition by the people using health services determined by certain factors which may enable or become an impediment to the utilization of these services and the need for people to care for themselves (Aday, 2003; Babitsch et al., 2012).

Researchers have revised, updated, and expanded the behavioral model for vulnerable populations to elaborate measures for use of health services which are specific to certain disease conditions and illnesses. The revised model also includes certain changes in personal practices such screening services, aimed at maintaining and improving the health status of the population to achieve a better health outcome for the marginalized and vulnerable population (Aday, 2003; Babitsch et al., 2012; Gelberg et al., 2000). Vulnerable populations include those members of the population who are at

risk for neglect, discrimination, and even harm due to their inability to maintain a certain social status which may lead to possible gaps in health care services such as cervical cancer screening (Aday, 2003; Kilborne et al., 2006). These groups are also prone to poor physical, social, and psychological health, and are often unable to meet their needs for vital health services due to an existing difference in their social status as a result of either ethnicity, race, gender, and/or other factors that highlight discrimination based on social status (Babitsch et al., 2012; Kilborne et al., 2006; Shi & Stevens, 2011). In this study, I used the framework to better understand low compliance rates to cervical cancer screening among a vulnerable segment of the population, U.S. Hispanic women (Fang, & Tan, 2011; Ho & Dinh 2011; Wang et al., 2008).

Of the 739 respondents in this study, 64.3% (n=475) responded with a yes to cervical cancer screening, while 35.7% (n=264) did not participate in cervical cancer screening. This finding underscores previous research by the CDC (2012) that revealed a low compliance with cervical cancer screening among Hispanic women when compared to other minority women groups. According to Ho and Dinh (2011), low compliance with cervical cancer screening can be attributed to acculturation, age, marital status, lack of awareness about screening and cervical cancer, psychological (apprehension), socioeconomic status, and limited access to health care services. Following from their research, I examined the predictors of cervical cancer screening to ascertain the extent to which socioeconomic status, acculturation, and sexual activity were associated with, and impacted, compliance with cervical cancer screening.

I used chi-square tests for data analysis. I found that socioeconomic status, sexual activity, and acculturation (measured by language proficiency in 2011, 2012, and 2013 and, also, by educational level in 2011 and 2013) were not significantly associated with cervical cancer screening. However, acculturation measured by educational level in 2012 was significantly associated with cervical cancer screening. My findings support the CDC's (2014) research showing that compliance with cervical cancer screening varies based on a woman's level of education. Authors of the CDC report maintained that women with the most schooling tend to be more compliant with cervical cancer screening.

I also analyzed data using logistic regression. I found no statistically significant relationship between family income and cervical cancer screening. However, education and language were associated with cervical cancer screening at a statistically significant level.

Interpretation of Findings

32.1% of the study participants responded yes to cervical cancer screening in 2011 and 2012, while 32.2% study participants responded yes to cervical cancer screening in 2013. This may be attributed to the way the questions about cervical cancer screening were asked in 2011 and 2012 when compared to 2013. In 2011 and 2012, the participants were asked if they had a cervical cancer screening in the past year, while in 2013 they were asked if they ever had a cervical cancer screening. It is important to note that the rate of cervical cancer screening has improved in the last decade in the United States (CDC, 2014). However, my findings indicated that Hispanic women continue to

encounter barriers with complying with the recommendations for routine cervical cancer screening. Addressing these barriers by ascertaining the extent to which these barriers impact compliance with cervical cancer screening may improve compliance rates and decrease high mortality rates from cervical cancer.

Cervical Cancer Screening and Predisposing Factors

The behavioral model for vulnerable populations implies that certain factors such as marital status, acculturation, and education may affect utilization of preventive health care services by vulnerable populations such as minority women (Aday, 2003; Babitsch et al., 2012). Other factors include immigration status, literacy, certain childhood characteristics (e.g., foster care, placement in group homes, history of abuse and neglect), debilitating parental illnesses, homelessness, housing amenities, and alcoholism (Aday, 2003; Gelberg et al., 2000). Other researchers have found that ethnicity, language, socioeconomic, and demographic factors such as marital status, gender, age, and health beliefs predict vulnerable groups' use of health care (Fernandez & Morales, 2007; Lofters et al., 2011). In this study, I examined the impact of marital status, acculturation, and educational level on cervical cancer screening among my study population of U.S. Hispanic women.

Marital status (measurement for sexual activity). I analyzed marital status for two reasons. According to the behavioral model for vulnerable populations, marital status is a predisposing factor for vulnerable groups' use of preventive health care services. Also, previous researchers identified marital status as a predictor for cervical cancer screening (Limmer, LoBiondo, & Dains, 2014). In this research study, I grouped

participants into eight categories: married and sexually active, married and not sexually active, widowed and sexually active, divorced and sexually active, separated and sexually active, living with a partner and sexually active, never married and sexually active, and having an unknown status and sexually active.

Data analysis using the chi-square test revealed that there was no association between marital status and cervical cancer screening. Measurement of acculturation based on language proficiency in 2011, 2012, and 2013, and acculturation measured by educational level in 2011 and 2013 were not significantly associated with cervical cancer screening. However, acculturation measured by educational level in 2012 was significantly associated with cervical cancer screening. This finding supports those by the CDC (2014) showing that compliance with cervical cancer screening varies based on a woman's level of education. The CDC report maintained that women with the most schooling tend to be more compliant with cervical cancer screening.

My logistic regression analysis found no statistically significant relationship between family income and cervical cancer screening. However, education and language were associated with cervical cancer screening at a statistically significant level. In this chapter, I will offer my interpretations of findings and discuss study limitations, the significance of the research study, and my recommendations for future research studies.

Interpretation of Findings

My data revealed that 32.1% of the study participants responded yes to cervical cancer screening in 2011 and 2012, and 32.2% of study participants responded yes to cervical cancer screening in 2013. This difference may be attributed to the way the

questions about cervical cancer screening were asked in 2011 and 2012, when compared to 2013. In 2011 and 2012, the participants were asked if they had cervical cancer screening in the past year while in 2013, they were asked if they ever had cervical cancer screening.

Cervical Cancer Screening and Predisposing Factors

According to the behavioral model for vulnerable populations, certain factors such as marital status, acculturation, and education may affect the use of preventive health care services by vulnerable populations such as minority women groups (Aday, 2003; Babitsch et al., 2012). Other factors are immigration status, literacy, certain childhood characteristics (e.g., foster care, placement in group homes, children with history of abuse and neglect), debilitating parental illnesses, homelessness, housing amenities, and alcoholism (Aday, 2003; Gelberg et al., 2000). Previous literature identified the following factors as some of the predictors to health care utilization by vulnerable groups: ethnicity, language, socioeconomic, and demographic factors such as marital status, gender, age, and health beliefs (Fernandez & Morales, 2007; Lofters et al., 2011). In this study, I addressed marital status, acculturation (measured by language proficiency), and educational level.

Marital status (measurement for sexual activity). The behavioral model for vulnerable populations posits that marital status is a predisposing factor to the extent of utilization of preventive health care services by the vulnerable population. Previous literature identified marital status as a predictor for cervical cancer screening (Limmer, LoBiondo, & Dains, 2014). In this research study, the participants were grouped into

eight categories: married and sexually active, married and not sexually active, widowed and sexually active, divorced and sexually active, separated and sexually active, living with a partner and sexually active, never married and sexually active, and unknown status and sexually active. Data analysis using the Chi-square test revealed that there was no association between marital status and cervical cancer screening in 2011, 2012, and 2013. However, according to Limmer et al. (2014), three studies included in research on predictors to compliance with cervical cancer screening revealed a positive correlation between marital status and compliance with cervical cancer screening guidelines among adult women in the United States.

Acculturation (measured by language proficiency). The current study examined the association between language proficiency and compliance with cervical cancer screening. Previous studies maintained that acculturation is a predictor for the utilization of health care preventive services. Babitsch et al. (2012) identified individual factors such as age, gender, education, occupation, ethnicity, family status, acculturation, immigration status, literacy, attitudes, values, and knowledge related to health and health services as predictors for compliance with preventive health care services. Language proficiency was grouped into three categories: English language, Spanish language, and English and Spanish. In this research study, most of the participants were proficient in English language (n=682, 92.2%), 4.8% of the participants were proficient in Spanish language (n=36), while 2.3% of the participants were proficient in both English and Spanish (n=17). Most of the participants who were proficient in English language responded yes to cervical cancer screening (92.6%), 4.2% of the participants who were proficient in

Spanish language responded yes to cervical cancer screening, while 3.1% of the study participants who were proficient in both English and Spanish responded yes to cervical cancer screening. Data analysis conducted using the Chi-square test revealed that there was no association between acculturation measured by language proficiency and cervical cancer screening in 2011, 2012, and 2013. Data was also analyzed using logistic regression. Findings revealed that the association between language proficiency and cervical cancer screening was not statistically significant. The reason for this could possibly be because most of the study participants (91%) are fluent in English language. This supports previous studies that English language as a measure of acculturation was a factor with compliance to cervical cancer screening and access to health care among immigrant women (Lee, Nguyen, & Tsui, 2011). Other findings from previous studies found that illiteracy and lack of proficiency in the English language are significant barriers to utilization of cervical cancer screening services (Lee & Vang, 2010). However, acculturation is a very complex issue because of the mixed (positive and negative) influence on the health on the health status of immigrants (Siegel et al., 2012).

Educational level. The level of education of the study participants was investigated as a measurement for acculturation in this research study to ascertain the extent to which education impacts cervical cancer screening. According to Lee et al. (2013), the level of education can affect the degree of language comprehension and usage which can be associated with reporting of health status and compliance with preventive measures. Lee and Vang (2010) found that illiteracy and lack of proficiency in the English language are significant barriers to utilization of cervical cancer screening

services. Previous findings by the CDC (2014) study on cervical cancer screening compliance maintained that women who have the most education tend to be more compliant with routine cervical cancer screening than women with less schooling. In this research study, the level of education was grouped in three categories: no formal education/ grades 1-5, grades 6-12, and GED/HS/College/Associate/Bachelors/Masters/Doctoral degrees. Most of the participants were educated from GED and above (n=528, 71.4%), 6-12 grade education (n=183, 24.7%), no formal education/grade 1-5 (n=28, 3.7%). Data analysis using the Chi-square test showed that in 2012, educational level was significantly associated with cervical cancer screening ($p=0.00$). Most of the study participants (71.1%) who were educated from GED and above responded yes to cervical cancer screening, which further supports previous findings that educational level is a significant determinant to the utilization of preventive health care services.

The findings from this current study may assist public health care providers, policy makers, governmental agencies, and other stakeholders with the development of interventions that could boost health literacy and utilization of preventive health care services. The findings may also assist stakeholders in modification of health literatures/programs that will benefit those with little or no education to address any misconception about the utilization of health care preventive services such as cervical cancer screening. Public health providers and other personnel involved in the provision and facilitation of health care services in the community should focus on interventions such as health awareness campaign in schools, faith-based institutions, local grocery

store/markets that will promote adherence to cervical cancer screening. According to Allen et al. (2014), Parishes play an important role in community health because they provide both social and health support to their members through creation of awareness about cancer and other health screening services. They also provide health education programs in the Parishes and routinely provide members with current information about cancer and other screening services.

Cervical Cancer Screening and Enabling Factors

The behavioral model for vulnerable populations posits that enabling factors are those within an individual's environment that may be determinants to the utilization of health care services based on family, personal resources, source of healthcare, health insurance status, income community, and health services resource e.g. patient-physician ratio, hospital-bed-population ratio, cost of financing healthcare services, entry structure, and protocol of caring for the population (Aday, 2003; Shi & Stevens, 2011, Worthington et al., 2012). According to Worthington et al. (2012), an individual's family income can determine a woman's participation in cervical cancer screening.

Income (measurement for socioeconomic status). Family income can predict the extent of utilization of preventive services by the vulnerable population. The higher the family income, the more likely members in the family will comply with available preventive health care services. According to the CDC (2014), women with higher income level are more likely to comply with preventive health care services such as cervical cancer screening. In this research study, family income was grouped into three categories: 0 - \$34,999, \$35,000 - \$74,999, and \$75,000 and above. Using the Chi-square

test to analyze the data showed that there was no significant association between family income and cervical cancer screening among Hispanic women in 2011, 2012, and 2013. The findings from data analysis using logistic regression indicated family income as a predictor of cervical cancer screening was not statistically significant. However, future studies may examine other covariates such as age, health insurance status, and educational level in relation to family income to determine their correlation to cervical cancer screening.

Previous literature attributed poor compliance with cervical cancer screening among minority women such as Hispanic women to age, no health insurance due to financial constraints, acculturation, and low socioeconomic status (Byrd, Chavez, & Wilson, 2007; Duggan et al., 2012; Paskett et al., 2010). Other literature supported the study's findings identifying lack of health insurance, poor access to health care services, language barrier, and educational level as some of the barriers to compliance with cervical cancer screening among Hispanic women (CDC, 2014; Gonzalez et al., 2012).

Cervical Cancer Screening and Need Factors

According to the behavioral model for vulnerable population, the need factors are comprised of an individual's perception of his/her self-need and evaluation self-need based on the overall health status of the population (Aday, 2003; Shi & Stevens, 2011). However, there are mixed findings from previous studies on the association between an individual's perception and evaluation of his/her general health status and compliance with preventive health services such as cervical cancer screening (for women). According to Stein et al. (2012), preventive services such as cervical cancer screening can predict

compliance with screening services. Cho et al. (2010) maintained those with poor health are more likely to participate with screening services than individual who perceive their health status as good. However, Kaplan and Inguanzo (2011) posit that individuals without any health insurance who perceived their overall health as poor may encounter some difficulties with access to preventive health care services. In my research study perceived health status was not a covariate, but future studies may evaluate the association between perceived health status and compliance with cervical cancer screening.

Limitations of Study

Generalizing the study findings based on the data from NHIS may have excluded undocumented Hispanic women immigrants who may have higher incidence rate of the disease and very low compliance with cervical cancer screening due to low socioeconomic status and other factors. Furthermore, the NHIS used data from individuals who are non-institutionalized in the general population thereby excluding individuals in long-term facilities example: juvenile detention centers, half-way houses, prisons, nursing homes, and personnel of active duty. Excluding these individuals may affect the interpretation findings of the study. The use of secondary data from the NHIS may represent a limitation because responses to predetermined questions from the NHIS survey are used for this study. If I had compiled the questions on my own, I would have based the questions on the constructs of the behavioral model for vulnerable populations. Furthermore, the participants' comprehension of the questionnaires based on language barriers and translation may have affected their response. According to Fang, Ma, and

Tan (2011), language barrier and poor utilization of linguistically ethnic/racial friendly materials affects compliance with preventing measures such as screening and feedback from minority groups with English as a second language.

It is pertinent to mention that there was a notable difference between the questions on cervical cancer screening in 2011, 2012, and 2013. In 2011 and 2012, the participants were asked about cervical cancer screening in the past one year, while in 2013, they were asked if they have ever had cervical cancer. Hence this may have accounted for the high number of yes responses for cervical cancer screening in 2013.

Recommendations

Findings from this research study revealed that future studies could focus on the impact of covariates of age, perceived health status, and immigration status on utilization of cervical cancer screening services among Hispanic women in the United States. Policy makers and other stakeholder may consider lowering the age for Pap smear tests from 21 years to 18 years for earlier screening and identification of abnormal Pap smear tests which may help in reducing the morbidity and mortality rates of cervical cancer in the Hispanic population and other vulnerable groups. Provision of funds for an extensive public health literacy campaign on the importance of utilization of preventive health care services such as cervical cancer screening among the vulnerable groups such as the Hispanic women may improve compliance with cervical cancer screening and help reduce both the incidence and mortality rates of cervical cancer. Development of a culturally sensitive measurement for acculturation for Hispanic women that would incorporate their immigration status, health beliefs, and behaviors prior to migration to

ascertain their understanding about the importance of preventive health care services should be considered. Data collection should extensively involve predominantly Spanish-speaking Hispanic women for generalizability, because about 91% of the participants in this study were Hispanic women who are proficient in English language. Extensive school-based awareness from middle school to college, with the assistance from the local public health department and school nurse, on utilization of preventive measures such as cervical cancer screening should include such measures as part of the sex education curriculum from middle school. Future studies should include the examination of the extent of association between cultural values/beliefs, societal values, health-seeking behaviors, and compliance with cervical cancer screening among Hispanic women.

Implications

Ascertaining the extent to which socioeconomic status, acculturation, and sexual activity impact cervical cancer screening rates among Hispanic women in the U.S. could help improve compliance with cervical cancer screening and possibly decrease the consequences of abnormal Pap smear tests such as cervical cancers. The findings of this research study could assist policy makers, public health providers, and other governmental agencies with the promotion of guidelines and program interventions that may improve better compliance with cervical cancer screening among Hispanic women (CDC, 2014) thereby potentially leading to positive social change. Furthermore, the knowledge of factors that prevent compliance with cervical cancer screening could be beneficial for researchers, policy makers, public health providers, and other organizations with development of policies and programs that could focus on preventive measures and

other interventions with the goal of improving compliance with cervical cancer screening (CDC, 2014; Duggan et al., 2012; Paskett et al., 2010). Public health providers could collaborate with policy makers in developing free and/or affordable cervical cancer screening centers for Hispanic women and other vulnerable groups in the general population. The study findings could also be used as a foundation for future studies on cervical cancer screening which may decrease the incidence of the disease among Hispanic women in the United States. The outcome of this research may lead to positive social change by addressing the inequalities in access to health care among minority groups such as Hispanic women, who are mostly at risk for preventable cervical cancer through development of accessible extensive cervical cancer screening programs.

Conclusion

Cervical cancer remains both a national and global public health concern due to the high incidence and mortality of the disease among the minority women groups and low income countries (CDC, 2014; WHO, 2014). Screening for cervical cancer by Pap smear testing remains the gold standard for early detection of precancerous lesions. However, lack of compliance with screening by minority women such as Hispanic women due to low level of acculturation, poor socioeconomic status, and sexual activity continues to hinder efforts to decrease both the incidence and mortality rates of the disease. This study obtained data from the NHIS from 2011, 2012, and 2013 to ascertain the extent to which socioeconomic status, sexual activity, and acculturation affect cervical cancer screening among Hispanic women in the United States with a mixed result on the impact of acculturation on compliance with screening. Future studies should

focus on the impact of covariates such as age range, immigration status, perceived health status, and chronic gynecological diseases on compliance with cervical cancer screening among minority women.

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