Walden University

College of Health Sciences

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Walden University
2020

Abstract

Factors Affecting Cervical Cancer Screening Among Dominican Women Living in the

United States

by

Cybil Bonhomme

Bachelor's Degree, Barry University

Master's Degree, University of West Florida

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Public Health

Walden University

February 2020

Abstract

The highest incidence and mortality rates of cervical cancer are seen among minority women groups in the United States. Hispanic women have the highest rate of cervical cancer, contributing to the 2nd highest mortality rate of the disease. Researchers have examined the lower rates of cervical cancer screening among Hispanic women, as compared with other groups of U.S. women, but researchers have not examined cervical cancer screening practices, specifically for U.S. Dominican women. The purpose of this study was to examine the correlation between compliance with cervical cancer screening and major influences including acculturation, socioeconomic status, immigration status, and usual source of care. The behavioral model for vulnerable populations was the framework used in this research. Chi-square tests and logistic regression were used to analyze data from the National Health Interview Survey for 2011-2015 focusing on U.S. Dominican women ages 21-65 years (N = 3,644). The results revealed that during certain years there was an association between geographic place of birth ($p = .015$), years in the United States ($p = .015$), and usual source for preventive care ($p = .001$), but no correlation was found for education level ($p = .235$), family income ($p = .240$), citizenship status ($p = .400$), language of the interview ($p = .176$), and source of care when sick during any of the years analyzed ($p = .374$). The findings could promote positive social change by informing cervical cancer screening interventions targeting U.S. Dominican women.

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Chapter 1: Introduction to the Study

The World Health Organization (WHO) (2014a) asserts that cervical cancer is the fourth most common cancer globally and the fourth leading cause of cancer-related mortality among women. There are approximately 528,000 novel diagnoses and 266,000 deaths on an annual basis worldwide (WHO, 2014b). In the United States alone, 12,109 new cases are detected annually and approximately 4,092 deaths are reported from the disease (American Cancer Society, 2015; Centers for Disease Control and Prevention [CDC], 2014a; National Cancer Institute, 2014). In terms of the virus that develops to form cervical cancer, the human papilloma virus (HPV) currently affects nearly 79 million Americans and approximately 14 million people become newly infected each year (CDC, 2015f). Mortality rates have declined by approximately 80% in the United States since the 1980s as a result of early and regular cervical cancer screening and recent advancements in vaccinations (McLay, Foufoulides, & Merrick, 2010; National Cancer Institute, 2014). The Papanicolaou (Pap) test is a routine procedure used for cancer screening to detect abnormal changes in the cervix that, if detected early, can be treated before becoming cancerous (National Cancer Institute, 2014).

As highly preventable as cervical cancer is, regrettably the decline in cervical cancer is not the case for all women in the United States. The incident rate of cervical cancer among Hispanic women and other minority groups remains high in the United States when compared with non-Hispanic White women (CDC, 2014d; National Cancer Institute, 2014). This may be the result of the rapid population growth in the United

States, lower socioeconomic status (due to poor knowledge about the benefits of routine screening), and diminished access to health care services (CDC, 2014c).

When scrutinizing the subgroups of the Hispanic population (including Mexicans, Puerto Ricans, Cubans, Salvadorans, Dominicans, Guatemalans, Colombians, Hondurans, Ecuadorians and Peruvians), prior research reveals that Mexicans have the lowest cancer incidence among all Hispanic ancestry groups and Dominicans demonstrate having the highest incidence rates of all Hispanic groups (Haile et al., 2012; Penedo et al., 2011). The rate will continue to escalate if proper measures are not administered towards reducing the cervical cancer burden among the Dominican population. The findings from this study have implications for positive social change and could be beneficial in developing public health interventions that can diminish the morbidity and mortality of cervical cancer not only within the population selected for this study, but also among women worldwide. In this chapter, I will discuss the background of the study and establish a premise for studying the association between acculturation (proficiency in English), socioeconomic status (as it pertains to family income and education level), and immigration status.

Background of the Study

Cervical cancer is a slow-growing preventable malignant lesion that begins to develop in a woman's cervix (CDC, 2014f). The cervix is a tube-shaped body part (also referred to as the neck) located at the lower end of the uterus, connecting to the vagina (CDC, 2014f, Ellis, 2011). The cervix contains layers lined with particular cells: the inner part of the cervix is lined with glandular and metaplastic cells, while the outer portion is

lined with squamous cells (CDC, 2014f; Ellis, 2011). HPV can infect the cervix, which is

acquired during sexual activities. This virus is the causative agent for a majority of

cervical cancers, attacking the cervix by slow invasion of the cells lining the cervix

(CDC, 2014f; Ellis, 2011). If HPV is not detected early (during the precancerous stage), it

could result in invasive cervical cancer (ICC) and mortality (Bernard et al., 2014; CDC,

2014f, Ellis, 2011). Once the cancerous cells commence to cultivate and spread, the

abnormal cells can slowly invade the entire body resulting in detrimental effects on the

health (CDC, 2014f).

HPV is so common that at some point during their lifetime, most sexually active

men and women will be exposed to the virus (CDC, 2015f; Hariri et al., 2011a). The

alarming rate of approximately 79 million currently infected Americans and the novel 14

million annual cases poses as a grave public health concern (CDC, 2015f). Thus,

effective measures in preventing cervical cancer include taking safety precaution

measures during sexual activities, immunization with the HPV vaccine, and routine

compliance with screening (American Cancer Society, 2015; Borne, Kerr-Campbell,

McGrowder, & Beckford, 2010; CDC, 2014b). The goal of having routine screenings by

a Pap smear is to detect the precancerous lesions and dysplasia of the cervix, and to treat

the abnormal cervical changes that may lead to cervical cancer (Duggan et al., 2012). The

recommended ages to undergo routine cervical cancer screening for women in the United

States are 21 to 65 years every 3 years to achieve the highest benefits with the lowest

harm (American Cancer Society, 2015; Borne et al., 2010; CDC, 2014b; U.S. Preventive

Services Task Force, 2016). According to the National Cancer Institute (2014), dysplasia

of the cervix is more prevalent amid women in their 20s and 30s, while there is a higher

sensitivity to HPV in women ranging from 30 to 69 years old (Bernard et al., 2014; CDC,

2014e).

Cervical cancer was previously the leading cause of death among women in the

United States, mostly in women older than the age of 30 years (CDC, 2014f). Within the

last 40 years, however, there has been significant decrease in the number of new and

existing cases and deaths from cervical cancer as a result of the introduction of the

cervical cancer screening test in the 1950s (National Cancer Institute, 2014). In fact, in

the last 3 decades, increased rates in cervical cancer screening have reduced the incidence

and mortality rates of cervical by approximately 80% (CDC, 2014a; Duggan et al., 2012;

Martinez-Danote et al., 2013). Unfortunately, the diminished rate is not evenly

distributed in the United States, because cervical cancer continues to rampage several

minority groups including immigrants (Siegel et al., 2012). When compared with non-

Hispanic, White women, Hispanic women are recorded to have the highest incidence of

cervical cancer and mortality rates when compared with non-Hispanic, White women

(CDC, 2014c; Martinez-Danote et al., 2013).

Cervical cancer is the second most prevalent cancer among women in Latin

American countries; when comparing rates in the United States, these countries have an

incidence rate that is five times higher in mortality (Soneji & Fukui, 2013). The

disproportion in the burden of cervical cancer among Hispanic women can be

apprehended to factors including poor income level, lack of health insurance,

immigration status, language barriers, failure to undergo routine Pap smear testing,

inadequate knowledge about the consequences of poor compliance with screening, and poor follow-up with abnormal Pap testing, which may be due to low acculturation (Duggan et al., 2012). Although some researchers have investigated the factors that affect the use of cervical cancer screening services among major Hispanic subgroups (i.e., Cubans, Mexicans, Puerto Ricans) (Siegel et al., 2012), my is necessary because there is a paucity of information on the factors that affect the cervical screening status and practices of women from the Dominican Republic who are living in the United States.

Problem Statement

A global estimate of 528,000 diagnoses of cervical cancer cases are reported annually, with a morbidity rate of 250,000, making this form of cancer the fourth most common type of cancer among women worldwide (Bray, Ren, Masuyer, & Ferlay, 2013; WHO, 2013b). According to the National Cancer Institute (2014), cervical cancer treatment costs more than $1.4 billion in the United States annually. Although there has been a significant decline in the incident rate of cervical cancer in the United States, the rates for Hispanics remain elevated (CDC, 2014c; Duggan et al., 2012; Horner et al., 2011). There continues to be a surge in the immigration of Hispanics, thus further contributing to the escalating rates. The stubbornly elevated rates for cervical cancer among all Hispanic women living in the United States poses a public health concern because these rates reflect the disparities in access to cervical cancer screening and treatment (CDC, 2014c). For Dominicans, the immigrant population in the United States (commencing in the 1960s) stood at 12,000 and rapidly grew thereafter, reaching 350,000 in 1990 and 879,000 in 2010 (United States Census Bureau, 2014a; World Bank

Prospects Group, 2013). Studies have been conducted to investigate cervical cancer screening practices in major Hispanic subgroups living in the United States, but no studies have been conducted specifically focusing on Dominican women (both immigrants and U.S. born). My research could help determine the factors that play a role for Dominican women living in the United States in their lack of engagement in early cervical cancer detection screening that could ultimately reduce cervical cancer deaths (Lofters, Hwang, Moineddin, & Glazier, 2013).

Purpose of the Study

My purpose in this study was to investigate the cervical cancer screening practices among U.S. Dominican women and the factors that affect their cervical cancer screening rates. In this quantitative study, I used a cross-sectional design to scrutinize the factors that affect cervical cancer screening among Dominican women. I examined the association between the dependent variable, cervical cancer screening, and the independent variables of acculturation (based on English language proficiency), socioeconomic status (pertaining to family income and education level), immigration status, and usual source of care among the study population.

Research Questions and, Hypotheses

RQ1: Does a correlation exist between usual source of care, socioeconomic factors (measured by family income and education level), and cervical cancer screening status among Dominican women living in the United States?

$H_0$1: There is no correlation between usual source of care, socioeconomic factors (measured by family income and education level), and cervical cancer screening status among Dominican women living in the United States.

H_a1: There is a correlation between usual source of care, socioeconomic factors (measured by family income and education level), and cervical cancer screening status among Dominican women living in the United States.

RQ2: Does acculturation, as determined by proficiency in the English language or language of the interview, influence cervical cancer screening among Dominican women in the United States?

$H_0$2: Acculturation, as determined by proficiency in the English language or language of the interview, has no influence on cervical cancer screening among Dominican women in the United States.

H_a2: Acculturation, as determined by proficiency in the English language or language of the interview, does influence cervical cancer screening among Dominican women in the United States.

RQ3: Is there an association between immigration status and cervical cancer screening among Dominican women in the United States?

$H_0$3: There is no association between immigration status and cervical cancer screening among Dominican women in the United States.

H_a3: There is an association between immigration status and cervical cancer screening among Dominican women in the United States.

Theoretical Framework

I used the behavioral model for vulnerable populations as the theoretical framework in this study to test the influence of acculturation, immigration status, and socioeconomic status on the individual's readiness to partake in programs, such as cervical cancer screening. According to Harcourt et al. (2014), the behavioral model for vulnerable populations is suitable for predicting cervical cancer screening rates and related health outcomes among U.S. Hispanic women. This model was developed in the late 1960s to help researchers comprehend why individuals use health services, and it was theorized that people do so based on their enabling, needs, and predisposing constructs according to the original model (Babitsch et al., 2012). The revised model incorporates additional features scrutinizing the main constructs of enabling, predisposing, and needing under the two domains: traditional and vulnerable (Babitsch et al., 2012). The vulnerable domains are centered primarily on enabling resources and social structure. Predisposing traditional and vulnerable domains are individual factors such as acculturation, age, attitudes, education, ethnicity, family status, gender, immigration status, knowledge, literacy, marital status, occupation, and values related to health and health services (Babitsch et al., 2012).

The enabling traditional and vulnerable domains scrutinize factors that may hinder or promote the use of health services such as income, means of transportation, social support, wealth, and other perceived barriers to heath access including clinic waiting time and policies are included in the enabling traditional and vulnerable domains (Babitsch et al., 2012). Perceived need for health care services is a part of the need

traditional and vulnerable domains. These domains also consist of how individuals view and experience their general health and their overall level of functioning (i.e., preventive services, symptoms of diseases). It also includes evaluated health needs of the general population and their application to the vulnerable population (Babitsch et al., 2012). The use of the behavioral model for vulnerable populations on Dominican women provides a framework to measure their interactions and use of health care services.

Nature of the Study

I used a cross-sectional quantitative design for this research, and I analyzed secondary data from the National Health Interview Survey (NHIS) for years 2012, 2013, 2014, and 2015. I used a nonexperimental quantitative method to enable me to incorporate closed-ended questions and numerically measure responses; it also allowed me to statistically test the association between the variables (Aschengrau, & Seage, 2008; Creswell, 2009). In this study, I investigated the effects of socioeconomic status, based on family income and education level, usual source of care, acculturation based on English language proficiency, and immigration status on screening rates for cervical cancer among Dominican women living in the United States. I used a chi-square analysis and logistic regression to ascertain the association between the dependent variable (cervical cancer screening) and independent variables (usual source of care, socioeconomic factors, acculturation, and immigration status).

Definitions

Access to health care: The timely use of personal health services and health care providers facilitated by gaining entry into the health care system, finding a health care

location that provides the needed services, and having a health care provider whom the patient trusts and can communicate with for the achievement of best results in health outcomes (Healthy People, 2020).

Acculturation: A process of cultural and psychological alteration that takes place with an individual (usually an immigrant) adopts the attitudes, beliefs, behaviors, practices, and values of a particular culture (Sam, & Berry, 2010; Siegel, Naishadham, & Jemal, 2012). These changes consist of clothing, food, language, and learning (Sam & Berry, 2010). Because the level of education can affect an individual's language comprehension and usage, and thereby affect a person from reporting their health status as well as their compliance with preventive measures (Lee, O'Neill, Ihara, & Chae, 2013), it was essential to examine educational level and language used for the interview.

Cervical cancer: A slow growing cancer that starts to develop within the cells that lines the cervix at the transformation zone; although typically asymptomatic, it can be detected with routine Pap testing (American Cancer Society, 2014; NCI, 2014a).

Cervical cancer screening: The application of the Pap test and HPV test for preventing cervical cancer or detecting precancerous lesions before they become an ICC (American Cancer Society, 2014; NCI, 2014c).

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

Decennial census: A census that is mandated by Article 1, Section 2 of the U.S. Constitution, counting every resident in the United States and is conducted every year that ends in zero (U.S. Census Bureau, 2012d).

Dysplasia: Abnormal cellular changes in the cervix primarily caused by the HPV (American Cancer Society, 2014; NCI, 2014a).

Educational level: Highest level of education schooling an individual has attained (U.S. Census Bureau, 2014d).

English proficiency: The ability to speak, read and write in English fluently (Schleicher, 2014).

Hispanic/Latino: A person of Mexican or Central and South American culture or origin regardless of race (U.S. Census Bureau, 2012b).

Human papillomavirus (*HPV*): A sexually transmitted viral infection that is capable of causing disease such as genital warts and cervical cancer within the affected individual (CDC, 2014e; Hariri, Dunne, Saraiya, Unger, & Markowitz, 2011).

Income level: An economic measure that is applied to a person's collective earnings across a larger group in a city, state, region, or country (U.S. Census Bureau, 2014d).

Invasive cervical cancer (*ICC*): Cervical cancer that has spread from the epithelial surface of the cervix and crossed the membrane to invade deeper underlying tissue of the cervix, often resulting in mortality (NCI, 2014c).

Pap test: A routine women's health screening procedure testing for the presence of precancerous cells on the cervix through the collection and identification of cells via the use of a microscope in a lab (American Cancer Society, 2014; NCI, 2014a).

Precancerous cervical cell: Asymptomatic abnormal cells detected during a routine Pap testing using a microscope in the laboratory

Socioeconomic status: An aggregate measurement of an individual's economic status, social status, and work history, which is used to draw comparisons with others within a society (National Center for Educational Statistics, 20012).

Transformation zone: The area of the cervix where the squamous cells (covering the cervix) and the columnar cells (lining the cervix) meet; precancerous cells commence in this area.

Assumptions

There were several assumptions made within this study. My first assumption was in reference to the self-reported nature of the study. I assumed that the use of the participants' self-reported data that I was testing was yielding accurate and reliable information. Another assumption was that the administration of the questionnaires was done properly, devoid of any type of interview bias, and that the participants were honest about their answers. I further assumed that the respondents' attitudes and knowledge (in reference to their compliance with screening) varied based on their ethnicity and that this was especially true among minority groups. Finally, I am assumed that Dominican participants within this study included both those who were born in the United States and those who had migrated to the United States.

Scope and Delimitations

I limited my sample to noninstitutionalized Dominican women in the United States who participated in the National Health Interview Survey. My decision to use Dominican women stems from the fact that these individuals are a part of a growing subgroup of the Hispanic population. Hispanic women have the highest incidence rate of

cervical cancer and the second highest mortality rate of the disease when compared with other women (National Cancer Institute, 2014); however, mostly Cuban, Puerto Rican, and Mexican women are scrutinized when it comes to cervical cancer. I wanted to scrutinize how much of a burden cervical cancer is specifically for Dominican women in the United States. Including only this subgroup of the U.S. Hispanic female population may limit the generalizability of study findings.

Because the respondents may not have revealed personal information, the study's internal and external validity may be compromised with the use of questionnaires. The participants may have felt the need deliver responses that they perceive to be socially acceptable, instead of responses that reflected their actual attitudes, behaviors, and perception toward cervical cancer screening. Their responding in such a way poses as a compromise to the study's internal validity. Threats to external validity can occur from the voluntary participation of the study participants; researchers have seen that the perceptions and values of volunteers in research studies may be different from the general population (Pinzon-Perez, Perez, Torres, & Krenz, 2005). Threats to both internal and external validity can be seen in the difficulties that some participants may have had in comprehending all the questions in the questionnaire when translating the terms from English to Spanish. Using my study, I could offer information on a subgroup of the Hispanic population in the United States; thus, the findings might be beneficial in comprehending the factors that influence cervical cancer screening not only among this group, but other multicultural groups as well.

Limitations

A major limitation within this study was the method that I used to collect the data. Using secondary analysis limits the study to the information that is available from the primary data set. The creators of the NHIS may have not incorporated undocumented Dominican immigrants as respondents (who may have a higher incidence rate of the disease and lower compliance with screening due to low socioeconomic status and other factors), in turn affecting the generalizability of the study findings. Using the dataset from (NHIS) also restricts the study to predetermined questions it asked. In addition, for some survey years, questions were worded slightly differently. Language barriers and translation may have also affected the participants' response as a result of lack of comprehension. 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. Thus, integrating the resources and allowing the individuals to select which materials they believe that they relate more comfortably with may significantly reduce bias.

Significance of the Study

Nearly 12,000 women are diagnosed with cervical cancer on an annual basis, of which 4,000 result in death (U.S. Cancer Statistics Working Group, 2013). The cost of treating cervical cancer surges with the stage of diagnosis. In Table 1, I reveal the breakdown of the estimated cervical cancer treatment cost based on the diagnosis stage according to Subramanian et al. (2010).

Table 1

Cost of Treating Cervical Cancer

Stage of diagnosis	Cost for Medicaid treatment at 6 months	Cost for Medicaid treatment at 12 months
In-situ	$3,807	$6,347
Local	$23,187	$32,225
Regional	$35,853	$46,681
Distant	$45,028	$83,494

Effort should be undertaken to ensure that no individual or group agonizes from the ravages of this disease, because advances in medical science have shown that cervical cancer is preventable. The positive social change implications from this research are that results could provide information on factors that affect the use of cervical cancer screening services among Dominican women living in the United States. Community health professionals, policy makers, and governmental agencies could gain valuable information to educate women, better promote guidelines, and develop interventions that could lead to and increase the use of cervical cancer screening services. This study could further be valuable for positive change that could consist of awareness of the factors that predict cervical cancer screening practices, in addition to creating interventions that could contribute to positive social change by reducing the morbidity, mortality, and the associated cost of cervical cancer.

Summary

The persistently elevated incidence of cervical cancer among Hispanic women poses as a significant public health dilemma and may vary across the subgroups. In this study, I evaluated the influence of acculturation, immigration status, insurance, and socioeconomic status on Dominican women's adherence with screening for cervical cancer. These findings could inform subsequent researchers investigating the degree to which certain predictors affect compliance with cervical cancer screening among all minority women.

In Chapter 2, I review the literature from an assortment of studies pertaining to cervical cancer screening among distinct populations to aid in establishing a theoretical basis for the study. I also offer support for the proclamation that the rate of cervical cancer is highest among Hispanic women, revealing them to be second in having the highest mortality rate for the disease. In Chapter 2, I also discuss how there is a growing population of Dominican women in the United States who are starting to contribute to a large part of the Hispanic population after Mexicans, Cubans, and Puerto Ricans. Dominican women in the Dominican Republic are largely inflicted by cervical cancer; thus, there is a need to study the factors that may affect their screening practices in the United States so that appropriate interventions are developed and implemented.

Chapter 2: Literature Review

Cervical cancer is a global health concern; it is not only the fourth most frequent cancer within all women, but it is also the fourth leading cause of cancer-related deaths among the female population worldwide (Jemal et al., 2011). Slightly more than 2 million women ages 15 years and older are at risk for developing this cancer (Jemal et al., 2011). On an annual basis, approximately 528,000 new diagnoses of cervical cancer and approximately 266,000 deaths from this disease occur worldwide (Ferlay, Shin, Forman, Mathers, & Parkin, 2010; WHO, 2014). An estimated 12,990 women in the United States will be diagnosed with cervical cancer this year and approximately 4,120 deaths will occur from this disease (American Cancer Society, 2016). The WHO and Institut Català d'Oncologia (ICO) estimated that by the year 2025, there will be an increase of 16.8% in new cervical cancer cases and 24.97% in deaths in the Americas (WHO/ICO, 2010). This indicates that new cases are expected to go from 12,491 to 14,590 and deaths from 4,431 to 5,515 annually.

Although cervical cancer has been the leading cause of death in women, early diagnostic services and the improvement in screening practices for abnormal cytological changes have significantly decreased the incidence and mortality rate by 49% in developed countries such as the United States (National Cancer Institute, 2014). In 2007, the death rate was 2.42 per 100,000, decreasing from 3.49 per 100,000 in 1991 (Siegel, Ward, Brawley, & Jemal, 2011). Unfortunately, such a decline has not been as apparent among certain races, ethnicities, and socioeconomic status. Approximately 80% of cervical cancer occurs in countries with a low-income status where the annual new cases

in these countries are more 400,000 with annual deaths of an estimated 241,969
(WHO/ICO Information Center, 2010). In the United States, this type of cancer is a
leading cause of death among Hispanics and Blacks predominately as a result of poor
compliance with cervical cancer screening, the fast rate of population growth among
Hispanics in the United States, reduced access to health care services, and lower income
(CDC, 2014d; National Cancer Institute, 2014). In 2007, the incidence of cervical cancer
among Hispanics was 11.5 per 100,000 and 10.2 per 100,000 among Blacks, but much
lower in Whites, with a rate of 7.5 per 100,000 (CDC, 2014c).

     The most critical routine for reducing the incidence and mortality rate of cervical
cancer is the screening test using Pap smears (CDC, 2014b). When compared with other
demographic groups, Hispanic women have the lowest rate of Papanicolaou smears.
Although almost 80% of non-Hispanic White women have the test, only 75% of Hispanic
women do (American Cancer Society, 2011). To determine factors that affect these
practices, a number of studies have been conducted to investigate cervical cancer
screening practices among minorities within the United States (Han et al., 2011; Jensen et
al., 2012; McDonald & Neily, n.d.; Tabnak, Muller, Wang, Zhang, & Howell, 2010).
Cervical cancer screening disparity has been scrutinized for major Hispanic subgroups
(i.e., Cubans, Puerto Ricans, Mexicans); however, few researchers have examined these
behaviors specifically for the Dominican subgroup of the Hispanic population.

     It is pertinent to review the published literature to determine the factors that have
been found to influence cervical cancer screening behaviors among minority groups. A
solid comprehension of these behaviors and factors is essential to not only understand the

health behaviors among these group, but also to aid in developing appropriate interventions to meet their needs. My purpose in this study was to examine how certain factors, such as acculturation, socioeconomic, insurance, and immigration status influence cervical cancer screening among Dominican women living in the United States. This, in turn, may inform the types of interventions needed to improve cervical cancer screening rates in Dominican immigrant women.

In this chapter, I discuss background information pertaining to cervical cancer and factors that contribute to the incidence of this condition, and I present a literature review on previous research on how variables such as acculturation, educational level, insurance, and socioeconomic status contribute to the risk of cervical cancer. In addition, I will review the theoretical framework that informs the study and the implications of the research for social change.

Literature Search Strategy

I conducted a systematic literature review to discover relevant existing research and studies on the identified barriers to cervical cancer screening among Hispanic and other minority women groups. I used the following keywords in the search: *cervical cancer, cancer screening, immigrants, cervical cancer screening and immigrants, minorities and cervical cancer screening, Dominicans and cervical cancer screening, Hispanic women, acculturation, income, marital status,* and *socioeconomic status.* I combined different key words to find as much relevant articles as possible and excluded non-peer-reviewed articles from my review. Some of the databases that I accessed were Academic Search Complete, Cochrane, CINAHL, EBSCO host, Medline, ProQuest,

PubMed, Science Direct, and the Walden University Library. The initial search was limited to studies after 2010. I also searched electronic peer-reviewed academic journals on behavioral sciences, education, and health, yielding approximately 35 articles. With my research questions in mind, I was predominantly interested in what correlation exists between low socioeconomic status and the compliance with cervical cancer screening, the effects of acculturation cervical cancer screening, and evaluating the influence of family income on cervical cancer screening.

The literature review is organized into themes and subthemes. I scrutinized literature in the following areas:

- Theoretical framework and methodologies used in literature.

- General information on cervical cancer.

- Previous studies on cervical cancer within the Dominican Republic.

- Studies on cervical cancer among minority groups.

- Factors influencing uptake of cervical cancer screening.

Theoretical Framework

The theoretical frameworks that are useful in explaining the use of health services include the behavioral model for vulnerable populations (Gonzalez et al., 2012); health belief model (Carpenter, 2010); health investment model (McDonald & Kennedy, 2007); the PRECEDE/PROCEED model (Wen et al., 2010); social cognitive theory (Mark, Donaldson, & Campbell, 2011); and transtheoretical model (Tung, Nguyen, & Tran, 2008). The model that I used to guide this study is the revised and expanded behavioral model for vulnerable populations. I selected this behavioral model because the factors

that contribute to Hispanic women and other minority groups' susceptibility may impede

not only the condition of their health, but also their use of cancer screening services.

In the late 1960s, the behavioral model for vulnerable populations was established

by a group of authors and researchers to comprehend why individuals use health services,

in addition to getting a better grasp of the lower use of health services by marginalized

and vulnerable people within the population (Babitsch et al., 2012). This model describes

health beliefs as "attitudes, knowledge and values that people hold about health and

health services" (Babitsch et al., 2012, p. 3) and postulates that these beliefs significantly

influence subsequent use of services and the perception of health need (Babitsch et al.,

2012). The behavioral model for vulnerable populations implies that the use of health

care services is practical tendency by the individuals using the services but is determined

by certain factors that may become an impediment to the use of these services and the

need for people to care for themselves (Shi & Stevens, 2011). Groups that are vulnerable

are more at risk for harm and neglect as a result of their social status and predisposed to

poor psychological, physical, and social health, thus requiring special attention for their

health needs to be met (Babitsch et al., 2012).

The behavioral model for vulnerable populations has been revised and expanded

through the years to incorporate intricate measures of health services that are more

specific to certain disease illnesses and conditions. This model describes health beliefs as

attitudes toward health services, knowledge about diseases, and values concerning illness

and health that people grasp about health and health services and postulates that such

principles significantly influence perception of health necessity and succeeding use of

services (Babitsch et al., 2012). Thus, the original model was established on the basis that individuals use health care services based on their predisposing characteristics such acculturation, country of birth, community, family, literacy level, immigration status, personal resources, and their perceived need for care (Babitsch et al., 2012).

The revised behavioral model for vulnerable populations features additional aspects concerning revolving alterations in personal practices encompassing the use of health care services, geared toward ameliorating and maintaining the health status of the population to acquire a superior health outcome for the marginalized and vulnerable population (Babitsch et al., 2012). Vulnerable populations are typically groups that are at greatest risk for discrimination, harm, and neglect as a result of their incapability to maintain a particular social status, which may induce possible gaps in health care services (Babitsch et al., 2012). In addition, these individuals are further prone to poor maintenance of physical, psychological, and social health, and they may be unable to sufficiently meet their needs for vital health services due to ethnicity, gender, race, and other status related factors that might place them at risk for discrimination (Babitsch et al., 2012; Shi & Stevens, 2011).

In terms of predisposing vulnerable domains, these include social structure (i.e., acculturation, country of birth, immigration status, literacy level), childhood characteristics, and sexual orientation. Enabling factors encompass the ability to navigate the system; community resources such as health services; and competing needs including hunger, income, perceived barriers to care, regular source of care, and self-help skills (Shi & Stevens, 2011). The need domain pertains more toward factors such as conditions

that are of special consideration to vulnerable populations and the perceptions of health, and the evaluation of such needs by health care providers. The aspects scrutinized under the predisposing, enabling, and need characteristics play a significant role in health behaviors and subsequent outcomes.

The behavioral model for vulnerable populations has been found by some researchers to be valuable in explaining the utilization of health among vulnerable group (Hogan et al., 2012; Stein, Anderson, Robertson, & Gelberg, 2012). Using the expanded model as a framework, Fernandez and Morales (2010) discovered how predisposing factors such as demographic differences and enabling factors such as health insurance, low income, and usual source of health provider have noteworthy association with utilization of screening services among Hispanic women. This model offers two aspects to explain health utilization among vulnerable groups and the subsequent health outcomes: traditional and vulnerable domains.

The traditional aspect focuses on the vulnerable population including minority groups and homeless individuals. This domain is further divided into the following:

- A predisposing realm with demographic characteristics such as age, gender, health beliefs, marital status, and social status (education, ethnicity, employment, and family size).

- An enabling sector including community resources (residence, region), cost of financing health care services, entry structure and protocol of caring for the population, family, health services resources such as patient volume distribution, for example: patient-physician ratio, hospital-bed-population

ratio, and personal resources (source of health care, health insurance status, income) (Shi & Stevens, 2011; Worthington, McLeish, & Fuller-Thomson, 2012).

The vulnerable aspect has more to do with the enabling resources and social structure. This includes the following:

- A predisposing vulnerable realm accounting for acculturation, 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), 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), developmental issues, drug abuse, and alcoholism, immigration status, history of unlawful conduct leading to jail or probation, mental illness, coping skills, cognitive, and literacy (Aday, 2003; Gelberg, Andersen, & Leake, 2000).

- An 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).

- A need vulnerable realm: accounts for perceived needs that are relevant to the vulnerable populations (e.g., HIV/AIDS, sexually transmitted diseases, tuberculosis and premature and low-birth weight babies) (Aday, 2003; Gelberg et al., 2000).

Researchers have utilized the behavioral model for vulnerable population's framework in order to determine the predictors of access to health care service usage and outcomes among vulnerable populations (Gelberg et al., 2000). According to Baker et al. (2005), this model was found to be appropriate in the comprehension of determinants of timely utilization of vision care amid a substantially large minority group residing in housing communities in Los Angeles County, California. The researchers found a strong association between utilization outcomes and having a regular source of care and health insurance coverage utilizing the data obtained from Services Access in Urban Public Housing study (SAUPH). Baker et al. (2005) results were supported by Small (2010) who found a significant association between mental health disorders and having a regular source of care and utilization of mental health services among people with co-occurring disorders. Hoerster, Beddawi, Peddecord, and Ayala (2010) discovered that age, birthplace, English literacy, ethnicity, health insurance status, income, marital status, time in the United States, transportation to work and years of education as predisposing and enabling factors linked with health care utilization among California farm workers. In another study, Kagotho and Jan (2008) found that region of access to medical care, education, origin, and visa adjustment status were meaningfully associated with prostate cancer screening among older immigrant men.

Despite the effectiveness of cervical cancer screening in the United States, compliance with and the utilization of screening services remains relatively low among the population of Hispanic women (Gonzalez et al., 2012). Gonzalez et al. (2012) hypothesized that preventive services such as cervical cancer screening predict screening

under the need for care domain and age and language (their proxy for acculturation)

predict cervical cancer screening as the predisposing domain; meanwhile, factors such as

income and health plan status are the strongest predictors for enabling domain. In

contrast, demographic factors, ethnicity, language and socioeconomic factors were

identified as predictors to health care use by vulnerable groups in a study conducted by

Fernandez and Morales (2007). Thus, Fernandez and Morales noted that the model

conceptualizes the use of health care as an outcome of the interplay between the enabling,

need and predisposing factors of the vulnerable population. Other researchers, however,

maintained that the application of the model is tremendously beneficial for better

comprehension of the use of health available health services such as cervical cancer

screening among vulnerable populations (Baker et al., 2005; Fernandez & Morales, 2007;

Hogan et al., 2012; Stein, Anderson, Robertson, & Gelberg, 2012).

Literature Review Related to Key Concepts

Cervical Cancer

Cervical cancer is a slow-growing, preventable cancer that begins in the cervix

and occurs mostly in women over the age of 30 years (CDC, 2014f). The cervix, also

known as the neck of the uterus, is the lower narrow portion connecting the vagina in the

female reproductive system. It is composed of an outer portion, or ectocervix, lined with

a single layer of column-shaped cells and the inner layer (endocervix) is covered

with multiple layers of cells topped with flat cells (Ellis, 2011). Infection with HPV can

lead to alterations in the epithelium, which can lead to cancer of the cervix. It is the

acquisition of genetic mutation by healthy cells that causes cancer of the cervix, occurring in the form of abnormal cells. These abnormal cells with continue to grow and multiply until they accumulate and form a tumor. The cancerous cells will not stay stagnant, rather they will migrate and spread to other tissues in the body to form metastasis causing devastating effects on health. About 10% of cervical cancer occurs as adenocarcinoma and approximately 90% of this cancer occurs as squamous cell cancer. In order to detect cervical cancer and diagnose, a biopsy is taken of the abnormal lesion after an irregular result from cervical cancer screening (National Cancer Institute, 2014).

There are two common types of HPV that cause cervical cancer, 16 and 18, and can be prevented with routine screening and HPV vaccination. They can both be treated successfully if caught during the early stages; many women with cervical cancer can experience grave outcomes, such as mortality, if detected in the advanced stages (CDC, 2014e; Dunne & Park, 2013; National Cancer Institute, 2014). Women with cervical cancer may not express or feel any symptoms during the early stages, however, once the cancerous cells commence to metastasize in the body, an assortment of symptoms start to be evident. These include abnormal vaginal bleeding (i.e., bleeding after intercourse, bleeding between regular menstrual periods, heavier and longer menstrual periods, or bleeding after menopause), abnormal vaginal discharge, back and pelvic pain, loss of appetite, pain during intercourse, tiredness and weight loss (National Institute of Health, 2012).

Predisposing Factors Contributing to Cervical Cancer

The greatest predisposing causative agent for cervical cancer is the Human Papillomavirus (HPV). There are nearly 180 types of the infection. About 40 are known to affect the reproductive system and may contribute to several diseases including cervical cancer. Fifteen types are classified as high risk (CDC, 2014e; Gadducci, Barsotti, Cosio, Domenici, & Genazzai, 2011). HPV types 31 and 45 have been recognized in nearly 10% of worldwide diagnosis, while types 16 and 18 have accounted for approximately 75% of the cases (Gadducci et al., 2011; Jemal et al., 2013).

HPV infection is the most frequently transmitted disease globally (CDC, 2014e). This virus is the most commonly transmitted sexual infection and may be transmitted through vaginal or anal sex (CDC, 2014e). According to the CDC (2011b), with HPV being so common, most sexually active men and women will be exposed to the virus once in their lifetime (Gadducci et al., 2011; Jemal et al., 2013). Presently, approximately 79 million individuals are infected with HPV and nearly 14 million new cases develop annually. Since there are no symptoms associated with the virus, it usually vanishes on its own without any infection. The virus may persist, however, in some to cause abnormal cell changes that can lead to cervical cancer (CDC, 2011b).

Women engaging in unprotected intercourse and having multiple sexual partners are at higher risk of contacting the infection (CDC, 2014a). In terms of other risk factors, Fonseca-Montinho (2011) conducted a study discovering the association between smoking and cervical cancer. Smoking interferes with both prevalence and incidence of the infection and has an association with the occurrence of ICC and intraepithelial

neoplasm. Additional risk factors also associated include co-infection with HIV, exposure to diethylstilbestrol before birth, having more than three to four children, high risk sexual behaviors, hormone replacement therapy, long-term use of birth control pills, and weakened immune system (CDC, 2014a; Gadducci et al., 2011).

There has been a tremendous amount of progress made towards the scourge of HPV and in preventing cervical cancer. In the United States and other developed countries, over the last three years, there has been a systematic decrease of about 50% in new cases (National Cancer Institute [NCI], 2014b). According to the National Cancer Institute, numerous measures are effective in preventing the HPV infection such as, avoidance of sexual promiscuity and prolonged use of oral contraceptive, the use of protective contraception during sexual activities, abstinence from sexual activity, smoking cessation, and vaccination against HPV 16 and HPV 18 (National Cancer Institute, 2011). The vaccine has proven to be an essential cervical cancer prevention strategy. The steady decrease in cases of cervical cancer in the past decades is greatly attributed to ameliorated screening for cervical cancer HPV vaccination from ages 9 to 26, however, the compliance with the immunization remains low among Hispanic women (National Cancer Institute, 2011).

Other recommendations in preventing cervical cancer entail having regular gynecologic and cytological screenings. The U.S. Preventive Services Task Force (2015) asserts that routine cervical cancer screening should be performed every three years, commence three years after initial vaginal intercourse, and no later than 21 years old, regardless of any sexual activity. Other cervical cancer screening guidelines consist of:

- Women aged 30 to 65 years who want to lengthen the screening interval (screening with a combination of cytology and HPV testing) should do so every 5 years.

- Women aged 65 years and older could stop routine screening if they had a history of two consecutive normal Pap smear, three consecutive normal Pap and HPV DNA test within the past 5 years; those not fitting these criteria should continue routine screening.

- Routine screening is no longer necessary if a woman underwent gynecological surgeries such as total hysterectomy that involved the removal of the uterus and cervix for treatment, unless it was performed as a treatment for cervical cancer or pre-cancer.

- Women who have had a hysterectomy without the removal of the cervix should continue to have regular Pap tests (American Cancer Society, 2012; American Congress of Obstetrics and Gynecology, 2014; Duggan et al., 2013; National Cancer Institute, 2011; U.S. Preventive Services Task Force, 2016).

Cervical Cancer Screening Practices Among Minority Women

The U.S. Census Bureau (n.d.) reported that in the year 2012, the minority women population was nearly 59 million. In Table 2, I show the breakdown of the population according to race/ethnicity.

Table 2

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	26,098,322	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-PCT12O.

Among the minority women across ethnic and racial groups, there is an existing disproportion in the incidence and mortality rates of cervical cancer screening and the cancer itself (Fang, & Tan, 2011; Ho & Dinh, 2011). Thus, numerous studies have scrutinized the participation in cervical cancer screening among minority women in the United States to ascertain predictors of screening.

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

American Indians/Alaskan Native also have higher rate of cervical cancer (Wong et al., 2011). Thus, researchers noted that in an observational population-based study about cancer rates among Alaskan Native women, there are no significant difference between cervical cancer rates among the two groups. They observed, instead a marked decline in cervical cancer rates (Day, Lanier, Bulkow, Kelly, & Murphy, 2010).

Cervical cancer screening rates have been found to be lowest among Asian American women, when compared to the rest of the groups. This is mostly likely attributed to limited cultural practices and beliefs, psychosocial factors, and limited knowledge about the importance of cervical cancer screening. In comparison to non-Hispanic White women, this group has a higher incidence and mortality rate of cervical cancer (Fang, Ma, & Tan, 2011). Ho and Dinh (2011) studied aspects that are related with compliance in screening for cervical cancer among Southeast Asian American women with Cambodia, Hmong, and Vietnam nationalities. They discovered that acculturation, age, the characteristics of the clinician, lack of awareness about screening and cervical cancer, limited access to health care services, marital status, psychological (apprehension) about screening and socioeconomic status contributed to very low participation with cervical cancer screening. Ma et al. (2012) conducted a study (based on 1450 Vietnamese American women) to determine whether certain factors, such as access to health care services, acculturation, awareness, cultural beliefs, demographics and knowledge and are linked to previous history screening. The researchers determined that there is significantly low awareness and knowledge about cervical cancer screening and HPV. Table 3 demonstrates the percentage of compliance with Pap smear for both non-

Hispanic White women and minority groups. Graph 1 shows the incidence of getting

cervical cancer across the races.

Table 3

Ethnicity/Race of U.S. Women Ages 18 Years and Older 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 America	85.1%	81.1%	80.1%	85.0%
Hispanic	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).
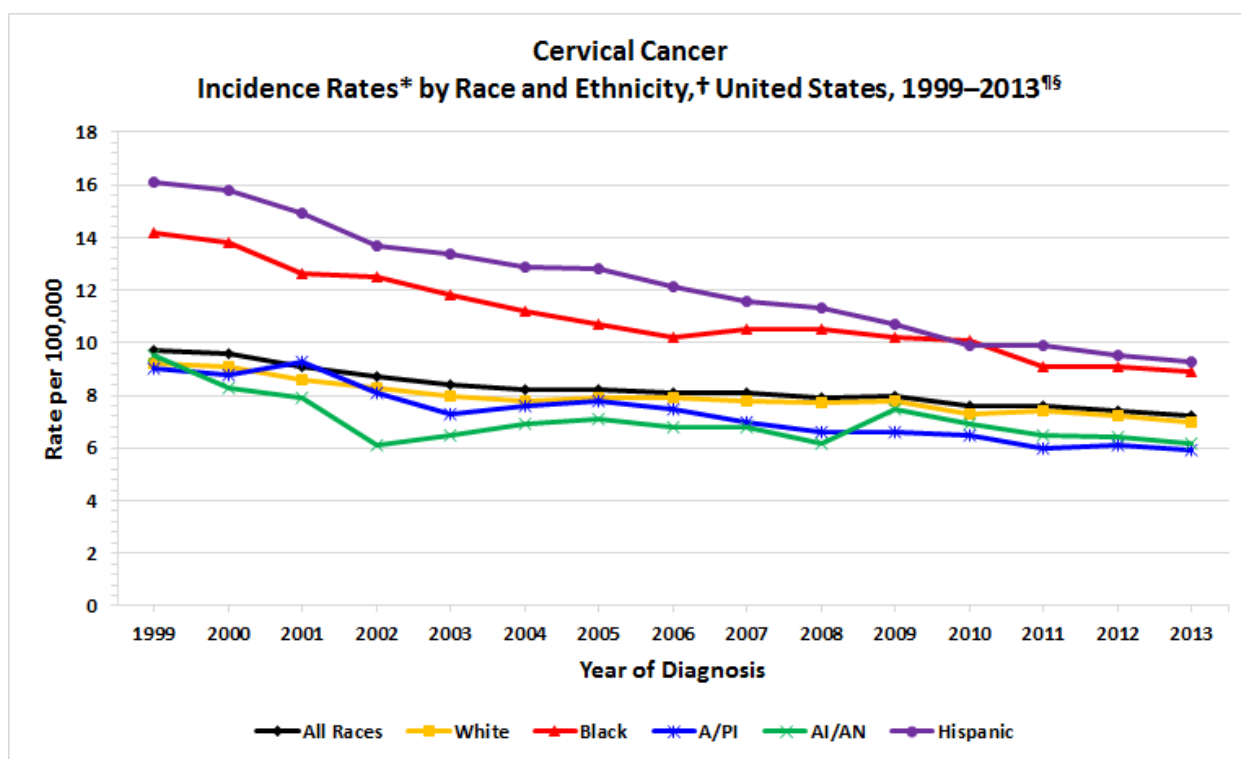
Figure 1. Incidence rates by ethnicity/race of U.S. women between 1999 and 2013 (CDC, 2012).

Foreign Birth

The U.S. Census Bureau (2010) estimated that there were an estimated 37.6 million foreign-born individuals residing in the United States in 2010; thus, their health status affects the overall health of the country. While the effective measures in reducing the burden of cervical cancer have been embraced by native-born U.S. citizens, foreign-born and immigrant women have barriers that hinder the use of these measures. Picklea et al. (2014) discovered that based on foreign birth and years of duration in the country there were significant differences in cancer screening. The differences were seen to be as high as 25-40% in screening rates between some foreign-born groups and their U.S.

counterparts. Lifetime years that have been spent in the country were also found to have a high difference. Lofters et al. (2010) discovered that the lowest screening rates among immigrant women from South Asia, Middle East, and North Africa in a similar study in Canada. This finding was comparable to the results Sanz-Barbero et al. (2011) obtained, noting that immigrant women in Spain were less likely to use cervical cancer screening services than native-born Spanish women.

Migration of Dominican Women

As of 2014, the Hispanic population in the United States was 55 million, making up 17% of the nation's total population and the nation's largest ethnic or racial minority (Siegal et al., 2015). Between 2013 and 2014, nearly 1.15 million Hispanics added to the nation's population and it is projected that in the year 2060 the projected constitution will be 119 million Hispanic individuals (U.S. Census Bureau, 2014b). This population is made up of Mexicans, Puerto Ricans, Cubans, South or Central Americans, Dominicans, or other Spanish descent. Mexicans make up the majority (64.3%), followed by Puerto Ricans (9.5%), Salvadorans (3.7%), Cubans (3.7%), and Dominicans (3.1%) (U.S. Census Bureau, 2014b).

The Dominican immigrant population in the United States (commencing in the 1960s) stood at 12,000 and rapidly grew thereafter reaching 350,000 in 1990 and 879,000 in 2010 (U.S. Census Bureau, 2012a; World Bank Prospects Group, 2013). This large-scale migration to the U.S. from the Dominican Republic began in the wake of economic and political turmoil that arose after dictator Rafael Trujillo was murdered by rebels in 1961 and the U.S. military and other government agencies intervened (Siegal et al., 2015;

U.S. Census Bureau, 2014f). In 2012, Dominican immigrants constituted to 2% of the total U.S.; foreign-born population of slightly over forty million with 960,000 individuals (U.S. Census Bureau, 2012a; World Bank Prospects Group, 2013). Women have historically dominated the immigration from the Dominican Republic to the U.S.; in fact, 56% of all Dominican immigrants living in the United States between 1970 and 2012 were female (USCIS, 2013). With the omission of immigrants from Cuba, Dominican immigrant population has been larger than other immigrant populations from the Caribbean (Siegal et al., 2015).

Very few of these Dominicans come to the U.S., via employment avenues, instead nearly all obtain lawful permanent residence in the United States, (also identified as getting a "green card") by way of family reunification (USCIS, 2014). Compared to the overall foreign-born population in the United States, immigrants from the Dominican Republic were more likely to live in poverty and have gained U.S. citizenship, be limited in English proficiency and less likely to have a college degree or to be uninsured (Siegal et al., 2015; U.S. Census Bureau, 2014c; U.S. Census Bureau, 2014d).

Cervical Cancer in the Dominican Republic

According to the WHO (2013), non-communicable illnesses such as heart disease and cancer pose as the greatest threat to women's health in the Dominican Republic. Thus, of all the illnesses inflicting women in this region of the world, cervical cancer the highest mortality rate and age standardized incidence (International Agency for Research on Cancer [IARC], 2010). This cancer ranks as the second cause of female cancer and the first most common female cancer in women aged 15 to 44 years in Dominican Republic

(IARC, 2010). The IARC (2010) states that a woman in the Dominican Republic was over eight times as likely to die of cervical cancer than a woman living in the United States in the year 2008. Based on 2012 estimations, approximately 1,507 novel cervical cancer cases are diagnosed on an annual basis in the Dominican Republic (IARC, 2012). This is a fundamentally disconcerting fact given the highly preventable nature of the cancer.

The most necessary and fundamental steps toward the larger goal of suitable follow-up of positive discoveries and early clinical treatment of cervical cancer are equitable and efficient national screening programs (Soneji & Fukui, 2013). In the Dominican Republic, the health care systems are fragmented, and access is limited and geared to maternal health. As a result, very little coverage is contributed to cytology-based screening (Soneji & Fukui, 2013). Soneji & Fukui (2013) conducted a study in the Dominican Republic revealing that the probability of this type of screening was 98% higher compared to women who had not had a recent doctor's visit. These researchers also discovered that women in the country with greater wealth experienced ever-increasing probabilities of having a recent Pap smear screening (Soneji & Fukui, 2013).

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Socioeconomic Status, English Language Proficiency, Cultural Factors, and

Cervical Cancer Screening

Compliance with screening among Hispanic and other minority women is greatly

influenced by disparities in socioeconomic status (Soneji & Fukui, 2013; Kinglesy &

Bandolin, 2011). Among Hispanic women, key determining factors to compliance with

clinician's visit and access to preventive health care services are lack of health insurance

evidenced by poverty (Soneji & Fukui, 2013). Simard et al. (2012) also found that the

cervical cancer mortality rate increase is largely attributed to poor compliance with

routine Pap testing as a result of the widening disparities among minority women group

in the United States. The researchers concluded that the cervical cancer rate would

largely decrease with the elimination of socioeconomic disparities.

Lee et al. (2013) conducted a study on the effect of socioeconomic disparity in

cervical cancer screening, from 1998-2010, on Korean women. They discovered that

there was a negative effect on screening participation as a result of socioeconomic

disparities because women with lower income per household and low education level had

the least likelihood of complying with screening when compared with well educated

women with very high household income. A report from the CDC (2014d) also noted

these associations of contributing factors to health care disparities in cancer prevention.

The report measured low socioeconomic status based on an individual's employment (gainful employment), financial state (gross annual income), and level of education. It was noted how low socioeconomic status regardless of health insurance status, lower income and persons of lower educational level are least likely to participate in screening as opposed to persons with higher education and higher income from employment (CDC, 2014d). Individuals with lower education and income were also found to have a lower likelihood of accessing health care services.

Researchers Gonzalez et al. (2012) noted that cervical cancer screening rates among Hispanic women are very low due to factors such as lower educational level, lower income level, and lack of health insurance coverage. Kim et al. (2013) supported the same findings via 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. These researchers noted that there could be a decrease in mortality from preventable cervical cancer by participation with routine cervical cancer screening. Thus, they based low socioeconomic on geographical location of residence, income, level of education attained and marital status, noting that the highest cervical cancer mortality was among women who possessed the lowest level of education, had lower income, and unmarried women (Kim et al., 2013).

Lee and Vang (2011) scrutinized the correlation between education level and cervical cancer screening among Hmong Americans who have low literacy and low English proficiency. Barriers other than low literacy and low English proficiency this group suffered from included beliefs about the etiology of illness, health care, health

insurance, race of health care provider and years in the United States. (Lee & Vang, 2011). A group of researchers operationalized language of interview as a measure of acculturation (Lee, Nguyen, & Tsui, 2011). They discovered that the participants in their study who interviewed in an Asian language were less likely to receive cervical cancer screening than their counterparts who interviewed in English language. Foreign-born women from the Dominican Republic may be experiencing the effect of educational status and other factors contributing to the disparity of cervical cancer screening. According to the Census Bureau (2010), immigrants from the Dominican Republic were more likely than the overall foreign-born population in the United States to be limited in English proficiency, have gained U.S. citizenship, live in poverty, in addition to being less likely to have a college degree or to be uninsured.

Acculturation and Cervical Cancer Screening

Acculturation, also known as assimilation, is comprised of a process of adopting the attitudes, beliefs, behaviors, practices and values of a particular culture by immigrants from different countries (Siegel, Naishadham, & Jemal, 2012). Due to its positive and negative influence on individual's health status of the immigrant population, acculturation can be quite complex. Assimilation of Dominican immigrants could determine their engaging in behaviors such as abuse, excessive alcohol intake, lack of physical exercise, poor nutrition and violence, their access to preventive services and health care, which may result in significant challenges in cancer control (Siegel et al., 2012). There are multiple indicators that can be attributed to the effect of acculturation on the health status of immigrants such as age, change in diet, change in health status,

educational level, English language proficiency, gender, language used at home or work,

length of stay in the United States, marital status, race/ethnicity and sociodemographic

effect (Lee, O'Neill, Ihara, & Chae, 2013). However, for the purpose of this research

study, the focus was on educational level, acculturation and the proficiency in English

based on the available data from the NHIS.

Educational level is truly influential on the rates of cervical cancer screening. The

CDC (2014d) found that women who have the most education tend to be more compliant

with routine cervical cancer screening than women with less schooling. An individual's

educational level has the ability to 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). When compared to non-Hispanic White women,

Hispanic women in the United States have lower cervical cancer screening rates (Duggan

et al., 2012; Gonzalez et al., 2012; Paskett et al., 2010). This could be accredited to

acculturation, lack of access to health care services, low socioeconomic status, no health

insurance due to financial constraints, perceived link of high risk sexual behavior with

Pap test and psychological factors (perceived vulnerability) (Duggan et al., 2012; Paskett

et al., 2010; Kinglesy & Bandolin, 2011).

Researchers Gonzalez et al. (2012) led a study supporting these findings

identifying compliance, lack of health insurance, language barrier, poor access to health

care services and utilization of screening services as some of the factors for low cervical

cancer screening among Hispanic women. Martinez-Donate et al. (2013) attests that

acculturation evidenced by language such as low proficiency in English language, legal

factors relating to immigration status, sociocultural, and structural barriers have affected compliance with screening for cervical cancer by Hispanic women. Lee and Vang (2010) found that lack of proficiency and illiteracy in the English language are significant barriers to utilization of cervical cancer screening services. These researchers found the English language as measure of acculturation to be a factor with access to health care among immigrant women and compliance to cervical cancer screening for the mere fact that 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).

Sexual Activity and Cervical Cancer Screening

Having sexual intercourse without the use of protection at any age predisposes a woman to sexually transmitted diseases such as HPV infection. A significant factor to exposure to sexually transmitted diseases is age (Bourne et al., 2010). According to Plummer, Peto, and Franceschi (2011), since initial sexually transmitted infection such as HPV infection occurs after first sexual activity, sexual activity at a very young age is a significant risk factor for cervical cancer. Borne et al. (2010) noted that women who have their first sexual intercourse prior to age 15 are at a higher risk for sexually transmitted disease than those from ages 15-and above. Thus, according to cervical cancer screening guidelines, women who are younger 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 highlights the risk identified by Borne et al. (2010) and

Plummer et al. (2011) of the association between having sexual intercourse at a very young age and being at risk for the HPV infection.

Tracy, Alison, and Ireland (2010) conducted a study based on lesbians and their compliance with cervical cancer screening and noting that lesbians are at a higher risk for cervical cancer as a result of their engagement in some modifiable risk factors for the disease such as obesity and smoking when compared to the rest of the women in the population. Additionally, this group of women is not only at a higher risk of being exposed to the HPV infection from their partner, but also has low participation in Pap testing. In their study of sociodemographic characteristics of women with greater sexual activity and cervical cancer screening, Drolet et al. (2013) noted that women with low socioeconomic status with report of greater sexual activity had very low cervical cancer screening rates. In terms of marital status, Limmer, LoBiondo, and Daines (2014) recognized such a factor as a predictor for compliance to the screening of cervical cancer. When compared to single women, these researchers maintained that married women tend to comply with preventive health services such as Pap smear screening.

Interventions to Reduce the Burden of Cervical Cancer

Several interventions and mode of delivery have been discovered in this literature review to be effective in reducing the burden of cervical cancer. The literature has given evidence revealing that vaccination against the HPV virus and improved adherence to screening are truly effective in preventing cervical cancer and in preventing progression to invasive cancer when there are abnormal changes (CDC, 2014f). Numerous studies have determined the effectiveness of several interventions to reduce the burden of

cervical cancer (Han et al., 2011). Other studies have focused on increasing awareness of cervical cancer and HPV and on the method of delivery of the intervention (Duggan et al., 2012).

Maree and Wright (2011) discovered that there is a significant influence on screening when the information about cervical cancer is presented in a particular manner. A study conducted among Dominicans found that women are more likely to feel stigmatized when cervical cancer is presented as a sexually transmitted disease caused by promiscuous behaviors and as a result develop avoidance behavior towards screening (Bourne et al., 2010). Access to health care services was revealed in literature to be associated with receipt of cervical cancer screening (Kaplan & Inguanzo, 2011). Access to health care services was reported by uninsured individuals to more difficult to attain than those with insurance (Kaplan & Inguanzo, 2011). Consequently, such individuals may perceive their health status as poor (Kaplan & Inguanzo, 2011).

Methodologies Used in Previous Studies

To scrutinize the compliance with cervical cancer screening among the minority groups, researchers have utilized both quantitative and qualitative designs. The studies Lucas (2014) reviewed revealed that participants were recruited by a multistage, purposeful convenience as well as, non-probability sampling method for better accessibility to the target population. Soneji and Fukui (2013) utilized the U.S. Agency for International Development (USAID) for health surveys and an interviewer administered questionnaire on demographic. To determine if there were any existing relationships between the variables, these researchers analyzed the data using

multivariate logistic regression. Plummer et al., (2011) led a cohort study to match the identified variables utilizing a nested case-control sample. Logistic regression was used for analysis, while a multistage model was utilized to ascertain cervical cancer incident rates.

Duggan et al. (2012) organized data using a Chi square test of 2 x 2 tables and binary variable in a randomized controlled trial using a culturally sensitive video interview in Spanish language to foster comprehension of the questions and better collection of information. To assess the determinants of compliance with screening, Gonzalez et al. (2012) used a mail-in questionnaire and telephone interview in both English and Spanish using logistic regression to analyze their findings. By investigating existing databases, researchers have discovered that they can seek a large sample of the immigrant population. Lee et al. (2010) were able to obtain a large sample size for their study on subgroups of Asian American women by combining three years of data from the California Health Interview Surveys. Lofters et al. (2010) were able to conduct a large population-based study with broad inclusion criteria by accessing several linked databases for their study. In this study, I accessed an existing database to answer the research questions; the use of existing databases may provide information on ethnic minorities such as immigrant Dominican women residing in the United States.

Summary

This literature review provided an overview of predictors of cervical cancer screening (i.e., acculturation, sexual practices and socioeconomic status) among minority women. In the United States, the Hispanic population is growing, and Hispanic

immigrants have become an integral part of the American population. Literature has revealed how larger Hispanic groups suffer disparities in cervical cancer screening but has not revealed any noteworthy investigation specifically on Dominicans into their awareness of cervical cancer screening guidelines and the factors that influence their screening behaviors and practice. This study proposes to fill that gap. The knowledge that is attained from this study could be useful in the development of interventions that are tailored to meet the needs of a group that may be currently underserved. This knowledge and subsequent interventions could help promote Dominican women's use of the sophisticated screening resources that are available in their country of residence. In Chapter 3, I discuss the methodology that was utilized in conducting this study. Additionally, I present information on the data analysis protocol, ethical considerations, the population, the sample and survey instrument related to this study.

Chapter 3 Research Method

My purpose in this research was to investigate factors that influence cervical cancer screening among Dominican women living in the United States. In this chapter, I analyzed the association between cervical cancer screening, acculturation, socioeconomic factors, insurance, and immigration status to better understand the effects that these factors have on cervical cancer screening among this population. Other topics to be discussed in this chapter include the research methods utilized in this study, in addition to the rationale, methodology, population, sampling procedures (i.e., sample selection and size), data collection, threats to validity, and ethical treatment of participants.

Research Design and Rationale

I obtained the data for this cross-sectional study from the National Health Interview Survey data set for the years ranging from 2011 to 2015. I used a quantitative, nonexperimental design to analyze how the independent variables (i.e., acculturation, socioeconomic factors, immigration status, and insurance) affected the dependent variable cervical cancer screening practices of the study participants. According to Leonard et al. (2010), a quantitative design is a suitable method for testing the causal relationships between variables using numerical observations. Using this kind of study enables researchers to apply the findings from the sample participants to generalize to the target population. With a nonexperimental survey, a researcher can make observations, describe phenomena, and draw conclusions through questionnaires without the manipulation of variables, which may be helpful for improving and/or formulating future interventions. By using a nonexperimental quantitative design, I investigated several

variables and their influence on the outcome variable, and I drew conclusions about cervical cancer screening in Dominican women living in the United States. In studying the predictors of breast and cervical cancer screening among immigrant women, Harcourt et al. (2014) concluded that health behavior was meaningfully affected by ethnicity and years of residence in the United States. In this study, there is no expected time or resource restraints anticipated.

Methodology

Population

The participants for this study were women respondents from the NHIS for the years 2011, 2012, 2013, 2014, and 2015, of Dominican ethnicity between the ages of 21 and 65 years. The study participants were confined to this age range based on the 2014 American Cancer Society guidelines for cervical cancer screening (American Cancer Society, 2012). According to the guidelines, it is recommended that women start cervical cancer screening at 21 years of age or no later than 3 years after becoming sexually active and routinely be screened thereafter until the age of 65 years (American Cancer Society, 2012). The participants were enrolled in the study based on the sampling design that is used in the NHIS cross-sectional primary survey. The stratified multistage sample method (implemented in 2006) was the basis for this design, utilized to produce estimates for the entire population (i.e., permitting a representative sample of all households and noninstitutionalized groups). The present sampling plan is a complex, cost-effective technique thriving to ameliorate the reliability of race/ethnicity and geographical location

(CDC, 2016g; Parsons et al., 2014). Between 600 and 850 Dominican women participated in the NHIS survey between the years 2011 and 2015.

Sampling and Sampling Procedures

NHIS used a stratified multistage sample design for an estimate of the general population. This survey is conducted annually; the sample assignment is intended to reflect all the regions and quarters in this country. The households for the interview are further assigned based on the 13 weeks of each quarter. To better reflect the constant chancing of the U.S. population, the NHIS redesigns the sampling method every ten years to ensure an up-to-date reflection of the general population (CDC, 2016g).

The subsample of interest in this study were female respondents from years 2011 to 2015 living in the United States who are Dominican between the ages of 21 and 65 years. Any years prior to 2011 were not included in the study analysis as well as any individual younger than 21 years or older than 65 years. The decision to focus on this population group was necessitated by the paucity of information on Dominican women (a growing subgroup of the Hispanic population) cancer screening practices. These women are a part of a demographic that has the highest incidence rate and the second highest mortality rate for cervical cancer in the country (CDC, 2016g; Duggan et al., 2012; Horner et al., 2011). This research will in turn contribute to the body of literature and the development of policies on how best to develop interventions that will be targeted to decrease both the incidence and mortality rates of the disease within this group.

Power Analysis

Suresh and Chandrashekara (2012) maintained that to detect the optimal sample requirements that identify the true effect of the phenomenon within the population, it is essential to perform a sample size assessment. A sample size assessment is a critical process in the design of a planned research procedure (Suresh & Chandrashekara, 2012). In descriptive studies, researchers necessitate hundreds of subjects to provide a sensible confidence interval with small effect (Kadam and Bhalerao, 2010). Using a large power for any research makes identification of the phenomenon more probable and thus requires a large sample size.

In this study, my goal was to scrutinize the effect of cervical cancer screening practices among U.S. Dominican women with a 90%, 95% and 99% power level and an alpha level of 0.05. As shown in Table 4, I completed a power analysis to determine the minimum sample size for the research study based on effect size, statistical power level, and the probability level (p value, alpha level and/or error rate).

Table 4

Sample Size Calculations – Simple Random Sampling

Frequency		2011	2012	2013	2014	2015	Total
Population		847	720	737	675	665	3644
Effect size		0.8	0.8	0.8	0.8	0.8	
Power level	80%	138	134	135	133	132	552
	90%	206	197	199	194	194	990
	95%	265	251	253	245	244	1249
Level of probability							
(p value, alpha level)		.05	.05	.05	.05	.05	
or error rate)							

Procedure for Recruitment, Participation, and Data Collection

For this study, I used secondary data from the NHIS for the years 2011 to 2015. The NHIS is a primary source of health data consisting of personal interviews that are collected from a representative sample of the population over the span of the past 5 decades (CDC, 2016g). Nearly 35,000 to 40,000 households are chosen annually, and data are compiled from 75,000 to 100,000 individuals (CDC, 2016g). This free dataset is readily accessible online through the NHIS website (National Health Interview Survey, 2015). A selected sample cannot be substituted by another one; therefore, one civilian adult family member is then randomly selected from the household and the family member self-reports to the questions from the sample adult questionnaire (CDC, 2016g).

The interviewers are part-time employees of the U.S. census bureau who have obtained extensive training on specifications of the NHIS data collection and additionally conduct interviews in person within the homes of the selected samples (CDC, 2016g). The questionnaires are administered through the Computer Assisted Personal Interviewing (CAPI) mode due to the quality of the data and timeliness it provides (CDC, 2016g). By using this particular mode, the computer guides the interviewers through the data collection process and allows for routing and branching to appropriate questions based on the responses. CAPI also improves storage of data and eliminates the printing and mailing cost (CDC, 2016g). CAPI offers other advantages over paper surveys including more complete interviews because of the possibility of checking the error range and data transcription error (Kissinger et al., 2010).

During the interview, the interviewer enters the responses directly into the computer. A great advantage about this program is the capability of the computer to determine if the response is within the allowable range and consistent with other responses that have been given during the interview (CDC, 2016g). There are two main components to the survey: the core questions and the supplemental section. The core questions are series of questions that have been developed, standardized, and tested over time. Within the core part, respondents answer questions on assets, demographic information, health status and limitations, health care access and use, and injuries and income (CDC, 2016g). These questions have remained the same through the years. The supplemental sections, on the other hand, may change from year to year as data may be collected on relevant current issues of national importance (National Center for Health

Statistics, 2012). The core questionnaires are revised every 10 to 15 years with the last revision in 1997. The supplemental section of the survey that I used in this study was collected in 2010, 2011, 2012, 2013, 2014 and 2015. I limited the study to the stated years because they are the most recent years during which female respondents were asked about their cervical cancer screening status.

For this study, I used data that I retrieved via the Integrated Health Interview Series (IHIS), a free comprehensive public data repository of the NHIS that 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 (Davern, Blewett Lee, Boudreaux, & King, 2012; Integrated Health Interview Series, 2015). The data was harmonized with comprehensive documentation about the health of the population in the United States into a web-based system through the IHIS, which is useful in making consistent comparison and analysis of health issues across 5 decades (Davern et al., 2012).

Instrumentation and Operationalization of Constructs

The NHIS is a survey that has been used since the year 1957 to gather information on the health status of the noninstitutionalized people in the United States. The survey gathers annual information on demographics, health status, health behaviors, health care access, and use of health care services by participants (National Center for Health Statistics, 2012). The information that is provided in this survey can be valuable in evaluating how the country is progressing toward the Healthy People program goal of ameliorating the health of all Americans.

The measurement of the information is a crucial aspect in research. The use of measurement in a public health research study permits the researcher to assign numbers to an observation and quantify different aspects of a phenomenon (Stubbings et al., 2010). Measurement includes operationalizing constructs as variables (dependent and independent), developing and applying instruments, and testing of the variables. Validity and reliability are the main indicators used to measure instruments. Validity implies 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 through time (Stubbings et al., 2010). Instruments used for measurement must be reliable; however, an instrument may be reliable but not valid. Reliability of a measuring instrument refers to its ability to consistently assess the same thing through time, whereas validity refers to the extent to which it measures what was intended (Stubbings et al., 2010).

This study benefitted from the advantages inherent in an established database such as the NHIS, using the questionnaires that have been pretested and standardized in the course of several years. The standardization provides the advantage of asking the same questions from all recipients. This improves the reliability of this design. The instrument that was used to measure the variables that were the focus of this study include asking the respondent if she had ever had a Pap test. Other variables included usual source of care, highest level of education accomplished, language of interview and citizenship or rephrasing of the question. After I choose the questionnaires from the

NHIS for analysis, I operationalized my variables based on the constructs of the

behavioral model for vulnerable populations.

Table 5

Summary of Variables and Level of Measurement

Independent Variable	Level of measurement	Dependent Variable	Level of measurement
Acculturation	Ordinal (interval)	Cervical cancer screening	Ordinal (interval)
Immigration status	Ordinal (interval)		
Socioeconomic status	Nominal (continuous)		
Education	Ordinal (interval)		
Usual source of care	Ordinal (interval)		

Table 6
Variables and Level of Measurement

Type of Variable	Questions	Response(s) with options	Data Type
Cervical Cancer Screening (dependent variable)	Have you had a Pap test?	1: Yes 2: No 7: Refused 8: Not ascertained 9: Don't know:	Ordinal
Acculturation (determined by proficiency in the English language or language of the interview)	How well do you speak English?	1: Very well 2: Well 3: Not well 4: Not at all 7: Refused 8: Not ascertained 9: Don't know	Ordinal
	Language of the interview	1: English 2: Spanish 3: English and Spanish 4: Other 8: Not ascertained	
Immigration status	Geographic place of birth recode?	1: USA: born in one of the 50 United States or D.C 2: USA: born in a U.S. territory 3: Not born in the U.S. or a U.S. territory 7: Refused 8: Not ascertained 9: Don't know	
	U.S. citizenship status	1: Yes, citizen of the United States 2: No, not a citizen of the United States 7: Refused 8: Not ascertained 9: Don't know	Ordinal
	Years that - - has been in the United States.	1: less than 1 year 2: 1 yr., less than 5 yrs. 3: 5 yrs., less than 10 yrs. 4: 10 yrs., less than 15 yrs. 5: 15 years or more 9: unknown	
Socioeconomic status (independent variable)	What was your total earnings last year?	1: 0-$35,000 2: $35,000 -$74,999 3: <$75,000 or more	Continuous
Education	What was your highest	1: No formal education or less than	Ordinal

	level of school completed?	HS 2: HS/GED Graduate 3 Above High School	
	1. Place to go when sick	0: Doesn't get preventive care anywhere 1: Clinic or health center 2: Doctor's office or HMO 3: Hospital emergency room 4: Hospital outpatient department 5: Some other place 6: Doesn't go to one place most often 7: Refused 8: Not ascertained 9: Don't know	
Usual source of care			Ordinal
	Place usually go for routine/preventive care?	0: Doesn't get preventive care anywhere 1: Clinic or health center 2: Doctor's office or HMO 3: Hospital emergency room 4: Hospital outpatient department 5: Some other place 6: Doesn't go to one place most often 7: Refused 8: Not ascertained 9: Don't know	Ordinal

Data Analysis Plan

The collected data was analyzed utilizing SPSS and all statistical tests was conducted using an alpha level of 0.05 for statistical significance. The decision to reject the null hypothesis was based on whether the p-value was less than or equal to the stated alpha level, in which the alternative hypothesis was accepted. If the *p*-value was found to be greater than the stated alpha value, the null hypothesis was retained, and the alternative hypothesis was rejected. All the confidence intervals and the effect size were interpreted for the strength of the relationship between the independent and dependent variables and to avoid a type 1 error.

RQ1: Does a correlation exist between source of care, socioeconomic factors (measured by family income and education level), and cervical cancer screening status among Dominican women living in the United States?

$H_0$1: There is no correlation between source of care, socioeconomic factors (measured by family income and education level), and cervical cancer screening status among Dominican women living in the United States.

H_a1: There is a correlation between source of care, socioeconomic factors (measured by family income and education level), and cervical cancer screening status among Dominican women living in the United States.

I utilized the Chi-Square test of independence and logistic regression to test for association between source of care, socioeconomic factors (measured by family income and education level), and cervical cancer screening status. I then conducted logistic regression to determine the significance of the result and reject or retain the null hypothesis based on the alpha level of 0.05.

RQ2: Does acculturation, as determined by proficiency in the English language or language of the interview influence cervical cancer screening among Dominican women in the United States?

$H_0$2: Acculturation, as determined by proficiency in the English language or language of the interview has no influence on cervical cancer screening among Dominican women in the United States?

H_a2: Acculturation, as determined by proficiency in the English language or language of the interview does influence cervical cancer screening among Dominican women in the United States?

I utilized the Chi-Square test of independence and logistic regression to test for association between proficiency in the English language and cervical cancer screening status. I then conducted logistic regression to determine the significance of the result and reject or retain the null hypothesis based on the alpha level of 0.05.

RQ3: Is there an association between immigration status and cervical cancer screening among Dominican women in the United States?

H_03: There is no association between immigration status and cervical cancer screening among Dominican women in the United States?

H_a3: There is an association between immigration status and cervical cancer screening among Dominican women in the U.S.in the United States?

I utilized the Chi-Square test of independence and logistic regression to test for association between immigration status and cervical cancer screening status. I then conducted logistic regression to determine the significance of the result and reject or retain the null hypothesis based on the alpha level of 0.05.

The information on the data analysis was presented by using descriptive and inferential statistics (i.e., frequencies and percentages). The Chi-square was utilized to test and report the cancer screening behaviors of participants. The dependent variable assessed on an ordinal scale to determine if participants have ever had a Pap test or never had a Pap test during the past 12 months. The independent variables of source of care,

immigration status, acculturation and socioeconomic status was assessed on an ordinal

scale. The Chi-square test was an appropriate choice for these variables since the measure

are categorical and independent of each other (Hyacinth, Adekeye, Ibeh, & Osoba, 2012).

Logistic regression allows researchers to test the association between a continuous,

categorical outcome variable and multiple independent variables (Hyacinth et al., 2012;

Pemg et al., 2013). This type of model analysis has been utilized to measure several

factors that influence cervical cancer screening among minority women (Hyacinth et al.,

2012; Ji et al., 2010; Pemg et al., 2013).

Threats to Validity

One of the shortcomings of the study was the utilization of secondary data.

Threats to validity for a non-experimental study are primarily based on measurements as

a result of secondary data minimizing the threat but restricting the researcher to what

already exists and not allowing room for stipulating the exact measures that could be

investigated (Smith et al., 2010). Due to the cross-sectional nature of the study, the

research may be susceptible to recall bias, being that the participants are requested to

disclose their partaking in cervical cancer screening and the duration of time since their

last Pap exam.

Additionally, many of the participants' responses may have been based on what

they consider to be socially acceptable. Researchers have shown that participants may not

accurately report their receipt of Pap test or may give socially acceptable answers, thus

making self-reporting not very accurate since it may not be authenticated (Lofters et al.,

2015). There may also be an issue of over-reporting. Women may over-report their last

Pap test as having occurred more recently than when it actually occurred (Lofters et al., 2015). The accurateness of self-reports should be interpreted in the assessment of screening rates and screening gaps since an extensiveness of over-reporting could result in low prevalence (Lofters et al., 2015). Moreover, when comparing other means of surveys (i.e., telephone or self-administered surveys), there may be reduced self–report accuracy with face-to-face interviews (Lofters et al., 2015).

Validating the self-report of the vulnerable population could reveal inequities that may even be greater than expected. Screening validity in women who are considered to be socially disadvantaged (grounded on English proficiency, health literacy status, income, immigration status, and race/ethnicity) may prove to be particularly challenging 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), when compared to non-Hispanic White women, African American and Hispanic women have the inclination to over-report screening at a meaningfully disproportionate level. Nevertheless, the benefits of self-reporting cannot be dismissed since self-reporting is an integral facet of a survey data collection, particularly with large sample sizes (Olesen, Butterworth, Jacomb, & Tait, 2012). Stanton et al. (2012) suggested that validity of studies using self-reporting ought to be based on an amalgamation of specificity and sensitivity of selected indicators, and additionally base the survey of population knowledge on prevalence since low prevalence could result in over-estimation even with high specificity.

The self-reported basis of the NHIS questionnaire utilized in this non-experimental study could have greatly threatened the internal validity in the form of selection bias in measurement (Smith et al., 2010). Making a generalization of the study on the basis of the population, particularly in a very large population, may pose a threat to the external validity (CDC, 2016g; Smith et al., 2010). The validity of the measurement procedures may have threatened the statistical conclusions of the study. Factors such as effect size, an inflation of type 1 error, inadequate statistical power, application of appropriate sampling procedure, and any assumptions of the statistical test may also have affected the statistical conclusion validity. It is appropriate that the study design be articulated so as to minimize threats to both the internal validity and statistical conclusion validity (Smith et al., 2010).

Ethical Procedures

I contacted the National Center for Health Statistics, Health Interview Statistics division to verify that all data is free online access for the general public and that no special permission is necessary for data utilization. This study only made use of secondary data from the NHIS and thus, I did not necessitate the access to human participants. There was no accessibility to any personal or identifying information that may establish bias or any conflict of interest by this researcher. Furthermore, information attained by the NHIS was done anonymously for the protection of the participants. I did not make any attempt throughout the study to acquire any personal or identifying information of the participants. This research study was approved by the Institutional Review Board (IRB) at Walden University (IRB# 01-09-17-0191734). The data usage

was strictly for the purpose of analysis with the approval of the Institutional Review Board (IRB) at Walden University. The use of secondary data for the study did not necessitate any processes or recruitment materials and did not involve any intervention activity. The content of this survey was anonymous in which the data collection was conducted by employees of the U.S. government qualified by the U.S. Census Bureau based on specified procedures and protocols of the NCHS. These employees were obligated to sign statements that guarantee the maintenance of confidentiality of the data (CDC, 2016g). No attempts were made to obtain any identifying information on the participants and all documents and reports were strictly and professionally utilized to accord respect for the participants in the original survey conducted by the NHIS. The utmost integrity and professionalism was maintained throughout the study analysis with no attempt of altering, falsifying or modifying of the study analysis. Data was safely stored in a personal computer in a locked cabinet and will remain in this manner over the course of 5 years; this researcher is the only one with access to this data. The data will be destroyed when the 5-year period has elapsed.

Summary

In this chapter, the research design and methodology utilized for a non-experimental quantitative study was presented, in which data was extracted from the National Health Interview Survey, a free online public data repository of the National Center for Health Statistics and a division of the CDC. This chapter explained the procedures that were utilized to collect data in order to provide answers to the research questions. The study focused on data that were utilized to answer the research questions

based on the correlation between acculturation, insurance, immigration and social economic status and compliance with cervical cancer screening practice among Dominican women residing in the United States. I also discussed the study design, sampling, instrumentation, process of data analysis, threats to validity, and ethical considerations for this study. Chapter 4 will focus on the analysis of the data while chapter 5 will be based on the interpretation of the results and making recommendations based on the findings.

Chapter 4: Results

My purpose in this cross-sectional quantitative research study was to investigate the predictor of cervical cancer screening among Dominican women in the United States. I conducted a research using secondary data from the 2011, 2012, 2013, 2014, and 2015 National Health Interview Surveys to determine the association between the dependent variable, cervical cancer screening, and the extent to which the independent variables of usual source of care, socioeconomic factors, acculturation, and immigration status, affect compliance with screening in the target population.

Research Questions and Hypotheses

RQ1: Does a correlation exist between usual source of care, socioeconomic factors (measured by family income and education level), and cervical cancer screening status among Dominican women living in the United States?

$H_0$1: There is no correlation between usual source of care, socioeconomic factors (measured by family income and education level), and cervical cancer screening status among Dominican women living in the United States.

H_a1: There is a correlation between usual source of care, socioeconomic factors (measured by family income and education level), and cervical cancer screening status among Dominican women living in the United States.

RQ2: Does acculturation, as determined by proficiency in the English language or language of the interview influence cervical cancer screening among Dominican women in the United States?

$H_0$2: Acculturation, as determined by proficiency in the English language or language of the interview has no influence on cervical cancer screening among Dominican women in the United States.

H_a2: Acculturation, as determined by proficiency in the English language or language of the interview does influence cervical cancer screening among Dominican women in the United States.

RQ3: Is there an association between immigration status and cervical cancer screening among Dominican women in the United States?

$H_0$3: There is no association between immigration status and cervical cancer screening among Dominican women in the United States.

H_a3: There is an association between immigration status and cervical cancer screening among Dominican women in the United States.

In this chapter, I present the descriptive analysis of the variables being studied, in addition to the results of the chi-square and logistic regression analyses. The analysis reveals the statistical significance of each of the independent variable to the dependent variable. Based on those results, I will show whether the hypothesis is accepted or rejected.

Data Collection

This study consisted of randomly collected data from Dominican women in the United States. for the years 2011-2015. Table 7 illustrates a breakdown by year of Dominican women who participated in the study between the years of 2011 and 2015.

Table 7

U.S. Dominican Female Respondents to NHIS by Year, 2011-2015

	Frequency				
	2011	2012	2013	2014	2015
Dominican Republic					
Total	**N = 138**	**N = 134**	**N = 135**	**N = 133**	**N = 132**

Table 8 provides information about Pap smear testing of the study respondents.

Table 8

Dominican Respondents with Pap Smear Test

	Frequency in Percentage				
Response	2011	2012	2013	2014	2015
Yes	54.0%	51.2%	39.7%	48.6%	40.5%
No	43.9%	46.3%	58.1%	50.5%	56.2%
Total	**N = 138**	**N = 134**	**N = 135**	**N = 133**	**N = 132**

Tables 9, 10, 11, 12 and 13 describe socioeconomic factors, as they pertain to family income and level of education; immigration status based on citizenship and the number of years in the U.S; acculturation relating to proficiency in the English language (i.e., how well is English spoken, language of the interview) and usual source of care.

I determined socioeconomic factors using participants' educational level (ranging from no formal education to post graduate degree) and family income. The highest level of education attained among participants throughout all the years was a high school

education/GED graduate. A higher percentage of a high school education/GED graduate

was found in 2014 at 36.4% and lowest in 2013 with 31.9%. The lowest form of

educational level was above high school in 2011, 2012, and 2014 and less than high

school in 2013 and 2015. In terms of family income, the highest frequency throughout all

the years was among those who made between $0 - $34,000 and lowest among the

bracket of $75,000 (2011 having the highest and lowest frequency of 66.4% and 1.5%).

Table 9 provides complete levels of frequencies for socioeconomic status.

Table 9

Percent Frequency of Socioeconomic Status

Classification	*2011* Freq%	2012 Freq%	2013 Freq%	2014 Freq%	2015 Freq%
Education					
Less than HS	29.0%	29.4%	27.8%	30.2%	27.8%
HS/GED Graduate					
Above High School	34.7%	33.7%	31.9%	36.4%	32.5%
	25.1%	27.5%	30.3%	25.7%	0.7%
Family Income					
$0 - $34,999					
$35,000 - $74,999	66.4%	55.3%	51.8.1%	62.7%	46.4%
$75,000 & over	15.3%	15.6%	17.9%	12.6%	14.4%
	1.5%	5.1%	1.8%	2.7%	5.2%

For usual source of care, I analyzed both routine and preventive care. The highest

source of care for routine procedures for all years appeared to be in a doctor's office or

HMO, followed by a clinic or health center. Survey year 2016 had the highest frequency

in this category with 60% and 2015 the lowest with 38.1%. When analyzing the usual

source of preventive care, I found that the highest frequency was among the respondents

who did not get preventive care anywhere and lowest for those who did not go to one place most often. In Tables 10 and 11, I provide frequency of usual source of routine and preventive care.

Table 10

Percent Frequency of Usual Source of Routine Care

	2011	2012	2013	2014	2015
Classification **Place to go when sick**	**Freq%**	**Freq%**	**Freq%**	**Freq%**	**Freq%**
Clinic or health center	21.1%	30.1%	26.6%	24.6%	30.9%
Doctor's office or HMO	73%	63.8%	66.5%	72.2%	67.6%
Hospital emergency room	1.5%	2.0%	1.0%	1.6%	
Hospital outpatient Department	2.5%	2.0%	1.5%	0.5%	1.1%
Some other place	0.5%	0.5%	3.0%	0.5%	0.5%
Doesn't go to one place most often	1.5%	0.5%	1.5%	0.5%	
Total	**N = 138**	**N = 134**	**N = 135**	**N = 133**	**N = 132**

Table 11

Percent Frequency of Usual Source of Preventive Care

	2011	2012	2013	2014	2015
Classification Place usually go for Preventive care	**Freq%**	**Freq%**	**Freq%**	**Freq%**	**Freq%**
Doesn't get preventive care anywhere	59.6%	43.1%	54.5%	60%	38.1%
Clinic or health center	8.5%	5.9%	7.3%	7.5%	16.7%
Doctor's office or HMO	23.4%	37.3%	27.3%	20%	28.6%
Hospital outpatient Department				2.5%	
Hospital emergency room	2.1%				
Some other place	4.3%		3.6%		2.4%
Doesn't go to one place most often	2.1%	5.9%	7.3%	7.5%	9.5%
Refused		2.0%			
Not ascertained		5.9%		2.5%	4.8%
Total	**N = 138**	**N = 134**	**N = 135**	**N = 133**	**N = 132**

I assessed acculturation using English language proficiency. In terms of language of the interview, the highest frequency throughout all the years was English at 95.5% in 2015. English and Spanish had the lowest count across all the years, 1.4% being the lowest in 2011 and 2015. The question of how well English is spoken was introduced in 2014 and asked again in 2015. The highest frequency was in 2015 with 51.9% of the participants responding to speaking English very well. 2014 had the lowest frequency of 13.3% in regard to participants speaking English well. In Table 12, I provide frequency of English language proficiency.

Table 12

Percentage Frequency of English Language Proficiency

	2011 Freq%	2012 Freq%	2013 Freq%	2014 Freq%	2015 Freq%
Language of Interview					
English	95.2%	91%	92.5%	92.6%	95.5%
Spanish	3.4%	6.1%	4.6%	3.3%	2.7%
English and Spanish	1.4%	2.2%	2.3%	3.3%	1.4%
How well English is Spoken					
Very Well				49.2%	51.9%
Well					
Not Well				13.3%	16.8%
Not at all					
				19.0%	15.8%
				17.0%	14.2%
Total	**N = 138**	**N = 134**	**N = 135**	**N = 133**	**N = 132**

I analyzed citizenship based on questions pertaining to geographic place of birth,
years in the United States and citizenship status. The highest frequency of geographic
place of birth among all years was found to be "Not born in the United States or U.S.
territory." The highest percentage was found to be in 2014 with a frequency of 64.1%.
Participants born in a U.S. territory had the lowest percentage and was found to be lowest
in 2013 with 0.4%. Regarding years in the United States, the highest frequency
throughout all the study years was among participants who resided in the States for over
15 years, in which 2015 had the highest percentage of 63.4%. Participants who were in

the United States for less than five years had the lowest frequency in 2015 with 8.1%. In

terms of citizenship status, a great majority of the respondents were U.S. citizens. 2015

had the highest frequency with 78.5% and 2011 the lowest at 68.8%. Those who were not

U.S. citizens had the highest frequency in 2011 with 30.6% and the lowest in 2015 with

20.9%. In Table 13, I provide citizenship frequency.

Table 13

Percent Frequency of Citizenship

Classifications	2011 Freq%	2012 Freq%	2013 Freq%	2014 Freq%	2015 Freq%
Geographic Place of Birth					
USA: born in one of the 50 United States or D.C.	40.3%	40.6%	37.2%	34.7%	40.8%
USA: born in a U.S. Territory	0.8%	1.4%	0.4%	1.0%	0.5%
Not born in the United States. or a U.S. territory	58.7%	57.6%	62.4%	64.1%	58.5%
Years in the U.S					
less than 5yrs.	15.9%	13.4%	13.6%	16.6%	8.1%
less than 10yrs. less than 15yrs.	15.1%	10.1%	13.8%	12.7%	15.3%
More than 15yrs.	12.9%	11.3%	14.5%	10.2%	10.9%
	54.8%	62.8%	56.6%	58.2%	63.4%
Citizenship Status					
Yes, citizen of the U.S.	68.8%	72.4%	71.8%	72.9%	78.5%
No, not a citizen of the U.S.	30.6%	26.9%	27.8%	26.2%	20.9%

Results

Data 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: citizenship, socioeconomic status (measured by family income, education level and source of care), and acculturation measured by English language proficiency. Following is the outcome of this analysis.

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

RQ1: Does a correlation exist between usual source of care, socioeconomic factors (measured by family income and education level), and cervical cancer screening status among Dominican women living in the United States

$H_0$1: There is no correlation between usual source of care, socioeconomic factors (measured by family income and education level), and cervical cancer screening status among Dominican women living in the United States.

H_a1: There is a correlation between usual source of care, socioeconomic factors (measured by family income and education level), and cervical cancer screening status among Dominican women living in the United States.

In 2011, 154 participants were analyzed. Overall in 2011, a total of 65.9% (n = 91) of participants responded with a yes for cervical cancer screening. The result of the Chi-square test in 2011 indicated that family income (p = .240), level of education

($p = .235$), and source of care related to place where respondents went when they were sick were ($p = .374$) not significantly associated with cervical cancer screening. The null hypothesis could not be rejected. The result for the Chi-square test indicted that source of care in terms of where respondents usually went for preventive care was significantly associated with cervical cancer screening ($p = .018$). The null hypothesis was rejected.

In 2012, 189 participants were analyzed. Overall in 2012, a total of 90% (n =126) of participants responded with a yes for cervical cancer screening. The result of the Chi square test in 2012 indicated that family income ($p = .142$), level of education (p = .088) and source of care related to place where respondents went when they were sick ($p = .520$) were not significantly associated with cervical cancer screening. The null hypothesis could not be rejected. The result for the Chi-square test indicted that source of care in terms of where respondents usually went for preventive care was significantly associated with cervical cancer screening ($p = .001$). The null hypothesis was rejected.

In 2013, 220 participants were analyzed. Overall in 2013, a total of 78.1% ($n = 172$) of participants responded with a yes for cervical cancer screening. The result of the chi square test in 2013 indicated that family income ($p = .452$), level of education ($p = .409$) and source of related to place where respondents went when they were sick care ($p = .167$) were not significantly associated with cervical cancer screening. The null hypothesis could not be rejected. The result for the Chi-square test indicted that source of care in terms of where respondents usually went for preventive care was significantly associated with cervical cancer screening ($p = .027$). The null hypothesis was rejected.

In 2014, 209 participants were analyzed. Overall in 2014, a total of 53% (n = 110) of participants responded with a yes for cervical cancer screening. The result of the Chi-square test in 2014 indicated that family income (p = .077), level of education (p = .576) and source of care related to place where respondents went when they were sick (p = .404) were not significantly associated with cervical cancer screening. The null hypothesis could not be rejected. The result for the Chi-square test indicted that source of care in terms of where respondents usually went for preventive care was significantly associated with cervical cancer screening (p = .022). The null hypothesis was rejected.

In 2015, 182 participants were analyzed. Overall in 2015, a total of 73% (n = 136) of participants responded with a yes for cervical cancer screening. The result of the Chi-square test in 2015 indicated that family income (p = .222), level of education (p = .297) and source of care (p = .224) related to place where respondents went when they were sick were not significantly associated with cervical cancer screening. The null hypothesis could not be rejected. The result for the Chi-square test indicted that source of care in terms of where respondents usually went for preventive care was significantly associated with cervical cancer screening (p = .013). The null hypothesis was rejected.

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

RQ2: Does acculturation, as determined by proficiency in the English language or language of the interview influence cervical cancer screening among Dominican women in the United States?

$H_0$2: Acculturation, as determined by proficiency in the English language or language of the interview has no influence on cervical cancer screening among Dominican women in the United States.

H_a2: Acculturation, as determined by proficiency in the English language or language of the interview does influence cervical cancer screening among Dominican women in the United States.

In 2011, data for 154 participants were analyzed. Overall in 2011, a total of 84% (n = 84) of participants responded with a yes for cervical cancer screening. The results of Chi-square test in 2011 indicated that language proficiency was not significantly associated with cervical cancer screening (p = .176). The null hypothesis could not be rejected. Once again, after excluding the ones that did not answer, the sample size was very small which may have contributed to the lack of significance found in the study.

In 2012, data for 189 participants were analyzed. Overall in 2012, a total of 37% (n = 70) of participants responded with a yes for cervical cancer screening. The results of Chi-square test in 2012 indicated that language proficiency was not significantly associated with cervical cancer screening (p = .634). The null hypothesis could not be rejected. Once again, after excluding the ones that didn't answer, the sample size was very small which may have contributed to the lack of significance found in the study.

In 2013, data for 220 participants were analyzed. Overall in 2013, a total of 32.5% (n = 72) of participants responded with a yes for cervical cancer screening. The results of Chi-square test in 2013 indicated that language proficiency was not significantly

associated with cervical cancer screening ($p = .075$). The null hypothesis could not be rejected.

In 2014, data for 209 participants were analyzed. Overall in 2014, a total of 26.8% (n = 56) of participants responded with a yes for cervical cancer screening. The results of Chi-square test in 2014 indicated that language of the interview ($p = .117$) and how well English is spoken ($p = .369$) were not significantly associated with cervical cancer screening. The null hypothesis could not be rejected.

In 2015, data for 182 participants were analyzed. Overall in 2015, a total of 52.5% (n =123) of participants responded with a yes for cervical cancer screening. The results of Chi-square test in 2015 indicated that language of the interview (p = .309) and how well English is spoken ($p = .254$) were not significantly associated with cervical cancer screening. The null hypothesis could not be rejected.

Immigration status. A Chi-square test for independence was also utilized to analyze research question three.

RQ3: Is there an association between immigration status and cervical cancer screening among Dominican women in the United States?

H_03: There is no association between immigration status and cervical cancer screening among Dominican women in the United States.

H_a3: There is an association between immigration status and cervical cancer screening among Dominican women in the United States.

In 2011, data for 154 participants were analyzed. Of those, 96.9% (n = 92) of study were United States citizens; 53.7% (n = 51) of participants gave a yes response to

participation in cervical cancer screening. Next, 87% (n = 43) of study were not United States citizens; 53.3% (n = 23) of participants gave a yes response to participation in cervical cancer screening. In regard to the geographic place of birth, 98.9% (n = 61) of study were born in one of the 50 United States; 54.8% (n = 34) of participants gave a yes response to participation in cervical cancer screening. 100% (n = 2) of the participants were born in a United States territory in which 100 (n = 2) gave a yes response to participation in cervical cancer screening. Lastly, 97.3% of the participants were not born in the United States or a United States territory of which 52% (n = 39) gave a yes response to participation in cervical cancer screening. When analyzing the data for N = 139 of the participants for years in the United States, 100% (n = 26) of the participants have been in the United States for less than 10 years; 53% (n = 8) gave a yes response to participation in cervical cancer screening. Next, 100% (n = 14) lived in the United States for less than 15 years of which 50% (n = 7) gave a yes response to participation in cervical cancer screening. Lastly, 94.6% of the participants lived in the United States for more than 15 years; 56.8% gave a yes response to participation in cervical cancer screening.

Overall in 2011, a total of 49.8% (n = 108) of participants responded with a yes for cervical cancer screening. The results of Chi-square test in 2011 indicated that United States Citizenship (p = .062) and number of years in the United States (p = .421) were not significantly associated with cervical cancer screening. The null hypothesis could not be rejected. Geographic place of birth (p = .015) was significantly associated with cervical

cancer screening. The null hypothesis was rejected. Table 14 provides information on

Chi-square testing of the variables for 2011.

Table 14

Chi Square Test of Independent and Dependent Variables 2011

	Have you ever had a Pap test						
	Yes	No	P-value		Yes	No	P-value
No. of Participants	85	65		**No. of Participants**			
Education Level			0.235	**How well English is spoken**			
Less than HS	44.1%	55.9%		Very well			
HS/GED Graduate	50.8%	48%		Well			
Above High School	59.2%	47.6%		Not well/Not at all			
No. of Participants	41	24		**No. of Participants**	85	66	
Family Income				**Language of the interview**	54.4%	43.5%	0.176
$0 - $34,999	60.1%	35%		English	60%	40%	
$35,000 - $74,999	52.1%	47.9%	0.240	Spanish	100%	0%	
$75,000 & over	60%	40%		English & Spanish			
No. of Participants	85	66		**No. of Participants**	82	54	
Geographic Place of Birth				**Place to go when sick**			
USA: born in one of the 50 United States or D.C.	56.7%	41.7%	0.015	Clinic or health center Doctor's office or HMO	58.9%	39.4%	0.374
USA: born in a U.S. Territory	48.1%	48.1%		Hospital emergency Room/Hospital outpatient Department	65%	35%	
Not born in the United States. or a U.S. territory				Some other place			
No. of Participants	13	13		Doesn't go to one place most often			
Years in the U.S	50%	50%	0.421				
Less than 10yrs	25%	62.5%					
Less than 15yrs	66.7%	33.3%					
More than 15yrs							

No. of Participants	8	15	
Place usually go for Preventive care			
Doesn't get preventive care anywhere	18.2%	72.7%	0.018
Clinic or health Center, Doctor's office or HMO	57.1%	42.9%	
Hospital outpatient Department/ Hospital emergency room	0%	0%	
Some other place Doesn't go to one place most often	100%	0%	
No. of Participants	85	66	
Citizenship Status			
Yes, citizen of the United States	57%	41.5%	0 .062
No, not a citizen of the United States	44.4%	50%	

In 2012, data for 189 participants were analyzed. Of those, 97% (n = 97) of study were United States citizens; 58% (58) of participants gave a yes response to participation in cervical cancer screening. Next, 100% (n = 12) of study were not United States citizens; 91.7% (n = 11) of participants gave a yes response to participation in cervical cancer screening. Regarding the geographic place of birth, 96.7% (n = 87) of study were born in one of the 50 United States; 60% (n = 54) of participants gave a yes response to participation in cervical cancer screening. 100% (n = 1) of the participants were born in a United States territory in which 100% (n = 1) gave a yes response to participation in cervical cancer screening. Lastly, 100% (n = 21) of the participants were not born in the United States or a United States territory of which 66.7% (n = 14) gave a yes response to participation in cervical cancer screening. When analyzing the data for N = 189 of the

participants for years in the United States, 100% (n = 3) of the participants have been in the United States for less than 10 years; 75% (n = 2) gave a yes response to participation in cervical cancer screening. Next, 100% (n = 2) lived in the United States for less than 15 years of which 100% (n = 2) gave a yes response to participation in cervical cancer screening. Lastly, 100% of the participants lived in the United States for more than 15 years; 64.7% (n = 11) gave a yes response to participation in cervical cancer screening.

Overall in 2012, a total of 50.1% (n = 156) of participants responded with a yes for cervical cancer screening. The results of Chi-square test in 2011 indicated that United States Citizenship (p = .120) and number of years in the United States (p = .541) were not significantly associated with cervical cancer screening. The null hypothesis could not be rejected. Geographic place of birth (p = .019) was significantly associated with cervical cancer screening. The null hypothesis is rejected. Table 15 provides information on Chi-square testing of the variables for 2012.

Table 15

Chi Square Test of Independent and Dependent Variables 2012

Have you ever had a Pap test

	Yes	No	P-value		Yes	No	P-value
No. of	70	40		**No. of Participants**			
Participants			0.088				
Education Level				**How well English is spoken**			
Less than HS	61.1%	33.3%		Very well			
HS/GED Graduate	57.7%	39%		Well			
Above High School	35.6%	32%		Not well/Not at all			
No. of Participants	32	17		**No. of Participants**	70	40	
Family Income			0.142	**Language of the interview**	62.3%	34.9%	0.061
$0 - $34,999	69.6%	26.4%		English	60%	40%	
$35,000 - $74,999	58.3%	41.7%		Spanish	50%	50%	
$75,000 & over	50%	33.3%		English & Spanish			
No. of Participants	70	40		**No. of Participants**	82	54	
Geographic Place of Birth	60%	36.7		**Place to go when sick**			
USA: born in one of the 50 United States or D.C.	100%	0%		Clinic or health center Doctor's office or HMO	66%	33%	
USA: born in a U.S. Territory	66.7%	33.3%	0.019	Hospital emergency Room/Hospital outpatient Department	75%	62.5%	0.520
Not born in the United States. or a U.S. territory				Some other place			
				Doesn't go to one place most often			
No. of Participants	16	7					
Years in the U.S							
Less than 10yrs	75%	50%					
Less than 15yrs	100%	35.3%	0.541				
More than 15yrs	64.7%	0%					
No. of Participants	8	9					

Place usually go for Preventive care			
Doesn't get preventive care anywhere	42.9%	57.1%	0.001
Clinic or health Center, Doctor's office or HMO	62.5%	37.5%	
HMO	0%	83.4%	
Hospital outpatient Department/ Hospital emergency room	33.3%	66.7%	
Some other place			
Doesn't go to one place most often			
No. of Participants	70	40	
Citizenship Status			
Yes, citizen of the United States	58%	39%	0.012
No, not a citizen of the United States	91.7	8.3	

In 2013, data for N = 220 participants were analyzed. Of those, 97.6% (n = 121) of study were United States citizens; 53.2% (n = 66) of participants gave a yes response to participation in cervical cancer screening. Next, 106% (n = 12) of study were not United States citizens; 58.3% (n = 7) of participants gave a yes response to participation in cervical cancer screening. With regard to the geographic place of birth, 98.7% (n = 113) of study were born in one of the 50 United States; 54.3% (n = 63) of participants gave a yes response to participation in cervical cancer screening. 100% (n = 1) of the participants were born in a United States territory in which no participant gave a yes response to participation in cervical cancer screening. Lastly, 100% of the participants were not born in the United States or a United States territory of which 52.6% (n = 10)

gave a yes response to participation in cervical cancer screening. When analyzing the data for the participants for years in the United States, 100% (n = 3) of the participants have been in the United States for less than 10 years; 75% (n = 3) gave a yes response to participation in cervical cancer screening. Next, 100% (n = 4) lived in the United States for less than 15 years of which 75% (n = 3) gave a yes response to participation in cervical cancer screening. Lastly, 100% (n = 12) of the participants lived in the United States for more than 15 years; 33.3% (n = 4) gave a yes response to participation in cervical cancer screening.

Overall in 2013, a total of 52.5% (n = 156) of participants responded with a yes for cervical cancer screening. The results of Chi-square test in 2013 indicated that United States Citizenship ($p = .400$) and number of years in the United States ($p = .144$) were not significantly associated with cervical cancer screening. The null hypothesis could not be rejected. Geographic place of birth ($p = .049$) was significantly associated with cervical cancer screening. The null hypothesis is rejected. Table 16 provides information on Chi-square testing of the variables for 2013.

Table 16

Chi Square Test of Independent and Dependent Variables 2013

Have you ever had a Pap test

	Yes	No	P-value		Yes	No	P-value
No. of Participants	73	60		**No. of Participants**			
Education Level			0.409	**How well English is spoken**			
Less than HS	70.2%	29.8%		Very well			
HS/GED Graduate	55.5%	44%		Well			
Above High School	56%	40%		Not well/Not at all			
No. of Participants	30	28		**No. of Participants**	73	60	
Family Income			0.452	**Language of the interview**			
$0 - $34,999	45.6%	50.2%		English	53%	45.3%	
$35,000 - $74,999	70%	49%		Spanish	75%	25%	0.075
$75,000 & over	25%	75%		English & Spanish	50%	50%	
No. of Participants	73	60		**No. of Participants**	67	50	
Geographic Place of Birth	54.3%	43.1%		**Place to go when sick**			
USA: born in one of the 50 United States or D.C.	0%	100%	0.049	Clinic or health center Doctor's office or HMO	53.3%	43.4%	
USA: born in a U.S. Territory	52.6%	47.4%		Hospital emergency Room/Hospital outpatient Department	67.3%	30.5%	0.167
Not born in the United States. or a U.S. territory				Some other place			
No. of Participants	10	10		Doesn't go to one place most often			
Years in the U.S	75%	50%	0.144				
Less than 10yrs	100%	25%					
Less than 15yrs	75%	66.7					
More than 15yrs							
No. of Participants	8	13					

Place usually go for Preventive care			
Doesn't get preventive care anywhere	27.3%	72.7%	
			0.027
Clinic or health Center, Doctor's office or HMO	73.4%	23.3%	
Hospital outpatient Department/ Hospital emergency room	0%	100%	
Some other place			
Doesn't go to one place most often			
No. of Participants	70		
Citizenship Status			
Yes, citizen of the United States	53.2%	44.4%	.400
No, not a citizen of the United States	58.3%	41.7%	

In 2014, data for N = 209 participants were analyzed. Of those, 95.4% (n = 106) of study were United States citizens; 53.6% (n = 59) of participants gave a yes response to participation in cervical cancer screening. Next, 90% (n = 9) of study were not United States citizens; 40% (n = 4) of participants gave a yes response to participation in cervical cancer screening. In regard to the geographic place of birth, 97% (n = 95) of study were born in one of the 50 United States; 54.1% (n = 53) of participants gave a yes response to participation in cervical cancer screening. Next, 86.4% (n = 19) of the participants were not born in the United States or a United States territory of which 45.5% (n = 10) gave a yes response to participation in cervical cancer screening. When analyzing the participants for years in the United States, 66.7% (n = 2) of the participants have been in the United States for less than 10 years; none of the participants gave a yes response to

participation in cervical cancer screening. Next, 100% (n = 4) lived in the United States

for less than 15 years of which 100% (n = 4) gave a yes response to participation in

cervical cancer screening. Lastly, 92.9% (n = 13) of the participants lived in the United

States for more than 15 years; 42.9% (n = 6) gave a yes response to participation in

cervical cancer screening.

Overall in 2014, a total of 50.2% (n = 136) of participants responded with a yes

for cervical cancer screening. The results of Chi-square test in 2011 indicated that United

States Citizenship (*p* = .379) and number of years in the United States (*p* = .270) were

not significantly associated with cervical cancer screening. The null hypothesis could not

be rejected. Geographic place of birth (*p* = .048) was significantly associated with

cervical cancer screening. The null hypothesis is rejected. Table 17 provides information

on Chi-square testing of the variables for 2014.

Table 17

Chi Square Test of Independent and Dependent Variables 2014

Have you ever had a Pap test

	Yes	No	P-value		Yes	No	P-value
No. of Participants	56	60		**No. of Participants**	53	56	
Education Level				**How well English is**			
Less than HS	47.7%	52.3%	0.576	**spoken**	49.5%	46.2%	
HS/GED Graduate	69.8%	58%		Very well	27.3%	72.7%	0.049
Above High School	54.9%	58.6%		Well	66.7%	66.7%	
				Not well/Not at all			
No. of Participants	23	28		**No. of Participants**	56	60	
Family Income			0.077	**Language of the interview**			
$0 - $34,999	55%	39%		English	45.4%	51.9%	
$35,000 - $74,999	46.7%	65%		Spanish	62.5%	37.5%	

$75,000 & over	50%	50%		English & Spanish	66.7%	0%	0.117

	Col1	Col2	p
No. of Participants **Geographic Place of Birth**	56	60	
USA: born in one of the 50 United States or D.C.	49%	47%	
USA: born in a U.S. Territory	0%	100%	0.048
Not born in the United States. or a U.S. territory	43.8%	56.3%	
No. of Participants	7	12	
Years in the U.S Less than 10yrs	50%	75%	0.270
Less than 15yrs	0%	100%	
More than 15yrs	46.2%	53.8%	
No. of Participants	7	11	
Place usually go for Preventive care Doesn't get preventive care anywhere	25%	75%	
Clinic or health Center, Doctor's office or HMO	58.4%	41.6%	0.022
Hospital outpatient Department/ Hospital emergency room			
Some other place	0%	100%	
Doesn't go to one place most often			
No. of Participants	56	60	
Citizenship Status			0.379
Yes, citizen of the United States	47.7%	48.6%	
No, not a citizen of the United States	37.5%	62.5%	

	Col1	Col2	p
No. of Participants **Place to go when sick**	51	60	
Clinic or health center Doctor's office or HMO	48.5%	47.8%	
Hospital emergency Room/Hospital outpatient Department	0%	100%	0.404
Some other place			
Doesn't go to one place most often	0%	100%	

In 2015, data for N = 182 participants were analyzed. Of those, 95.4% (n = 105) of study were United States citizens; 53.6% (n = 59) of participants gave a yes response to participation in cervical cancer screening. Next, 90% (n = 9) of study were not United States citizens; 40% (n = 4) of participants gave a yes response to participation in cervical cancer screening. With regard to the geographic place of birth, 97% (n = 95) of study were born in one of the 50 United States; 54.1% (n = **53**) of participants gave a yes response to participation in cervical cancer screening. Next, 86.4% (n = 19) of the participants were not born in the United States or a United States territory of which 45.5% (n = 10) gave a yes response to participation in cervical cancer screening. When analyzing the participants for years in the United States, 66.6% (n = 2) of the participants have been in the United States for less than 10 years; none of the participants gave a yes response to participation in cervical cancer screening. Next, 100% (n = 4) lived in the United States for less than 15 years of which 100% (n = 4) gave a yes response to participation in cervical cancer screening. Lastly, 92.9% (n = 12) of the participants lived in the United States for more than 15 years; 42.9% (6) gave a yes response to participation in cervical cancer screening.

Overall in 2015, a total of 51.2% (n = 135) of participants responded with a yes for cervical cancer screening. The results of Chi-square test in 2015 indicated that United States Citizenship ($p = .236$) and number of years in the United States ($p = .090$) were not significantly associated with cervical cancer screening. The null hypothesis could not be rejected. Geographic place of birth ($p = .036$) was significantly associated with

cervical cancer screening. The null hypothesis is rejected. Table 18 provides information

on Chi-square testing of the variables for 2015.

Table 18

Chi Square Test of Independent and Dependent Variables 2015

Have you ever had a Pap test

	Yes	No	P-value		Yes	No	P-value
No. of Participants	63	51		**No. of Participants**	60	47	
Education Level				**How well English is spoken**			
Less than HS	54.6%	41.3%	0.297	Very well	54.6%	40.2%	.050
HS/GED Graduate	42.4%	52.4%		Well	33.3%	66.7%	
Above High School	56.2%	41.2%		Not well/Not at all	83.4%	16.7%	
No. of Participants	41	27		**No. of Participants**	63	51	
Family Income			0.222	**Language of the interview**			
$0 - $34,999	67.9%	29.6%		English	53.9%	40.9%	0.309
$35,000 - $74,999	58.6%	41.3%		Spanish	25%	75%	
$75,000 & over	25%	50%		English & Spanish	0%	100%	
No. of Participants	63	51		**No. of Participants**	60	43	
Geographic Place of Birth				**Place to go when sick**			
USA: born in one of the 50 United States or D.C.	54.1%	42.9%	0.036	Clinic or health center Doctor's office or HMO	57%	38%	0.224
USA: born in a U.S. Territory	45.5%	40.9%		Hospital emergency Room/Hospital outpatient Department	33.3%	83.4%	
Not born in the United States. or a U.S. territory				Some other place	66.7%	33.3%	
No. of Participants	10	9		Doesn't go to one place most often	0%	100%	
Years in the U.S	0%	100%	0.090				
Less than 10yrs	100%	33.3%					
Less than 15yrs	42.9%	50%					
More than 15yrs							
No. of Participants	4	10					

Place usually go for Preventive care			
Doesn't get preventive care anywhere	14.3%	85.7%	
			0.013
Clinic or health Center, Doctor's office or HMO	100%	66.7%	
Hospital outpatient Department/ Hospital emergency room	66.7%	100%	
Some other place			
Doesn't go to one place most often			
No. of Participants	63	51	
Citizenship Status			
Yes, citizen of the United States	53.6%	41.8%	0.236
No, not a citizen of the United States	40%	50%	

Logistic Regression Analysis

Analysis for logistic regression was conducted to ascertain the extent of the relationship between cervical cancer screening (dependent variable) and citizenship, socioeconomic status (measured by family income, education level and source of care) and acculturation measured by English language proficiency (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 (x^2 =5.305; df=8; p = .993), which correctly explains the 66.4% of the variation of the study participants who were screened for cervical cancer. The odds ratio for geographic place of birth was (OR 1.005, 95% CI: 100.1 – 1.010, p = 0.023) years in the United States (OR 1.005, 95% CI: 100.1 – 1.010, p = 0.023) and place

usually went for preventive care (2.46, 95% CI 0.475-12.756, p = .055); all three

variables geographic place of birth, years in the U.S. and place usually went for

preventive care predicted cervical cancer screening among Dominican women at a

statistically significant level. However, odds ratio for education level (OR 1.00, CI 0.80-

12.976, p = .955), family income level (OR .800, 95% CI 0.00-.096, p = .823),

citizenship status (OR 1.456, 95% CI 0.26-1.00, p = .470), language of the interview (OR

1.00, 95% CI 0.00-1.00, p = .076) and place to go when sick (OR .432, 95% CI 0.00-

1.00, p = .725). Table 19 provides the results of the logistic regression analysis.

Table 19

Hosmer and Lemeshow Test for 2011

Year	x^2	df	Sig
2011	5.305	8	.993

Classification	Table		
Observed			Predicted
Pap smear Screening in the past 12 months		Pap smear Screening in the past 12	
	month		
	Yes		53.7%
	No		43.2%

Overall percentage
66.4%

Variables in the	Equation-2011						
	B	S.E	Wald	df	Sig Lower	Exp (B)	95% CI upper
Education level	.000	1.414	.000	1	.955	1.00	12.976
Family Income	19.876	4.903	.000	1	.823	.800	.096
Geographic place of birth	2.910	.725	16.786	1	.000	1.744	8.623
Years in the U.S	2.351	.740	10.096	1	.001	3.041	754.43
Citizenship status	16.273	840.35	.000	1	.470	1.456	1.00
How well English is spoken							
Language of the Interview	3.219	12.41	.000	1	.076	1.00	1.00
Place to go when sick	18.085	2.896	.000	1	.725	.432	1.00
Place usually go for preventive care	18.804	.558	12.718	1	.026	1.00	7.94

Constant

a. Variable(s) entered on step 1: CITIZENP, EDUC1, ENGLANG, ERNYR_P, GEOBRTH, HISPAN_1, YRSINUS, FLNGINTV, APSPAP, APLKIND

Data Analysis by Year: 2012. Upon analysis of the 2012 data, the Hosmer and Lemeshow (model of goodness fit test) showed that the covariates (independent variables) fit the data (x^2 =3.48; *df*=8; *p* = .856), which correctly explains the 69% of the variation of the study participants who were screened for cervical cancer. The odds ratio for geographic place of birth was (OR .569, 95% CI: 0.00 – 1.00, *p* = 0.049) years in the U.S. (OR 1.00, 95% CI: 0.2463 – 4.296, *p* = 0.000) and place usually went for preventive care (1.05, 95% CI 0.475-1.00, *p* = .010); all three variables geographic place of birth, years in the U.S. and place usually went for preventive care predicted cervical cancer screening among Dominican women at a statistically significant level. However, odds ratio for education level (OR .808, CI 0.80-1.00, *p* = .635), family income level (OR 1.00, 95% CI 0.00-1.00, *p* = .681), citizenship status (OR 3.10, 95% CI 0.00-1.00, *p* = .119), language of the interview (OR 1.152, 95% CI 0.00-5.71, *p* = .056) and place to go when sick (OR .477, 95% CI 0.00-.694, *p* = .273) did not predict cervical cancer screening as the relationship was not statistically significant. Table 20 provides the results of the logistic regression analysis.

Table 20

Hosmer and Lemeshow test for 2012

Year	x²	df	Sig
2012	3.48	8	0.256

Classification	Table		
Observed		Predicted	
Pap smear Screening in the past 12 months	months	Pap smear Screening in the past 12	
Yes			83.2%
No			12.4%
Overall percentage			69.0%

Variables in the	Equation-2012						
	B	S.E	Wald	df	Sig Lower	Exp (B)	95% CI upper
Education level	4.037	8.498	.226	1	.635	.808	1.00
Family Income	19.614	5.589	.000	1	.681	.339	1.00
Geographic place of birth	16.948	15.05	.000	1	.049	.569	1.00
Years in the United States.	17.422	.508	1.371	1	.000	1.00	4.296
Citizenship status	17.948	2.765	.000	1	.119	3.10	1.00
How well English is spoken							
Language of the Interview	16.995	1.536	122.63	1	.560	1.152	5.71
Place to go when sick	18.864	2.234	.000	1	.273	.477	.694
Place usually go for preventive care	20.115	1.874	.000	1	.010	1.05	1.00

Constant

b. Variable(s) entered on step 1: CITIZENP, EDUC1, ENGLANG, ERNYR_P, GEOBRTH, HISPAN_1, YRSINUS, FLNGINTV, APSPAP, APLKIND

Data Analysis by Year: 2013. Upon analysis of the 2013 data, the Hosmer and

Lemeshow (model of goodness fit test) showed that the covariates (independent

variables) fit the data (x² =2.613; *df*=8; *p* = .897), which correctly explains the 62.5% of

the variation of the study participants who were screened for cervical cancer. The odds

ratio for geographic place of birth was (OR 2.654, 95% CI: .245-5.019, $p = 0.00$) and

place usually went for preventive care (8.69, 95% CI 0.00-1.00, $p = .024$); both variables

geographic place of birth and place usually went for preventive care predicted cervical

cancer screening among Dominican women at a statistically significant level. However,

odds ratio for education level (OR 1.185, CI 1.085-235.9, $p = .621$), family income level

(OR 1.411, 95% CI 0.00-7.978, $p = .778$), citizenship status (OR 8.81, 95% CI 0.00-3.10,

$p = .732$), years in the U.S. (OR 2.00, 95% CI 1.056-14.41, $p = .159$) and place to go

when sick (OR .358, 95% CI 0.00-1.00, $p = .205$) did not predict cervical cancer

screening as the relationship was not statistically significant. Unlike years 2011 and 2012,

language of the interview (OR 31.0, 95% CI 0.00-4.060, $p = .392$) also did not predict

cervical cancer screening as the relationship was not statistically significant in 2013.

Table 21 provides the results of the logistic regression analysis.

Table 21

Hosmer and Lemeshow test for 2013

Year	x^2	df	Sig
2013	2.613	8	0.897

Classification	Table		
Observed			Predicted
Pap smear Screening in the past 12 months	months		Pap smear Screening in the past 12
	Yes		53.7%
	No		44.1%
Overall percentage			62.5%

Variables in the	Equation-2013							
	B	S.E	Wald	df	Sig	Exp (B)	95% CI	
					Lower			upper

	B	S.E.	Wald	df	Sig.	Exp(B)	
Education level	5.508	11.143	.244	1	.621	1.185	235.9
Family Income	19.750	371.15	.000	1	.778	1.441	7.978
Geographic place of birth	18.186	.751	1	1	.000	2.654	5.019
Years in the United States.	-.698	.612	1.281	1	.159	2.00	14.41
Citizenship status	17.291	.833	430.55	1	.732	8.81	3.10
How well English is spoken							
Language of the Interview	.000	1.414	.000	1	.392	31.0	4.060
Place to go when sick	3.106	2.916	.000	1	.205	.358	1.00
Place usually go for preventive care	19.285	7.699	.000	1	.024	8.69	1.00

Constant

c. Variable(s) entered on step 1: CITIZENP, EDUC1, ENGLANG, ERNYR_P, GEOBRTH, HISPAN_1, YRSINUS, FLNGINTV, APSPAP, APLKIND

Data Analysis by Year: 2014. Upon analysis of the 2014 data, the Hosmer and Lemeshow (model of goodness fit test) showed that the covariates (independent variables) fit the data (x^2 =6.25; *df*=8; *p* = .486), which correctly explains the 70.2% of the variation of the study participants who were screened for cervical cancer. Unlike years 2011, 2012 and 2013, the odds ratios for geographic place of birth (OR .875, 95% CI: 0.00 – .345, *p* = 0.545) and place usually went for preventive care (OR .698, 95% CI: 0.00 – 1.00, *p* = 0.698) did not predict cervical cancer screening as the relationship was not statistically significant in 2014. Odds ratio for education level (OR 1.00, CI 0.00-1.00, *p*=1.00), family income level (OR 2.322, 95% CI 0.00-1.00, *p* = .963), citizenship status (OR .946, 95% CI 0.26-2.23, *p* = .999), language of the interview (OR 1.752, 95% CI 0.00-1.00, *p* = .567) and place to go when sick (OR .627, 95% CI 0.246-1.00, *p* = .912). The odd ratio for the question introduced in 2014 how well English is spoken (OR

.598, 95% CI 0.00-1.00, $p=.998$) also did not predict cervical cancer screening as the

relationship was not statistically significant. Table 22 provides the results of the logistic

regression analysis

Table 22

Hosmer and Lemeshow test for 2014

Year	x^2	df	Sig
2014	6.25	8	0.486

Classification	Table		
Observed			Predicted
Pap smear Screening in the past 12 months	months	Pap smear Screening in the past 12	
	Yes		47.2%
	No		52.8%
Overall percentage			70.2

Variables in the   Equation-2014

	B	S.E	Wald	df	Sig	Exp (B)	95% CI
					Lower		upper
Education level	3.332	8.303	.000	1	1.00	1.00	1.00
Family Income	17.550	5.993	.000	1	.963	2.322	1.00
Geographic place of birth	3.332	2.238	.000	1	.845	.875	.346
Years in the United States.	-.154	.556	.077	1	.782	4.28	22.938
Citizenship status	3.332	2.325	.000	1	.999	.946	2.23
How well English is spoken	17.363	5.516	.000	1	.998	.598	1.00
Language of the Interview	3.332	6.251	.000	1	.567	1.752	1.00
Place to go when sick	3.239	9.103	.000	1	.912	.627	1.00
Place usually go for preventive care	-19.114	49.176	.151	1	.698	1.275	1.00

Constant

d. Variable(s) entered on step 1: CITIZENP, EDUC1, ENGLANG, ERNYR_P, GEOBRTH, HISPAN_1, YRSINUS, FLNGINTV, APSPAP, APLKIND

Data Analysis by Year: 2015. Upon analysis of the 2015 data, the Hosmer and

Lemeshow (model of goodness fit test) showed that the covariates (independent

variables) fit the data (x^2 =3.64; df=8; p = .648), which correctly explains the 71.6% of

the variation of the study participants who were screened for cervical cancer. The odds

ratio for geographic place of birth was (OR 5.30, 95% CI: 1.526-20.559, p = 0.038)

predicted cervical cancer screening among Dominican women at a statistically significant

level, unlike the previous, 2014. Odds ratio for education level (OR .007, CI 0.00-2.640,

p=.344), family income level (OR .500, 95% CI 2.46-4.187, p = .215), years in the U.S.

(OR .833, 95% CI .346-1.365, p = .069) citizenship status (OR 9.45, 95% CI 0.00-1.00, p

= .176), how well English is spoken (OR .883, 95% CI 0.00-1.00, p=.438) language of

the interview (OR .984, 95% CI 0.00-1.00, p=.878), place to go when sick (OR .644,

95% CI 0.00-1.00, p=1.00) and place went for prevention care (OR 1.275, 95% CI 0.00-

1.00, p=.698) did not predict cervical cancer screening as the relationship was not

statistically significant. Table 23 provides the results of the logistic regression analysis.

Table 23

Hosmer and Lemeshow test for 2015

Year		x^2	df	Sig	
2015		3.64	8	0.648	
Classification	Table				
Observed					Predicted
Pap smear Screening in the past 12 months			Pap smear Screening in the past 12		
	months				
	Yes				79.2%
	No				32.5%
Overall percentage					71.6%
Variables in the	Equation-2015				
	B	S.E	Wald	df	Sig	Exp (B)	95% CI

					Lower		upper
Education level	3.883	4.105	.894	1	.344	.007	2.640
Family Income	1.386	1.118	1.537	1	.215	.500	4.187
Geographic place of birth	1.609	.775	4.317	1	.038	5.30	20.559
Years in the United States.	1.792	1.080	2.752	1	.069	.833	1.365
Citizenship status	18.865	5.49	.000	1	.176	9.45	1.00
How well English is spoken	2.708	4.97	.000	1	.438	.883	1.00
Language of the Interview	1.757	2.71	.000	1	.878	.984	1.00
Place to go when sick	.439	5.48	.000	1	1.00	.644	1.00
Place usually go for preventive care	-19.114	49.176	.151	1	.045	1.275	1.00

Constant

e. Variable(s) entered on step 1: CITIZENP, EDUC1, ENGLANG, ERNYR_P, GEOBRTH, HISPAN_1, YRSINUS, FLNGINTV, APSPAP, APLKIND

Summary

Chapter 4 provided information about data collection from NHIS in 2011, 2012, 2013, 2014, and 2015 in addition to analysis of the results of my investigation of the extent of the relationship between cervical cancer screening (dependent variable) among Dominican women in the United States and the independent variables, citizenship, socioeconomic status (measured by family income, education level and source of care) and acculturation measured by English language proficiency. Chi-square tests were used to ascertain the association between the dependent variable and independent variables in 2011, 2012, 2013, 2014, and 2015. In 2011 and 2012, the results revealed that geographic place of birth, years in the United States, and place usually went for preventive care had an association between these variable and cervical cancer screening among Dominican

women in the United States. The results however, revealed that there was no association between education level, family income, citizenship status, language of the interview, and place to go to when sick. In 2013, the results revealed there was an association between geographic place of birth and place usually went for preventive care and cervical cancer screening among Dominican women in the United States, but not for the other variables. In 2014, geographic place of birth and place usually went for preventive care was not statistically significant as well as the remaining variables. The new question introduced in 2014 and 2015, "How well English is spoken" also did not prove to be statistically significant. In 2015, geographic place of birth predicted cervical cancer screening among Dominican women at a statistically significant level like 2011, 2012, and 2013. Chapter 5 will provide a discussion on the 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

My purpose in conducting this quantitative cross-sectional study was to examine predictors of cervical cancer screening among Dominican women in the United States by investigating the association between cervical cancer screening and citizenship, socioeconomic status (measured by family income, education level and source of care), and acculturation measured by English language proficiency based on the behavioral model for vulnerable populations.

Researchers have reviewed, updated, and expanded the behavioral model for vulnerable populations to incorporate measures for use of health services that are explicit to certain disease conditions and illnesses. The revised model also embraces certain alterations in personal practices such screening services, aimed at maintaining and ameliorating the health status of the population to attain a better health outcome for the marginalized and vulnerable population (Babitsch et al., 2012). Vulnerable populations comprise those who are at risk for discrimination, neglect, and even harm due to their incapability to uphold a certain social status which may lead to possible gaps in health care services such as cervical cancer screening (Shi & Stevens, 2011). As a result of an existing difference in social status due to either ethnicity, race, gender, and/or other factors that highlight discrimination based on social status, these groups are further susceptible to poor physical, social, and psychological health, and are often unable to meet their needs for vital health services (Babitsch et al., 2012; Shi & Stevens, 2011). In this study, I used the behavioral model for vulnerable populations framework to gain a better understanding in the low compliance rates to cervical cancer screening among a

vulnerable segment of the population, United States Dominican women (Fang, & Tan, 2011; Ho & Dinh 2011).

Of the 623 respondents in this study, 55.5% ($n = 346$) responded with a "yes" to cervical cancer screening, whereas 44.3% ($n = 276$) did not participate in cervical cancer screening. These findings underscore prior research by the CDC (2014c) that revealed a low compliance with cervical cancer screening among Hispanic women when compared with other minority women groups. According to Ho and Dinh (2011), low compliance with cervical cancer screening can be accredited to age, acculturation, lack of awareness about screening marital status, and cervical cancer, socioeconomic status, psychological (apprehension) and limited access to health care services. Following from their research and similar research, I investigated the predictors of cervical cancer screening and how acculturation, citizenship and socioeconomic status affected compliance with cervical cancer screening.

For data analysis, I used the chi-square test and found that from 2011 to 2015, acculturation (measured by education level, family income), and source of care (i.e., place to go to when individuals are sick) were not significantly associated with cervical cancer screening. Although the interview question, "How well English is spoken" (introduced in 2014 and 2015) was found to be significant in the chi-square analysis, the logistic regression suggested there is no relationship between the two. Usual source of preventive care and citizenship with regards to geographic place of birth was significantly associated with cervical cancer practices. Individuals born in the United States had a higher percentage of getting a Pap test as opposed to those were not U.S. born. Other

researchers have found similar results. Pickle, Altshuler, and Scott (2014) found that

refugee women from Bosnia, Cuba, and Vietnam residing in Texas were less likely to

have undergone a Pap test. The majority of the participants in this study preferred to go to

a clinic as a usual source of preventive care. Marlow, Waller, and Wardle (2015) also

found an association between source of preventive care and cervical cancer screening

practices among several ethnicities (i.e., Indian, Pakistani, Bangaldeshi, Caribbean,

African) residing in the United Kingdom. Like my study, they found that going to the

clinic was a preferred place of receiving care. Kim, Choi, Hwang, and Kim (2012) found

that individuals who had a usual source of care had improved receipt of preventive

services including cervical cancer screening. Interview question, "How well English is

spoken," which was introduced in 2014 and 2015 also found to not be significant.

Citizenship, pertaining to whether or not respondents were U.S. citizens, was found to be

significant only in 2012. Reyes and Miranda (2015) found screening rates higher among

U.S. citizens compared with noncitizens overall and that not being a citizen to be a

barrier to cervical cancer screening. Using logistic regression, I found no statistically

significant relationship between acculturation (measured by education level, family

income), citizenship (pertaining to citizenship status), and source of care regarding place

to go to when individuals are sick for 2011-2015. How well English is spoken was not

found to be significant in the years introduced, 2014 and 2015. Thus, citizenship,

pertaining to geographic place birth and place respondents usually went for preventive

care were associated with cervical cancer screening at a statistically significant level in

2011 and 2012. Number of years in the United States was found to be associated with cervical cancer screening at a statistically significant level only in 2011.

In this chapter, I will present the interpretation of the results from my study with a discussion of the degree to which the findings support the major constructs of the behavioral model for vulnerable populations as it pertains to the rate of cervical cancer screening among Dominican women residing in the United States. I will also discuss the limitations of the study, provide recommendations for future research, as well as discuss the implications for social change.

Interpretation of Findings

My data revealed that 49.8% (2011), 50.1% (2012), 50.2% (2014) and 51.2% (2015) of the study participants responded "yes" to cervical cancer screening, whereas 52.5% of the 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, 2012, 2014, and 2015 when compared with 2013. In 2011, 2012, 2014, and 2015, the participants were asked whether 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 essential to point out that the rate of cervical cancer screening has ameliorated in the last decade in the United States (CDC, 2014a). However, my findings indicated that although there have been increased efforts to make cervical cancer screening available to women, Dominican women continue to encounter barriers with complying with the recommendations for routine cervical cancer screening. Addressing these disparities by establishing which these barriers have an influence on the 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 vulnerable populations (which include minority women) are susceptible to certain factors such as acculturation, education, literacy, immigration, and marital status that may affect the use of preventive health care services (Babitsch et al., 2012). Other researchers have found that age, ethnicity, gender, health beliefs, language and socioeconomic, and predict vulnerable groups' use of health care (Lofters et al., 2011). In this study, I examined the effect of citizenship, socioeconomic status and acculturation among my study population of United States Dominican women.

Cervical Cancer Screening and Predisposing Factors

The level of education (measurement for socioeconomic status) of the study participants was investigated as a measure of socioeconomic status to ascertain its relationship with the affect of cervical cancer screening. It must be noted that past literature has revealed mixed findings on the on the association of education with cervical cancer screening. According to Lee et al. (2013), the level of education can affect the extent of language comprehension and usage which can be allied with reporting of health status and compliance with preventive measures. On the other hand, a study by Blackwell et al. (2012) found that while education was a predictor for cervical cancer screening in the United States, education was not statistically significant for cervical cancer screening among Canadian women. Previous CDC study findings on cervical cancer screening

compliance preserved that women who have a higher education level tend to be more compliant with routine cervical cancer screening than women with less schooling (CDC. 2014b).

In this study, the level of education was grouped into three categories: less than high school, high school/GED level and above a high school education. Most of the participants ($n = 181$, 58.24%) had education above high school level. Ninety-six participants (55.08%) and 86 participants (55.36%) had less than high school and at least a high school education respectively. The Chi-square analysis revealed that education was not significantly associated with the receipt of cervical cancer screening. Although some studies have demonstrated a lack of association between education level and cervical cancer compliance, in this study having such a small number of respondents could have contributed to the lack of association seen between education level and cervical cancer screening. After analyzing the Chi-square analysis and the logistic regression, this study does not support previous findings that educational level is a significant determinant to the utilization of preventive health care services.

In this study, I investigated the effect of language of the interview and how well English was spoken. Lee, Nguyen, and Tsui (2011) had previously operationalized language of interview as a measure of acculturation in addition to the affect of language barriers in receipt of screening test. Of the study participants, 96.9 % ($n = 624$) conducted the interview in English. The findings revealed that the language in which the survey was conducted did not significantly affect whether participants received cervical cancer screening. Findings for language of the interview demonstrated a lack of significance,

which could be attributed to the fact that in this study there were a very small number of participants interviewed in languages other than English. How well English is spoken was found to statistically significant in the Chi-square analysis but not in the logistic regression also possibly pertaining to the low participants count. One participant ($n = 22$) interviewed in Spanish, five participants interviewed in a combination of English and Spanish. The Chi-square analysis showed that the reason why women did not have the screening was not associated with whether they interviewed in English, Spanish only or a combination of English and Spanish. In opposition to the constructs of the behavioral model for vulnerable population and findings from literature the results from this study did not find any significant association between acculturation and cervical cancer screening. On the other hand, because most of the participants (96.9%) were fluent in the English language, this supports preceding studies that English language as a measure of acculturation was an aspect with compliance to cervical cancer screening (Lee, Nguyen, & Tsui, 2011). Thus, acculturation is a very intricate issue as a result of the mixed (positive and negative) influence on the health status of immigrants (Siegel et al., 2012).

Some researchers have expanded the influence of screening beyond proficiency in the English language to length of residence in the United States, nativity, language competence and cultural competence (Zea, Asner-Self, Birman, & Buki, 2013). Johnson et al. (2010) evaluated compliance with screening among Hispanics as cultural orientation toward the Mexican culture and Anglo culture.

In this study, 62.2% (n = 521) of the participants were United States citizens. The findings revealed that citizenship status was significantly associated to receiving cervical

cancer screening in 2012, but not in 2011, 2013, 2014 and 2015. This could have resulted

in the fact that the year 2012 had a higher percentage of participants responding to not

being a citizen 81.7%. Regarding length of stay, 47% (n = 48) of the participants were in

the United States for less than 10 years. The results of this study did not find a

significance between length of stay in the United States and screening compliance

possibly attributable to the overall low count of participants (n = 107) for this interview

question. In this study 94.9% (n = 451) of the participants were born in one of the 50

United States. After analyzing the Chi-square analysis and the logistic regression, this

study does in fact support geographic place of birth as a significant determinant to

cervical cancer screening. Diaz, Candelaria, and Mellando (2016) have found that place

of birth has been related with cancer screening compliance among the minority

population. The findings from this study may suggest that citizenship is a complex

category and should consider several factors that including length of stay in the country,

birthplace location and citizenship status. By expanding the concept of citizenship,

researchers may be better able to predict its effect on the utilization of screening services

among other minority groups.

Cervical Cancer Screening and Enabling Factors

  Factors in an individual's personal or societal environment that makes it easy or

arduous for the individual to make use of or access health services are known as enabling

factors (Worthington et al., 2012). The presence or absence of these factors may have an

affect on health choices and behaviors. The enabling factors that were explored in this

study are family income and source of care. Kaplan and Inguanzo (2011) discovered that

these factors can be used to explain or predict the use of health services among

vulnerable populations. Hoerster, Beddawi, Peddecord, and Ayala (2010) reported that

lack of insurance and source of care was associated with non-receipt of cervical cancer

screening. Worthington et al. (2012) found that family income was a strong determinant

of whether or not an individual is screened for cervical cancer. The behavioral model for

vulnerable populations postulates that enabling factors are

those within an individual's environment that may be elements to the utilization of

health care services rooted in family, income community, health insurance status,

personal resources, source of health care and health service resources (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.

Family income can predict the vulnerable population's extent of utilization of

preventive services. It has been apparent that the higher the family income, the higher the

possibility of family members complying with available preventive health care services.

According to the CDC (2014a), women with higher income level are more likely to

comply with preventive health care services such as cervical cancer screening. In this

study, family income was grouped into three categories: $0 - $34,999, $35,000 - $74,999,

and $75,000 and above. The Chi-square analysis did not reveal that those with a higher

income group had a higher propensity for cervical cancer screening than those in the

lower income groups throughout all the years. 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 investigate covariates such

as source of care and citizenship in relation to family income to determine their correlation to cervical cancer screening. Previous literature accredited poor compliance with cervical cancer screening among minority women such as Hispanic women to lack of health insurance due and age to acculturation, financial constraints, and low socioeconomic status (Duggan et al., 2012; Paskett et al., 2010).

Previous studies have found a potential correlation between having a usual source of care and the receipt of screening services. According to Lee et al. (2011), physicians recommending a screening or an individual having a regular source of care seem to be consistent predictors of cancer screening among women across all demographic and income groups. If the usual source of care was a primary care site, then it was more likely that a current cancer screening test had taken place. Among Asian Americans, limited access to health care and acculturation, including having health insurance and a usual source of care, have been found to contribute to their low cancer screening rates (Lee et al., 2014). In this current study, N = 289 (56.4%) of the participants went to a clinic, health center, doctor's office or HMO when they were sick; the Chi-square analysis did not reveal that there was a correlation between usual source of care when asked where they went when they were sick. The findings from the data analysis using logistic regression indicated source of care in terms of where the respondents went when they were sick as a predictor of cervical cancer screening was not statistically significant. However, when respondents were asked about their usual source of preventive care, N = 29 (96.68%) of the participants went to a clinic, health center, doctor's office or HMO when they were sick; the Chi-square analysis did reveal that there was a correlation

between usual source of care when asked where they went for preventive care. The findings from the data analysis using logistic regression indicated source of care in terms of usual source of preventive care as a predictor of cervical cancer screening was statistically significant in 2011, 2012, 2013 and 2015. The results were not statistically significant in 2014.

Cervical Cancer Screening and Need Factors

The needs factors in the behavioral model for vulnerable population encompass an individual's perception of his/her self-need and evaluation self-need based on the overall health status of the population (Stevens, 2011). However, previous studies have discovered mixed correlations 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), cervical cancer screening is among a preventive service that can highly predict compliance with screening practices. Individuals with poor health are much more likely to take part in screening services as opposed to those who report their health status as being in good standing (Cho et al., 2010). Thus, 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, the covariate of perceived heath status was not included, but future studies may evaluate the association between perceived health status and compliance with cervical cancer screening to develop health interventions to improve health utilization services. Seeing that cervical cancer may be asymptomatic at the early stages, interventions should target

the correlation between perceived health status and knowledge and severity of cervical cancer.

Limitations of the Study

The data utilized in National Health Interview Survey (NHIS) are acquired from non-institutionalized individuals in the United States, thus excluding those from long-term facilities including half-way homes, juvenile detention centers, nursing homes, prisons and active duty personnel. Undocumented Dominican immigrant women who may have a higher incidence rate of the disease and very low compliance with cervical cancer screening due to low socioeconomic status and other factors may also have been excluded from the NHIS data. The exclusion of these groups from the survey may have implications for the interpretation of the findings. The study data were collected from self-reported data from respondents. Consequently, respondents may give responses that are socially acceptable and not be as forthcoming about certain behaviors overall. Furthermore, the participants' understanding of the questionnaires based on language barriers and translation of the questions may have affected their response. Feedback from minority groups with English as a second language may have language barriers and poor utilization of linguistically ethnic/racial friendly materials which may thereby affect their compliance with screening practices (Fang, Ma, & Tan, 2011). It is pertinent to mention that there was a notable difference between the questions on cervical cancer screening in 2011, 2012, 2013, 2014 and 2015. In 2011, 2012, 2014 and 2015, 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

The findings from this study suggests that more research needs to be done to determine factors that affect cervical cancer screening among Dominican women residing in the United States. Findings from this research study revealed that future studies could focus on the effect of covariates of immigration status and acculturation on utilization of cervical cancer screening services among Dominican women in the United States. This study suggests that socioeconomic factors such as source of care may be complex variables, as well as geographic place of birth and how well English is spoken. Policy makers and other stakeholder should consider the effect of these variables in the identification of abnormal Pap smear tests which may aid in reducing the morbidity and mortality rates of cervical cancer in the Dominican population and other vulnerable groups. Establishment of funds for an extensive public health literacy campaign on the necessity of utilization of preventive health care services including cervical cancer screening among the vulnerable groups such as the Dominican women may ameliorate compliance with cervical cancer screening and aid in reducing both the incidence and mortality rates of cervical cancer.

The U.S. Preventive Services Task Force as well as American Congress of Obstetricians and Gynecologists (ACOG) should consider including a specific section in their website with peer review articles discussing different race/ethnicities and recommendations on which interventions work best pertaining to factors impeding

cervical cancer screening practices. Incorporating evidence from this study will help to visualize how screening disparities differ among Dominican women compared to other Hispanic subgroups.

Findings from this study will inform organizations (such as medical/health professional schools) in their competency training on how to implement sound cultural competency techniques in delivering health services to Dominican women to aid in reducing cervical cancer screening disparities. Findings will also seek out the necessity in providing education that can lead to utilization of cervical cancer screening services based on guidelines and recommendations for this target population. It's become fundamental that more and more medical schools necessitate classes in cultural competency and doctor/patient communication as a crucial aspect of patient care. The capability to communicate effectively across barriers of language and a Dominican woman's culture will directly affect their treatment, outcome and compliance with screening. Development of a culturally sensitive measurement for acculturation for Dominican women that would integrate their behaviors, health beliefs and immigration status prior to immigrating to the United States to ascertain their comprehension about the importance of preventive health care services should be considered. 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 Dominican women.

Implications

Ascertaining how acculturation, usual source of care, socioeconomic and immigration status influence cervical cancer screening rates among Dominican women in the United States could aid in improving compliance with cervical cancer screening and conceivably decrease the consequences of abnormal Pap smear tests such as cervical cancers. The findings of this study regarding the knowledge of the factors that prevent compliance of cervical cancer screening and the statistical analysis 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 Dominican women thereby potentially leading to positive social change (CDC, 2014a; 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 Dominican 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 to ensure that the variables that are investigated are operationalized to fit the study population.

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). Pap smear testing for cervical cancer screening remained the gold standard for early detection of precancerous lesions. Thus, Dominican women persist to have a low compliance with screening as a result of low

level of acculturation, immigration and poor socioeconomic status continues to hinder efforts to decrease both the incidence and mortality rates of the disease. This quantitative cross-sectional study obtained data from the NHIS from 2011, 2012, 2013, 2014 and 2015 to investigate whether or not acculturation, source of care, immigration and socioeconomic status affect cervical cancer screening among Dominican women in the United States with a mixed result on the effect of immigration and source of care on compliance with screening. Future studies should focus on the effect of covariates such as immigration status (pertaining to geographic place of birth), the extent of language proficiency and source of care compliance with cervical cancer screening among minority women.

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