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The Effect of Personal Beliefs and Perceptions on Influenza Vaccination Uptake among Older Adults

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MPH, Walden University

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Dissertation Submitted in Partial Fulfillment

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Abstract

Despite a 90% fatality rate and high risk of complications from influenza infection, vaccination coverage remains lower among African American (AA) and Hispanic American (HA) older adults. Health care professionals, families, and older adults are concerned with improving vaccination uptake. The purpose of this study was to examine differences among older adult AA and HA compared to European Americans (EA) on how their personal beliefs and perceptions affect vaccination uptake. The health belief model guided this study. The study research design was a quantitative cross-sectional analysis of the 2009 National H1N1 Flu Survey. Weighed prevalence of vaccine uptake indicated all groups, AA (59%), HA (62%), and EA (69%) were below the Healthy People 2020 goal of 90%. Differences in adjusted odds ratios indicated that compared to EA, AA were 5 times more likely to vaccinate if they perceived a benefit (vaccine effectiveness); however, HA were 3 times less likely to vaccinate even if they perceived vaccine was effective. Both AA and HA were 3 times less likely to vaccinate even if they felt susceptible (planned to get vaccine next season) to the influenza infection. While both groups were more likely to vaccinate if they did not perceive severity (not worried about getting sick with vaccine) or were cued to action by recommendation from their health professional, vaccination uptake was 4 times more likely among HA compared to EA while AA were just slightly more likely. The positive implications for social change include effective strategies to clarify perceptions that increase vaccination rates in racial and ethnic minority groups, and to target health professionals to recommend vaccine uptake for older adults during medical appointments.

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Dedication

"*I can do all things through Christ who strengthens me." Philippians 4:13*

I dedicate this dissertation to my Heavenly Father, who has guided me throughout this journey with his Holy Spirit and had given me the patience and strength to complete it to the end, and without God's blessing, I would not have completed this dissertation. I would also like to dedicate this dissertation to my husband, Prabhakar, and my loving daughters, Preethi, and Anusha, who have supported me and had sacrificed our time together. Also, special thanks to my mom, Kamala Sarojini, and my father, Late Rev. Anandam Kota, who have always acknowledged the importance of education and inspired me to achieve whatever goals I have established for my future.

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Chapter 1: Introduction to the Study

Introduction

Vaccinations are one of the most significant public health achievements of the past century, saving millions of individuals from various infectious diseases (Ehreth, 2003). Vaccination remains to be one of the most preventive health measures in the older population against many infectious diseases. In the 1960s, United States (U.S.) health agencies mandated a policy for vaccination against influenza infection for high-risk populations, immunocompromised, and older adults (Assaad, El-Masri, Porhomayon, & El-Solh, 2012). The Centers for Disease Control and Prevention (CDC) recommended vaccinations for adults depending on their age, medical conditions, and the potential risk for specific diseases (Schaffner, Rehm, & File, 2010). Vaccination rates in the United States among adults who are 65 and older (older adults) have been below the national targets, and these individuals are at risk of infection-induced morbidity and mortality due to decreased immune function and increased age (Maggi, 2010).

Background of the Study

In the U.S., about 30,000 (90%) deaths are flu-related in adults who are 65 and older (Liu, van der Zeijst, Boog, & Soethout, 2011). Influenza infection is the seventh leading cause of mortality among the elderly population, who are primarily immunocompromised (Lang et al., 2012). The influenza virus causes numerous adverse events including hospitalizations, severe complications associated with flu, and even death among the elderly population (Lang et al., 2012). During influenza seasons, hospitalization rates have increased among age 65 and older (Fiore et al., 2010). Older

adults with more than one underlying condition have greater risk of influenza-related complications compared healthy older adults (Fiore et al., 2010). Retrospective data from 1996-2000 indicated that 560 influenza-related hospitalizations per 100,000 adults in comparison to 190 per 100,000 healthy older adults (Fiore et al., 2010). Influenza deaths seem to occur usually during fall through spring seasons, and the highest mortality rate is among adults 65 and older (Fiore et al., 2010). According to CDC (2014), during the H1N1 pandemic, there were about 60.8 million influenza cases in the U.S.

The gap in influenza vaccination coverage has been consistently low in older African American and Hispanic American adults. In 2008, the estimated vaccination prevalence for older adults was 52 % among African Americans and 52 % among Hispanic Americans compared to 70 % among European Americans (Fiore et al., 2010). The CDC (2010) analyzed data from 2000 through 2009-10 seasons by using the Behavioral Risk Factor Surveillance System (BRFSS) and National 2009 H1N1 Flu Survey (NHFS). The BRFSS is a telephone survey that collects randomly selected individuals among the noninstitutionalized and U.S. civilian population. The BRFSS data are collected from all of the 50 states and the District of Columbia. The NHFS is also a random-digit dialing telephone survey that collects data from all 50 states and the District of Columbia. The NHFS data collected the influenza A (H1N1) and seasonal influenza vaccination coverage during the 2009-2010 seasons to track uptake (Setse et al., 2011). The vaccination coverage during these years was persistently low, especially in African American and Hispanic American older adults, as shown in Figure 1.

Figure 1 represents the percentage of individuals vaccinated against seasonal influenza and H1N1 vaccination during 2000 through 2010 seasons by race and ethnicity. The seasonal influenza vaccination and H1N1 vaccination rates for European Americans, shows 73.9% (95% CI); African Americans 58.3% (95% CI); Hispanic Americans 61.4% (95% CI); and Other, 71.8% (95% CI). According to CDC, influenza vaccination continues to be below the Healthy People 2020 target of 90% (Setse et al., 2011).

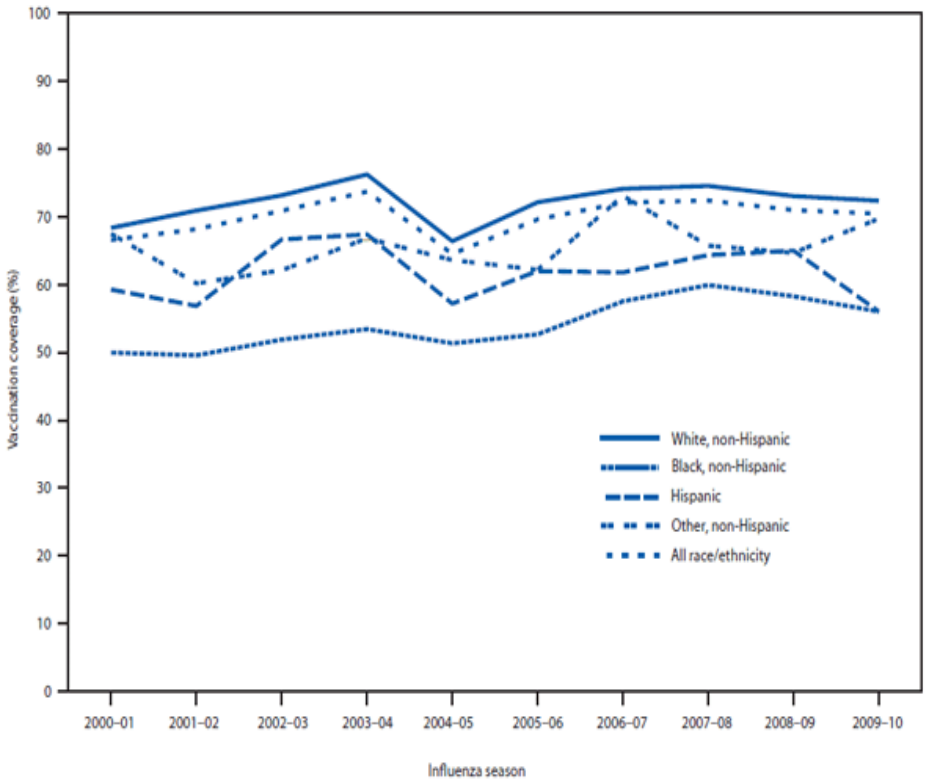


Figure 1. Influenza vaccination coverage for adults 65 and older, by race/ethnicity – BRFSS, United States 2000-2010. From "Influenza Vaccination Coverage – United States, 2000-2010" by R. W. Setse, G. L. Euler, A. G. Gonzalez-Feliciano, L. N. Bryan, C. Furlow, C. M. Weinbaum, and J. A. Singleton, 2011, *Morbidity and Mortality Weekly Report, 60*(1), p.48. Figure is a public domain.

Problem Statement

In the United States, many hospitalizations and deaths are been attributed to influenza resulting in a substantially high amount of hospital admissions and mortality. The 2009 pandemic caused about 13554 deaths worldwide (Glatman-Freedman et al., 2012). According to the U.S. Department of Health and Human Services, influenza contributes to 3.1 million days of hospitalizations and including 31.4 million yearly outpatient visits (Molinari et al., 2007). Studies have suggested that influenza vaccinations can be 80% effective in preventing death in older adults (Jefferson et al., 2010).

According to the National Council on Aging (2012), in the United States, nine out of ten deaths are flu-related, and more than six out of ten hospitalizations occur within the adult population who are 65 and older. The Office of Minority Health (OMH, 2012) stated that African Americans and Hispanic Americans were less likely to receive flu and pneumonia vaccinations in comparison to European Americans, irrespective of both flu and pneumonia vaccinations being covered under Medicare Part B with no deductible. Studies have continued to show ethnic variations in older adult vaccination uptake in minorities (Bish, 2011; Frew, 2012; Galarce, 2011; Kumar, 2012; Linn, 2010; Pearson, Zhao, & Ford, 2011; Setse, 2011; Uscher-Pines, Maurer, & Harris, 2011). Promoting influenza vaccination uptake among adults and understanding the personal beliefs and perceptions were evaluated by assessing the NHFS 2009-10 influenza seasonal data set.

Purpose of the Study

The purpose of this quantitative study was to examine the differences between older adult African and Hispanic Americans compared to European Americans in their beliefs and perceptions of the influenza vaccination and how these perceptions and beliefs influence vaccination uptake among these groups. This study used the 2009 H1N1 NHFS sponsored by CDC, National Center for Immunizations and Respiratory Diseases (NCIRD), and the National Center for Health Statistics (CDC, 2010; NCHS). The NHFS is a random assisted telephone survey that includes both landlines and cell phones. The telephone interviews were conducted in all 50 states and the District of Columbia in both English and Spanish. The NHFS collected data on H1N1 and seasonal flu to measure flu-related behaviors in adults, children, and priority groups. Through questionnaire administration, data were collected on knowledge, behaviors, and opinions on effectiveness and safety of flu vaccines, vaccination intention, recent respiratory illness, and pneumococcal vaccination status (CDC, 2010).

Research Questions and Hypotheses

The study examined three research questions to determine whether possible variations existed between the effect of personal beliefs and perceptions on vaccination uptake between African American and Hispanic American compared to European American older adult populations. The research questions and hypothesis for this cross-sectional study were the following:

1. Are there differences in personal beliefs and influenza vaccination uptake in older African American and Hispanic American adults compared to European Americans?

$H_0$1: There are no difference in beliefs and influenza vaccination uptake in older African American and Hispanic American adults compared to European Americans.

H_a1: There are differences in beliefs and influenza vaccination uptake in older African American and Hispanic American adults compared to European Americans.

2. Are there differences in perceptions and vaccination uptake in older African American and Hispanic American adults compared to European Americans?

$H_0$2: There are no differences in perceptions and vaccination uptake in older African American and Hispanic American adults compared to European Americans?

H_a2: There are differences in perceptions and vaccination uptake in older African American and Hispanic American adults compared to European Americans.

3. Are there differences in personal beliefs and perceptions of influenza vaccination uptake in older African American and Hispanic American adults compared to European Americans?

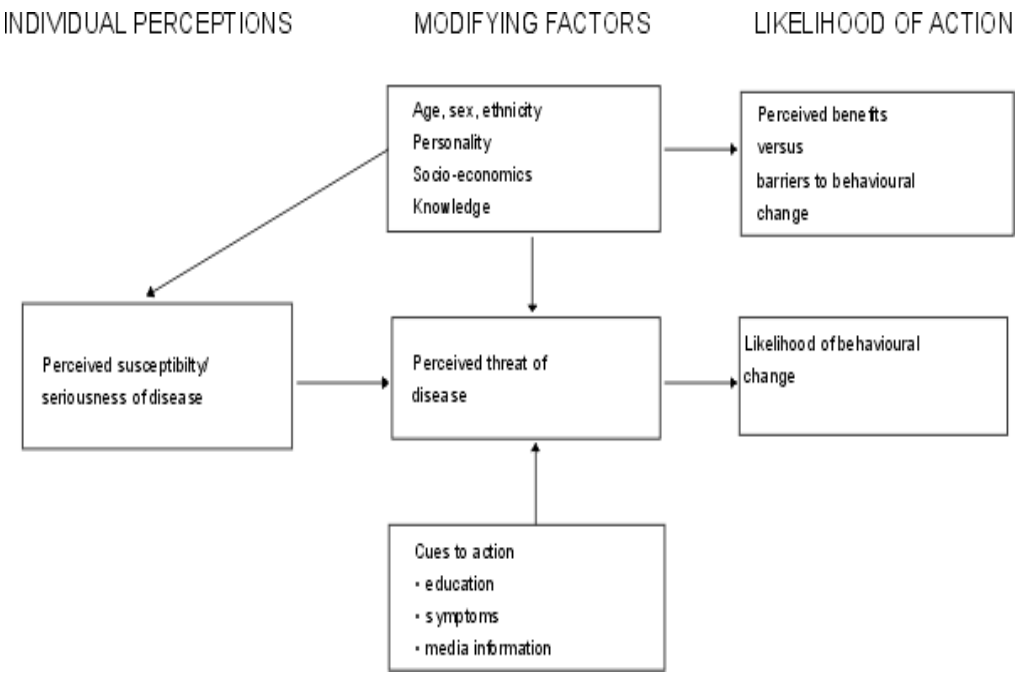
$H_0$3: There are no differences in personal beliefs and perceptions of influenza vaccination uptake in older African American and Hispanic American adults compared to European Americans.

H_a3: There are differences in personal beliefs and perceptions of influenza vaccination uptake in older African American and Hispanic American adults compared to European Americans.

Theoretical Framework

The health belief model (Glanz et al., 2002) guided the theoretical framework of the study to examine the personal beliefs and perceptions of African American and Hispanic American's health behavior towards flu vaccination uptake. This model helped determine why there may have been low levels of vaccination rates and why this has been a persistent gap between the older adult minority groups. Although adult influenza vaccination rates have improved throughout years, a substantial gap still exists among older African American and Hispanic American adults (Fiore, et al., 2010).

The health belief model was first developed in the 1950s by social psychologists Hochbaum, Rosenstock, and Kegel (Gipson & King, 2012). The health belief model is a psychological model that predicts health behaviors and personal beliefs or perceptions of illness or diseases (Carpenter, 2010). The health belief model consists of six constructs, "perceived susceptibility, perceived severity, perceived barriers, perceived benefits, cues to action, and self-efficacy," which influence health behaviors (Glanz et al., 2002, p. 35). The six constructs of health belief model are presented below in Figure 2 (Glanz et al., 2002).



Figures 2. A schematic outline of the health belief model by Glanz et al., 2002. Reprinted with permission (see Appendix B).

The health belief model provided a complete framework for understanding psychosocial factors associated with compliance (Glanz et al., 2002). The health belief model is used to understand the health behaviors and the process of health behavior change (Carpenter, 2010). Although there are many health models, the health belief model provided the best theoretical base for this study and helped examine what older African American, and Hispanic American adults view about vaccinations and disease. The theory is on the individual's right to change his or her health behavior due to the following determinants, "susceptibility, perceived severity, perceived benefits, and perceived barriers" (Glanz et al., 2002, pg. 35). The health belief model is based on the understanding that the individual is unlikely to alter their health behavior unless they believes that they are at risk or in danger. In this study, older adults that perceived

themselves at risk of contracting the influenza infection would be likely to understand the need for the annual influenza vaccination. This model is effective in examining public health issues, having an effect on positive health behavior (Carpenter, 2010). The health belief model provides an adequate framework for public health professionals and health care professionals.

Nature of the Study

The method of investigation for this study was a quantitative and cross-sectional research design to carry out secondary data analyses of the CDC NHFS 2009-2010 influenza season data set. The archival data were collected from NHFS and were sponsored by the CDC, NCIRD, and NCHS. The NHFS survey was conducted once, and was also designed to monitor and evaluate the pandemic H1N1 vaccination campaign during the 2009-2010 influenza seasons. The data set was in the public domain, which allows public health researchers to analyze and compare data on a broad range of health topics. The research population for this study was all African, Hispanic, and European American older adults. The NHFS 2009-2010 influenza season survey data used in this study examined personal perceptions and beliefs associated with adult influenza vaccination uptake between the older African American and Hispanic American adults. The NHFS data assessed a vaccination uptake as the dependent variable, personal beliefs and perceptions about vaccinations as independent variables, and gender and age as control variables. This study was designed to address three research questions.

The results from this study may help to reach older adult members of these minority groups, helping to decrease health disparities, raise community awareness, and

improve health in vulnerable populations. Documenting the gaps and analyzing the differences associated with personal beliefs and perceptions can lead to positive social change. Vaccination rates have changed over the years, and the rates have not increased in any group for more than ten years (Cheney & John, 2013). The development of programs can help individuals choose positive health behaviors that can potentially decrease morbidity and mortality in this subset of the U.S. population.

Definition of Terms

The following terms are used throughout this document and defined below for clarity.

Influenza: Influenza, also called *flu*, is an infectious, respiratory disease caused by influenza viruses. Influenza infection can cause mild to severe infection and sometimes it can lead to death (CDC, 2014).

Vaccination: Vaccination is the injection of a killed or weakened organism to prevent disease. Vaccination recommendation includes all people from 6 months of age to adults 65 and older, individuals who exhibit chronic health conditions, and for people who live with or care for other who have other chronic health conditions (Public Health, 2015).

Assumptions

The NHFS is a cross-sectional household survey sponsored by the CDC (2010). This type of research design inherently assumes that the survey tool is valid, that participants are honest in providing answers to questions. In addition, it is assumed that older African and Hispanic American adults provided correct and honest responses

reflecting their beliefs, knowledge, and perceptions when responding to the confidential interview conducted in the households (CDC, 2010). There was also the assumption that African and Hispanic American older adults were aware that flu vaccination uptake was an important prevention issue. Finally, it was assumed that these minority groups valued preventative care and their beliefs influenced their action to receive or not receive the influenza vaccination.

Limitations

The following study had several limitations. Using archival data is a limitation in the sense that conceptualization and measurement in the study is limited to available data in archival data used. The data were subject to recall bias due to self-report. Telephone interviews were administered in both English and Spanish, and the respondents' accuracy of responses was subject to bias. The results from this study were not validated against respondent's medical charts; for example, there may be confusion among respondents as to which vaccine they actually received (Santibanez, Singleton, Santibanez, Wortley, & Bell, 2012). A cross-sectional study can evaluate a larger sample but at only one point in time. However, this one-time observation is a limitation as causation was not determined due to the nature of the research.

Scope and Delimitations

A definite delimitation imposed here was to examine the influenza vaccination uptake in African and Hispanic American older adults, thereby studying a particular subset. The two racial groups were compared to European Americans as the reference group. The study was delimited to archival data from the 2009-2010 NHFS sample of

adults 65 years and older. Finally, the data sampling frame uses a stratified multi-stage design and data can be weighted to represent the entire nation. While the data can be analyzed from an analytical perspective using the actual participants that were selected to be interviewed, representation of the entire country was selected to obtain prevalence rates and thus the data were weighted.

Significance of the Study

Although older adults are at risk for infections and even death, influenza vaccination uptake among older African American and Hispanic American adults are relatively low (CDC, 2011). This study has contributed to the body of knowledge related to the perceptions African American and Hispanic American older adults have in regards to the influenza vaccination. Identifying these perceptions can help reduce morbidity in older adults and can lead to a better understanding of the barriers and personal perceptions that might be causing the low vaccination rates among older adults.

The review of the literature brought light to the need to explore African American and Hispanic American older adults' perceptions of the influenza vaccine as most studies addressed. The gap in the literature to beliefs and personal perceptions of older adults and vaccine uptake seems to involve particularly African and Hispanic Americans.

From 2000 through 2010, influenza vaccine coverage was consistently low among older adult African Americans (CDC, 2011). The coverage between African Americans and European Americans included a difference in 15% to 23%. The coverage for Hispanic Americans and European Americans included a difference in 7% to 16% as shown in Figure 1 (CDC, 2011). The findings from this study may contribute to

understanding why there have been lower vaccination rates in African American and Hispanic American adults 65 and older. The implications for positive social change were to provide a better understanding of the possible barriers that influence African and Hispanic American older adults in receiving the flu vaccine and how public health providers can increase positive beliefs and increase knowledge in regards to increasing vaccination uptake. This understanding can thus decrease the risk of infections, mortality, and morbidity in older African American and Hispanic American adults.

Summary and Transition

Influenza vaccinations are imperative in reducing illness and death in adults 65 and older. African and Hispanic American adults were less likely to receive influenza vaccinations in comparison to European American adults. This study used NHFS data to assess dependent, independent, and control measures of the study. The health belief model (Glanz, et al., 2002) contributed as the theoretical framework for this study and helped explore the differences in health behavior beliefs and perceptions towards vaccinations particularly in older African American and Hispanic American adults who were 65 and older.

Chapter 2 consists of the literature review of influenza vaccinations, history of influenza, viral etiology of influenza, health belief model, perceived susceptibility and knowledge, barriers, and beliefs associated with influenza vaccination in older adults and in the general population. Chapter 3 consists of research design, setting, study population and sample, data collection, and statistical analysis of influenza vaccination beliefs and

perceptions. Chapter 4 and Chapter 5 will entail results, discussions, and recommendations.

Chapter 2: Literature Review

Introduction

The purpose of this quantitative study was to examine the differences between older adult African and Hispanic Americans compared to European Americans in their beliefs and perceptions of the influenza vaccination and how these perceptions and beliefs influence vaccination uptake among these groups. This chapter begins with the history of influenza, its viral etiology, and symptoms, and then proceeds to influenza vaccinations and influenza guidelines. The chapter also highlights correlates of vaccination decision-making regarding influenza vaccination among older African American and Hispanic American adults. The six constructs of the health belief model reviewed in this chapter include, "perceived susceptibility, perceived severity, perceived barriers, perceived benefits, cues to action, and self-efficacy" (Glanz et al., 2002, pg. 35). The last section will provide a summary of the literature on applications of methods.

Literature Search Strategy

The literature search strategy was conducted by searching peer-reviewed and academic literature from multiple computerized databases such as Academic Search Premier, Pub Med, Medline with Full-Text Collection, Medscape, MEDSCAPE, Health and Medical Complete (ProQuest), SAGE journals online, and Morbidity and Mortality Weekly Reports published by the CDC. The following keywords were used to search terms (alone or in combination of two or more words): *vaccine, vaccinations; influenza, influenza vaccinations, access to vaccinations, vaccine access, H1N1 vaccinations, adult vaccinations, influenza virus, H1N1 influenza pathogen, H1N1 vaccines,* and *pandemic*.

The articles obtained and reviewed were scientific peer-reviewed articles published from 2002 to present.

History of Influenza

The influenza virus had been spreading since the 16th century, and this pathogen had caused many epidemics and global pandemics (Gupta & Padhy, 2010). Several pandemics have occurred since 20th century: "1918 Spanish flu (H1N1), 1957 Asian flu (H2N2), 1968 Hong Kong flu (H3N2), 1977 Russian flu (H1N1) and 2009 H1N1" (Horimoto & Kawaoka, 2005, pg. 591). The 1918 influenza pandemic caused 50 million deaths worldwide (Fukuyama & Kawaoka, 2011). The Asian flu (H2N2) resulted in more than 1 million deaths, and the Hong Kong flu (H3N2) generated approximately 700,000 deaths (Rajagopal &Treanor, 2007). The H1N1 influenza in 2009 had caused about 17,000 deaths by the start of 2010.

Viral Etiology of Influenza Virus

Influenza viruses are part of the Orthomyxoviruses family of Ribonucleic acid (RNA) viruses. Influenza virus is an eight-segment, negative-sense, single-stranded RNA genome that encodes 10 viral proteins and surface molecules such as haemagglutinin (H) and neuraminidase (N) (Noda & Kawaoka, 2010). Influenza viruses are categorized into three types: Type A, Type B, and Type C. Type A causes infection among mammals, swine, horses, birds, and so forth, and is of foremost risk to the human population. Influenza Type A virus has been linked with pandemics and has the highest mortality and morbidity rates (Cunha, 2004). Type B and Type C cause infections among humans only. Influenza Type B seems to be similar to Influenza Type A in terms of clinical

presentation and often occurs in children and young adults (Cunha, 2004). Influenza Type C does not cause epidemics or infection but causes mild respiratory infections in children and adults (Cunha, 2004). Influenza A is usually responsible for pandemics and consists of 16 glycoproteins, haemagglutinin (HA) (H1-H16) and nine neuraminidase (NA) (N1-N9) subtypes, were isolated from humans, pigs, horses, sea mammals, and birds (Horimoto & Kawaoka, 2005).

Three subtypes of HA (H1, H2, and H3) have been identified in the population. Influenza B usually occurs every two to four years, and Influenza C is often related to sporadic and subclinical infection (Stephenson & Zambon, 2002). The first subtype, H1N1 virus, caused the 1918 Spanish influenza and the 1977 Russian influenza. The second subtype, H2N2, caused the 1957 Asian influenza consisted of HA (H2), NA (N2), and the viral RNA polymerase gene segment, PBI (polymerase basic 1). The 1968 Hong Kong influenza was caused by the third subtype, H3N2; H3N2 has HA (H3) and PBI segments in a background of human genes (Horimoto & Kawaoka, 2005).

Influenza Symptoms

Influenza known as the *flu* and is defined as an infectious, respiratory illness caused by influenza viruses. Influenza viruses can cause both upper and lower respiratory tract infections (nose, throat, and lungs). Sometimes these infections can be mild to severe and even sometimes cause mortality in infected individuals (CDC, 2011). Signs and symptoms include feeling feverish or having chills, sore throat, muscle aches, body aches, headaches, fatigue, cough, stuffy or runny nose, and feeling nauseous. In children, symptoms most common include vomiting and diarrhea (CDC, 2011).

Influenza Vaccinations

Influenza vaccinations have been considered as a control measure for preventing influenza infections. The influenza-related complications have higher morbidity and mortality, particularly in adults who are 65 years and older and who have impaired immune systems (Weinberger, Herndler-Brandstetter, Swchwanninger, Weiskopf, & Grubeck-Loebenstein, 2008). Influenza is considered as a secondary infection in older adults, and it is frequently linked to severe complications (Weinberger, Herndler-Brandstetter, Swchwanninger, Weiskopf, & Grubeck-Loebenstein, 2008). Severe influenza is often considered to be interstitial pneumonia, which is susceptible to secondary pneumonia due to *Streptococcus pneumoniae* (Overman, 2011). Underuse of vaccinations increases the prevalence of infections in adult nursing homes (Belmin et al., 2010). The CDC (2014) has considered that influenza vaccination is the most protective method against prevention for influenza infection. Influenza vaccination should be administered to all individuals who want to decrease the chances of contracting the influenza infection or transmitting the virus to others. The CDC has recommended routine vaccination annually to all children from 6 months to 18 years of age, and all adults 50 and up, and other adults who have a weakened immune system. Antibody protection against the influenza infection will be higher for adults within two weeks post receiving flu vaccination (CDC, 2014).

Health Belief Model

The health belief model (Glanz, et al., 2002) was used as the theoretical framework for this study. The health belief model was established in the1950s by social

psychologists to determine why there was a failure in individuals to participate in programs in order to prevent illness (McEwen & Wills, 2007). Many of the previous studies have used health belief model to study the behaviors associated with vaccinations. The health belief model is an individual-level theory based on the notion of value and expectancy belief (Glanz et al., 2002). Individuals are predisposed to engage in the positive, healthy behavior when they choose to assume that they can lessen the risk that is likely to cause serious consequences. The health belief model was used to discern personal beliefs and personal perceptions of the influenza vaccination. Positive interventions were used for people who were unconcerned or resistant to the influenza vaccination (Cheney & John, 2013).

The four perceptions are the primary constructs of the health belief model: "perceived seriousness, perceived susceptibility, perceived benefits, and perceived barriers" these have been used to explain health behavior by personal beliefs or perceptions (Janz & Becker, 1984, p. 35). In addition to these constructs, the cue to action prompts the individual to make correct choices to prevent illness (Janz & Becker, 1984). If the person believes that he or she is at risk of contracting an illness or disease, he or she may change his or her health seeking behavior. A study has shown that individuals who have received influenza vaccination believed that they were at higher risk of contracting the influenza infection than the unvaccinated individuals (Cheney & John, 2013). Whereas, individuals not vaccinated against the influenza vaccination felt that they were unlikely to contract the infection; this is their perceived susceptibility (Cheney & John, 2013). On the other hand, perceived severity is the negative consequence the illness or

disease would have on the individual's life. If he or she believes the situation to be severe, he or she may modify his or her behavior to prevent the situation (Cheney & John, 2013). However, perceived severity itself was not a decisive factor for influenza vaccination (Cheney & John, 2013). If the individual believed a positive effect was related to the health action, this was a perceived benefit. That is, it could lower the likelihood of developing the illness or disease, she or he had fewer chances of spreading the infection to others, and he or she believed in the prevention of flu and having less time off from work due to illness (Warner, 2012). Conversely, the vaccination costs, worry about the side effects of the vaccination, possibly having an adverse reaction to influenza vaccination, and believing that it was unnatural, and it is a hindrance to the immune system by having the flu injection are perceived barriers (Warner, 2012). The effectiveness, safety, and possibility that the vaccine would cause illness have been a general concern among individuals (Cheney & John, 2013). The health belief model can be useful in explaining health behaviors, predicting underlying vaccination behavior in older adults. To understand knowledge, attitudes, and beliefs of vaccinations among the adult population, the health belief model was used as a theoretical framework for this study.

Barriers to Quality Health Care

According to Institute of Medicine, quality of health care is the "…degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with the current professional knowledge…" (Perez-Escamilla, 2010). Various studies in the United States have shown that the quality of

health care among minority population has been low and African American and HA had received a lower quality of healthcare (Sorkin, Ngo-Metzger, & De Alba, 2010). Studies have also shown that race and ethnicity are some factors that predict the quality of care patients receive (Shavers, et al., 2012). The quality of health care has been due to various factors such as "doctor-patient communication barrier, lack of trust, limited cultural competence of providers, health care organizations," patient health belief and behavior (Nerenz, 2012). Studies show that ethnic groups such as Latinos and African Americans receive poorer quality of health care (Shavers et al., 2012). One study has shown that African Americans prefer doctors of their race and ethnicity (Sorkin et al., 2010). Another study found that perceived barriers to immunization referred to patients not liking needles, lack of insurance coverage, feared adverse effects of vaccinations, and lack of knowledge about disease prevention (Johnson, Nichol & Lipczynski, 2008).

Influenza Vaccination among Older Adults

Eliminating health disparities among adults aged 65 and older has been one of the primary targets of Healthy People 2020 goals. African Americans and Hispanic Americans adults aged 65 and older have always had lower influenza vaccination rates than European American adults (CDC, 2012). In 2004, a telephone survey of European American, African American, Latino, Japanese and Filipino parishioners of a faith-based congregation, aged 50-75 years old used the health belief model to assess health behavior of influenza vaccination. About 45% of African Americans, 58% of Latinos, and 35% European Americans were not concerned about getting influenza (Chen et al., 2007). The cross-sectional, Medicare Current Beneficiary Survey (MCBS) in 2000 to 2002 indicates

that 54.7% African American beneficiaries were less likely than 71.6% European Americans reported receiving influenza vaccination (O'Malley & Forrest, 2006). Knowledge, beliefs, and attitudes of influenza vaccination have been studied in the general population, as well.

Influenza Vaccination in the General Population

In the study by Clark, et al. (2009) survey questionnaires were mailed to 2000 Registered Nurses and 1017 surveys were available for analysis. Most of the respondents reported receiving influenza vaccination, 59% (n = 595) during 2005-2006 seasons. About 39% of respondents were concerned about the adverse reactions to the vaccine and chose not to vaccinate.

One cross-sectional questionnaire study conducted at Frankfurt University Hospital found that medical and dental students chose not to vaccinate although they were to have close immediate access to the patients in the hospital. The reason was that the medical and dental students perceived a risk of contracting the influenza infection and getting adverse reactions if vaccinated (Betsch et al., 2012). The study also indicated 49% of students were concerned with the additives contained in the vaccine, 38% did not know if the vaccine would cause allergies and 37% of the students did not know if the cause of the illness could be due to vaccination. About 6.5% searched the Internet sources for risks related to influenza vaccinations and these risks were a perception that influenced vaccination intentions (Clark, Cowan & Wortley, 2009).

Perceived Susceptibility, Knowledge and Influenza Vaccination

The US Preventative Services Task Force recommends all individuals 65 years of age and older be vaccinated against influenza infection (CDC, 2012). Coe, et al., (2012) used health belief model to assess participants' intention to receive 2009 H1N1 influenza vaccine. In this cross-sectional descriptive study, participants filled out the questionnaires, and most of the participants (66.9%) were 25 to 64 years old. The study assessed participants' perceptions, attitudes about severity, susceptibility, risks, barriers, perceived benefits, cues to action and intention to receive 2009 H1N1 influenza vaccine. The health belief model in this study used the six constructs to examine participants' motivations for accepting their health-related behaviors such as "perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action and self-efficacy" (Glanz et al., 2002, pg. 35). The study indicated perceived severity was not useful health belief model construct in predicting influenza vaccination behaviors. Participants were more likely to received H1N1 vaccine if physicians, pharmacist, or nurses had recommended the vaccine to them (perceived barrier) (Coe et al., 2012).

This finding signifies the need to educate patients and health care professionals with awareness, educational campaigns to reduce potential barriers to vaccination and increase positive vaccination decisions. In one study, researchers found that African Americans and Latinos were not too inclined to receive influenza vaccination than any other racial groups. The study noted a variation of determinants among non-vaccination groups. The perceived severity is the most important determinant of receiving the influenza vaccine and believed in contracting the flu was highest among the low-income

African Americans. Health insurance status and cost barrier had been the most significant perceived barrier among Latinos. African Americans were concerned that influenza vaccine would cause illness and severe side effects, perceived susceptibility (Chen et al., 2007).

Individuals tend to undervalue health risks and have difficulty understanding risk (Beluga et al., 2006). Individuals' understanding of the likelihood of contracting influenza disease is one the preventive key predictors of health behavior. Chen et al. (2007) measured perceived susceptibility from the following survey question "How concerned are you about getting the flu?" The authors found that the majority of individuals were concerned with getting the flu and susceptibility varied by race. Ninety-six percent of European Americans, 91% African Americans and 54% Latinos were among concerned about contracting the influenza virus. Whereas, 45% European Americans, 33% African Americans and 34% Latinos were not at all concerned about getting sick from the influenza illness.

Educational attainment has also been associated with beliefs about vaccination behavior. A 2004 national telephone study indicated differences in beliefs in influenza vaccination differed by participants educational attainment (Wooten et al., 2012). Wooten et al. (2012) identified that vaccination uptake is lower in older African American and Hispanic American adults who had lower education levels and had a differing beliefs and attitudes of influenza vaccination. The study indicated that individuals who did not have high school diploma believed that they were at risk of contracting influenza illness if they were vaccinated with the influenza vaccination (46% compared to 32%, $p< 0.01$). Other

participants who had high school or greater education believed that their chances of contracting the disease if they have not received the vaccine were slightly higher (36% compared to 24%, $p<0.01$) in contracting the illness.

In 2003-2004, a cross-sectional telephone survey of Medicare beneficiaries was conducted where unvaccinated African American respondents believed influenza vaccinations made them ill (Lindley et al., 2006). Among unvaccinated and vaccinated respondents, African American had more negative perceptions and attitudes towards vaccination than European Americans. Interventions addressing negative beliefs and misinformation about vaccines are likely to reduce racial/ethnic disparities, do not prevent receipt of vaccination, and do not signify positive attitudes toward vaccination (Lindley et al., 2006). History of previous vaccine receipt and most common reasons for refusing vaccination included getting sick from the influenza vaccine, afraid of side effects, flu shot will not prevent the flu, flu is not a serious disease, knew someone who got sick from the flu shot, were similar in African American (48.6%) and European American (41.6%) patients (Schwartz et al., 2006).

Perceived Barriers and Beliefs Associated with Influenza Vaccination

Older adults who reside in nursing homes or residential homes do not receive annual vaccination (Warner, 2012). In the study by Chen et al., (2007), when asked ‘‘what is the main reason you did not get a flu shot in the past year?’’ Thirteen percent of Hispanic Americans reported access and cost issues were the primary reasons for not obtaining the vaccine. Whereas 10% of African Americans reported ‘‘I don’t want it, I don’t like it, I decided not to get it, or I prefer not to get it’’ was the primary reason for

non-vaccination compared to Hispanic Americans (4%) and European Americans (4%). Roughly 32% of unvaccinated African Americans, 18% European Americans and 13% Latinos believed that influenza vaccinations cause the flu or have serious side effects. With information gathered from the 2005-2007 Behavioral Risk Factor Surveillance System (BRFSS) survey, Pearson et al. (2011) found that Spanish-speaking Hispanic Americans 65 year and older were less likely received influenza vaccinations in comparison to Hispanic Americans who communicated in English.

Data analyzed from 2007 National Immunization Survey, a phone survey that examined 68% (n = 795) of European Americans 65 and older received influenza vaccination and there were only 54% (n = 1332) vaccinated African Americans. The study also showed that 52% of European Americans obtained the vaccine in doctor's office compared with 37% African Americans. In addition, 66% of European Americans believed vaccine was effective versus 50% of African Americans. Although both groups indicated a positive attitude towards seeking vaccination, African Americans were less inclined to receive vaccination (Groom, 2014).

Another study specified that perceived barriers to immunization presented that patients did not like the needles, lack of insurance coverage, had fear that vaccinations would have adverse effects and had a lack of knowledge about disease prevention. In addition, according to health care providers, lack of reminder system and patient failure to come for regular well care visits were also common reasons that adults did not receive vaccinations (Johnson, Nichol & Lipczynski, 2008).

Perceived Barriers and Beliefs

A cross-sectional survey of dental healthcare workers (DHCWs) conducted during 2010-2011 in Germany showed that there have been low vaccination rates among medical personnel. Many studies have confirmed that there are racial and ethnic disparities in United States health care systems. Minorities such as African American and Hispanic Americans have less access to healthcare (Komaromy et al., 1996). Minorities are socioeconomically disadvantaged and low level of education, uninsured African American and HA are worse in obtaining access to care. A study conducted in 2003 by Lillie-Blanton and Hoffman (2005) showed that African American and Hispanic Americans had low rates of employer-sponsored health insurance coverage. The low wage jobs did not offer insurance coverage, or it was unavailable or it was unaffordable. The study also revealed that three-fourths of African Americans and Hispanic Americans who were uninsured had income below 200 percent of the federal poverty level in comparison to uninsured European Americans (56%).

Hispanic Americans encounter hindrances towards accessing health care services due to cultural differences with their health care providers and language barriers (Wooten et al., 2012). Hispanic Americans with lower income were not able to afford out of pocket costs, even if they had health insurance coverage. Low education level can hinder individuals to find suitable coverage and communication barriers between healthcare providers can impair lack of understanding of the health care provider's instructions. Another factor that might hinder access to care is the immigration status of the individual and their cultural beliefs (Perez-Escamilla, 2010).

Literature on Methodology

A review of current literature on perceived susceptibility, knowledge, perceived barriers and beliefs associated with influenza vaccination in older adults and the general population revealed that most of the studies were observational and cross- sectional. The focus group studies were commonly qualitative studies. This literature review did not find mixed method studies relating to perceived susceptibility, knowledge, perceived barriers and beliefs associated with influenza vaccination in older adults or in a general population.

Cross-Sectional Studies

The study used a cross-sectional survey to explore the vaccination rates of older minority groups. The approach of the study was to assess an archival data NHFS conducted by CDC. NCIRD, NCHS and CDC implemented the National 2009 H1N1 Flu Survey. The NHFS collected data on vaccination uptake in both pH1N1 and seasonal influenza vaccinations in adults and children (CDC, 2014). In 2009, the World Health Organization established the influenza virus had reached pandemic status, causing many illnesses, hospitalizations, and deaths among older adults -- who were at increased risk for complications (CDC, 2012). Chen, Clairessa, Cantrell, Stockdale and Kagawa-Singer (2007) have studied the health belief model to observe vaccination rates among parishioners aged 50 to 75 years of age and identified the changeable determinants by race and ethnicity of European Americans, Latinos, African Americans, Filipino Americans and Japanese Americans.

Qualitative Studies

A literature review of qualitative studies relating to perceived susceptibility, knowledge, perceived barriers and beliefs associated with influenza vaccinations produced fewer results. Qualitative and quantitative studies have numerous differences in that quantitative studies were much more objective, whereas qualitative studies were subjective. Both studies used different methods in terms of data collection, sample size, and data analyses. Qualitative studies are designed to understand the underlying reasons, opinions and developed a hypothesis for research and sample size was typically small, and methods included focus groups and individualized interviews. Quantitative studies are designed to understand attitudes and behaviors, but have larger samples and the results can be generalized to a broader population (Creswell, 2003).

In 2007, a qualitative study with focus groups aged 65-75 years old used health belief model to predict health behavior. Two hundred and eight participants were selected from nine countries including China, Indonesia, Turkey, Korea, Greece, Canada, the United Kingdom, Brazil, and Nigeria. The participants were divided into 14 vaccinated groups and 12 unvaccinated groups. One hundred and fourteen participants (66.2%) were vaccinated. Vaccinated participants have anticipated that they were susceptible to contracting influenza infection and believed it was very contagious. Whereas, unvaccinated participants perceived the lesser chance of contracting influenza illness and did not think much about adverse effects and effectiveness of the influenza vaccine. Vaccinated participants believed in protecting their health, understood the efficacy of the vaccine, and knew the cost of the vaccine would cost much less than going to the doctor

or a hospital. However, unvaccinated participants did not understand vaccine effectiveness and believed that individual choices vary concerning vaccination. The external cues to action for vaccinated participants recognized that their vaccination influenced by interpersonal influences such as family, peers, neighbors, doctors, and nurses. The external cues to action for unvaccinated participants did not accept any external cues to action to prompting vaccination (Kwong et al., 2010).

Observational Studies

In a meta-analysis of observational studies, influenza vaccination rates were poor and did not meet World Health Organization targets (Monto, 2010). Older adults with chronic medical conditions contributed to 90% of influenza-related deaths (CDC, 2013). Reviews of 64 quasi-randomized, cohort and case-control studies have assessed the efficacy of influenza vaccination in older adults. The study has shown that influenza vaccination effectiveness was 23% against influenza infection (Rivetti et al., 2006). Most of the observation studies have shown increased influenza vaccine effectiveness in older individuals with underlying health conditions (Hak et al., 2006; Jefferson et al., 2010; Lang et al., 2011; Michaels et al., 2011; Mullooly et al., 1994; Nichol et al., 2003; Nicol et al., 2007; Nordin et al., 2001; Vila-Corcoles, 2007; Voordouw et al., 2003;).

Summary and Transition

This chapter highlighted personal beliefs and perceptions of older adults and the general population of influenza vaccination. Through literature review, previous studies have used health belief model to motivate older African American and Hispanic American adults to engage in positive health, increase vaccination rates and decreased

morbidity and mortality rates in African American and Hispanic older adults with health conditions. The health belief model explored the degree to which perceptions and beliefs led older adults to accept vaccination to prevent the flu. The influenza infection can lead to serious complications and even death; however, control of infection depends on increasing vaccine uptake within minority populations (Warner, 2012). Application of different health belief model constructs is likely to increase influenza vaccination by decreasing resistance through change in individual's beliefs about the vaccine (Cheney & John, 2013). Most of the literature published to date used cross-sectional and quantitative research designs, and reviews of theories have addressed various explanations and predictions to seek or accept health interventions and make right health choices. Chapter 3 describes the methodology used to carry out this cross-sectional archival study.

Chapter 3: Research Method

Introduction

The purpose of this quantitative study was to examine the differences between older adult African and Hispanic Americans compared to European Americans in their beliefs and perceptions of the influenza vaccination and how these perceptions and beliefs influence vaccination uptake among these groups. The study used archival data from CDC's NCHS and NCIRD. This chapter includes a description of the study design, sample description, sample data collection process, statistical analyses, and study variables for this study. Protection of human participants is presented in this chapter. This chapter also contained the hypotheses tested were based on the research questions. The chapter concluded with threats to validity along with a summary section and transition to Chapter 4.

Research Design and Rationale

The research design for this study was quantitative, and it assessed the archival data from the National 2009 H1N1 Flu Survey (NHFS). The study sample represented the civilian, noninstitutionalized adult household population residing in the United States. The NHFS was a cross-sectional survey of data collected at one point in time. The advantage of using the cross-sectional design for this study was that the data were a large sample, and it was inexpensive, easy to conduct, and multiple outcomes were examined (Mann, 2003). This study design allowed examining the outcome (dependent variable) and independent variables at the same time (Gordis, 2004). The quantitative model analyzed the personal beliefs (independent variable) and perceptions (independent

variable) of the older population associated with influenza vaccination uptake (dependent variable) of African and Hispanic American adult population.

Setting and Sample

The target population for this study consisted of older African American and Hispanic American men and women aged 65 years and older. The study population was a civilian, noninstitutionalized adult household population residing in the United States in 2009. The data collected for this study were from the NHFS 2009-2010 influenza seasons and selected populations. The remainder of the section describes the overall national representative survey, distribution of eligible participants by type of telephone (landline and cell), weighing

The NHFS is a dual frame sample design and interviews were conducted by landlines and cell phones. The interviews were conducted by the National Opinion Research Center at the University of Chicago (NORC), a data collection contractor for CDC. The survey evaluates awareness of seasonal flu vaccination, H1N1 flu vaccination, and perceptions and concerns of influenza vaccination, reasons for not obtaining vaccination, behaviors, general demographics data such as age, sex, race/ethnicity, household income, housing tenure, state of residence, employment status, marital status for household adults, and including the number of children were collected.

The 2009-2010 NHFS data sample contained 980783 telephone numbers, and out of these 734367 were landline numbers and 246416 were cell phone numbers. From the 734367 landline numbers, 338271 were not used due to either the telephone being out of order, on a block, or do not call requests. The remaining 396096 landline numbers were

used to call the households. About 106160 landline numbers were identified as home numbers, and 99.6% were successfully interviewed and screened for the survey. Almost all 105499 (99.8%) were eligible adults. Among the available household data, 45599 (43.2%) completed the adult household interview. Among the adult cell phone users, 19,827 were eligible adults with a cell phone number or landline number, and the number of older adults was 14393. Five hundred and fifty-six participants reported other or multi-racial background were deleted from the analytical sample, leaving 13827 participants in the final sample.

Archival Data

The data for this study were collected for 2009-2010 influenza season as part of the NHFS cross-sectional survey. A retrospective secondary analysis was used to derive the variables needed to test the hypotheses. The NHFS is an extensive random-digit dialing telephone survey of landlines and cell phones conducted by the University of Chicago on behalf of CDC that was collected from October 2009 through June 2010. The interviews were managed by phone with households in all 50 states and the District of Columbia. The NHFS sample was collected at national and state level. The NHFS sample consisted of both H1N1 and seasonal influenza vaccination data or all persons who were six months and older during the 2009-0 influenza season. The NHFS data included questions about influenza-related behaviors, opinions, vaccine safety, vaccine effectiveness, and individual demographic characteristics (CDC, 2010). The adult component of this survey addressed the research questions and proposed hypotheses.

Weighing and Nonresponse Data

The NHFS uses weights and imputation for item nonresponse variables. The NHFS uses imputation for nonresponse data to replace missing values for socioeconomic and demographic variables used in weighting, and the missing values of these variables were imputed for all of the completed interviews. These variables included gender, Hispanic origin, age group, race, the number of adults and children in the household, and a number of the landline telephone and cell phones used by adults in the household. Composite variables created in the NHFS data allowed users to eliminate duplication and make NHFS database easier to use. The composite variables included for H1N1, and seasonal flu vaccines were race, ethnicity, and household income (CDC, 2010). Some of the variables in NHFS database were composite variables derived from other questionnaire items. For these composite variables, the missing values appeared as missing, a dot for numeric variables and null field for character variables.

Other variables in the NHFS questionnaire contained special missing value codes and represented as 77 = Do not know, 99 = Refused, Missing if the question was not asked (CDC, 2014). The weighted data removed the nonresponse and noncoverage bias (Groves, 2006). Nonresponse or missing data occurred when information were not collected. The nonresponse sometimes led to bias in survey estimates if the characteristics of the nonrespondents and respondents were different and the weight adjustments for the nonrespondents did not appropriately account for the difference (Schneider, Clark, Rakowski, & Lapane, 2012).

Sampling weights used in NHFS sample data are available for each child or adult who completed the interview. Each child or adult had sampling weight called FLUWT. The sampling weights characterized as the proximate number of individuals in the target population that a particular subject in the data sample served. Because NHFS is a dual frame survey that included both home phones and cell phone samples, the base sampling weights for households were computed and, the weights were adjusted for household distribution. Base sampling was adjusted for nonresolution of telephone numbers, screener noncompletion, and interview noncompletion among eligible households. The landline and cell phone subjects had a separate set of state-level base weights, and were from different sample frames and sampled at various rates (CDC, 2010).

Statistical Analysis

NHFS database and SPSS software package were used for testing the hypotheses. Descriptive statistics were performed to examine demographic and vaccination uptake among older adults by African American and Hispanic American ethnic groups compared to their European American counterparts. Descriptive results were reported as frequencies and percentages. Logistic regression was used to test hypotheses in this study. The logistic regression estimates the odds of flu vaccination uptake predicted by beliefs and perceptions, adjusting for age, gender, and race. Logistic regression is used to determine which variables affect the probability of a particular outcome, in which the outcomes are binary (Ofstead et al., 2013).

Study Variables

Dependent Variable

The outcome or dependent variable in this study was influenza vaccination. The outcome variable was measured by self-reported vaccination question collected from NHFS Influenza Vaccination Adult questionnaire that was ascertained by the question: *"*Since August 2009, have you had seasonal flu vaccination? There are two types of seasonal flu vaccinations. One is a shot and the other is a spray, mist or drop in the nose." The original questionnaire responses were categorized into (1) "Yes," (2) "No," (77) "Don't Know" and (99) "Refused." To construct the dependent variable a binomial measure was constructed in SPSS as 1 = "Yes" and 0 = "No/Don't Know/ Refused."

Independent Variables

The primary independent variables in this study were beliefs and perceptions. The categorical variables were dichotomized for each question, and variables were assigned and recoded in SPSS. The demographic (age, gender) and independent variables (beliefs and perceptions) were compared by race (African American, Hispanic American, European American). The independent variables (beliefs and perceptions) measures were self-reported. The original response categories are discussed next, and the final measures as binomial derived variables are presented in Table 1:

1. "*How likely are you to get a seasonal flu vaccination between now and the end of June? Would you say you?*" The responses were categorized into "*(1) Will definitely get one, (2) Will probably get one, (3) Will probably not get one, (4) Or, will definitely not get one, (77) Don't Know and (99) Refused*."

The variables were dichotomized and the variables were recoded as 1 = Will definitely/probably get one, and 0 = Will probably/definitely not get one/Unknown.

2. "*There are many reasons why people don't get flu vaccinations. What is the main reason you [will not get/will probably not get/will probably not get/have not yet gotten] a seasonal flu vaccination this flu season*?" The responses were categorized into: "*(1) Concerns about the side effects or sicknesses; (2) Think vaccines do not work; (3) Vaccination is not needed; (4) Allergic to the vaccine; (5) The vaccine costs too much; (6) Vaccine not available; (7) Tried to get it but couldn't; (8) Haven't gotten to it yet/No time; (9) Don't know where to go/ Who to call; (10) Some other reason; and (11) Don't know; and (12) Refused*." The variables were recoded in SPSS: 1 = Side Effects (concerns about the side effects or sickness, and allergic to the vaccine); 2 = Effectiveness (think vaccines do not work, and vaccination is not needed); 3 = Cost (the vaccine costs too much); 4 = Availability (vaccine not available, tried to get it but couldn't and don't know where to go/who to call); and 5 = Other (haven't gotten to it yet/no time, some other reason, don't know and refused).
3. "*Since this past August, 2009 have you seen a doctor or other health professional about your own health at a doctor's office, hospital, clinic, or some other place. How many times did you see a doctor or other health professional about your own health since August 2009*?" The responses were

categorized into "*(1) Yes, (2) No, (77) Don't Know and (99) Refused*." "*Since August 2009, did your doctor or other health professional personally recommend that you get an H1N1 flu vaccination or a seasonal flu vaccination?" "(1) H1N1 flu vaccination (2) Seasonal flu vaccination (3) Both vaccinations, (4) Neither vaccination, (77) Don't Know and (99) Refused*." The variables were recoded 1 = Saw health professional once last year/Saw health professional or more times last year/Seasonal flu vaccination 0 = Did not see health professional in the last year/ H1N1 flu vaccination/Both vaccinations/Neither vaccination/Unknown.

4. "If *you [had not gotten / do not get] a seasonal flu vaccination this fall or winter, what [would have been/are] your chances of getting sick with the seasonal flu? Would you say?" The responses were categorized into "(1) Very High (2) Somewhat High (3) Somewhat Low (4) Very Low (5) Already had Seasonal Flu (77) Don't Know and (99) Refused."* The variables were recorded into 1 = Very Low, 2 = So*m*ewhat Low, 3 = Somewhat High, 4 = Very High and 5 = Unknown and 6 = Already had Seasonal flu. Don't know and refused responses were included in the analysis and were recoded as "Unknown."
5. "*How effective do you think seasonal flu vaccination [was / is] in preventing the seasonal flu*?" The responses are categorized into *"(1) Very effective, (2) Somewhat effective, (3) Not too effective, (4) Or, not at all effective (77) Don't know and (99) Refused.*" The variables were coded as 1 = Very effective/

Somewhat effective, 0 = Not too effective/Or, not at all effective/Unknown in SPSS. Don't know and refused responses were included in the analysis and were recoded as "Unknown."

6. "*How worried [were/are] you about getting sick from the seasonal flu vaccine? Would you say*: "The responses were categorized into*"(1) Very worried, (2) Somewhat worried, (3) Not too worried, (4) Or, not at all worried about getting sick from the flu vaccination? (77) Don't know and (99) Refused.* "The variables were recoded as 1 = Or, not at all worried about getting sick from the flu vaccination? 0 = "Not too worried/Somewhat worried/ Very worried/Unknown." "Don't know" and "refused" responses were included in the analysis and were recoded as "Unknown."

Table 1

Summary of Dependent and Independent Variable Measures

Health Belief Constructs	Description	Recoded Values	Variable Type
Vaccination Uptake (DV)	Received seasonal flu vaccination (shot or nose spray)	1=Yes 0=No	Binomial
Cues to action (Belief)	Plans to get a seasonal flu vaccination between now and the end of June	1=Definitely/probably 0=Definitely/probably not get one or Don't know or Refused	Binomial
Cues to action (Belief)	Saw a health professional in the last year and HP recommended H1N1 flu or seasonal vaccine	1=Saw HP at least once last year and HP recommended vaccine 0=Did not see HP in last year/H1N1 flu vaccination/ Both Vaccination/Unknown	Binomial
Perceived Severity (Belief)	How worried are you about getting sick from the seasonal flu vaccine?	1=Not at all worried about getting sick from the flu vaccination 0=Not too worried/ Somewhat worried/ Very worried/ Unknown	Binomial
Perceived Benefits (Perception)	How effective do you think seasonal flu vaccination is in preventing seasonal flu?	1=Very effective/ Somewhat effective 0=Not too effective/ or, not at all effective/Unknown	Binomial

Note, from "National 2009 H1N1 Flu Survey (NHFS)" by Centers for Disease Control and Prevention National Center for Immunization and Respiratory Diseases and National Center for Health Statistics, March 2012.

Other Independent Variables

Descriptive statistics for demographics (race, gender, and age) were used to analyze data in this study. Descriptive analysis was used to summarize frequency and percentages and was used to examine the association between race, age, and gender in

older African and Hispanic adults. These confounding variables were tested separately, and SPSS statistical analysis was used to categorize this data (Table 2).

Race/Gender/Age

The race variable "RACEETH4_I" was self-reported and categorized into (1) Hispanic, (2) Non-Hispanic, African American only, (3) Non-Hispanic, White Only and (4) Non-Hispanic, Other or Multiple Races. The "RACEETH4_I" variable was recoded into "Race" as 1 = European American, 2 = African American, 3 = Hispanic American, and Other or Multiple Race was set to SYSMIS. The "SEX_I" variable was categorized into (1) Male and (2) Female. The "SEX_I" variable was recoded as "Gender" variable and responses were dichotomized as 0 = Male and 1 = Female. Both males and females who were 65 and older were eligible to take part in this study. The age variable "AGEGRP" was self-reported and categorized into 1 = 65+ Years and 0 = 6 months – 64 Years. Only AGEGRP=1 was selected for this study (Table 2).

Table 2

Demographic Independent Variables

Variable	Scale	Analysis	Coded
Race	Nominal	Descriptive Statistics	1 = European American 2 = Hispanic American 3 = African American
Gender	Nominal	Descriptive Statistics	0 = Male 1 = Female
Age	Interval/Ratio	Descriptive Statistics	Age will be recorded in years

Research Questions and Hypotheses

1. Are there differences in personal beliefs and influenza vaccination uptake in older African American and Hispanic American adults compared to European Americans?

H_01: There are no difference in beliefs and influenza vaccination uptake in older African American and Hispanic American adults compared to European Americans.

H_a1: There are differences in beliefs and influenza vaccination uptake older African American and Hispanic American adults compared to European Americans.

Statistical Plan: IV = Personal Beliefs (Thinks vaccine is somewhat to very effective, Plan to get vaccination next season and saw HP and HP recommended flu or seasonal vaccine); DV = Vaccination Uptake; Covariates = gender (ref: males); race/ethnicity (ref: European Americans); statistical test to reject Null = Logistic regression.

2. Are there differences in perceptions and vaccination uptake in older African American and Hispanic American adults compared to European Americans?

H_02: There are no differences in perceptions and vaccination uptake in older African American and Hispanic American adults compared to European Americans?

H_a2: There are differences in perceptions and vaccination uptake older African American and Hispanic American adults compared to European Americans.

Statistical Plan: IV = Perceptions (Not worried at all about getting sick with the vaccine); DV = Vaccination Uptake; covariate = gender (ref: males); race/ethnicity (ref: European Americans); statistical test to reject Null: Logistic regression.

3. Are there differences in personal beliefs and perceptions of influenza vaccination uptake in older African American and Hispanic American adults compared to European Americans?

H_03: There are no differences in personal beliefs and perceptions of influenza vaccination uptake in older African American and Hispanic American adults compared to European Americans.

H_a3: There are differences in personal beliefs and perceptions of influenza vaccination uptake in older African American and Hispanic American adults compared to European Americans.

Statistical Plan: IV = Personal beliefs and perceptions (Thinks vaccine is somewhat to very effective, Plan to get vaccination next season, saw HP and HP recommended flu or seasonal vaccine, Not worried at all about getting sick from the vaccine); DV = Vaccination uptake; covariate = gender (ref: males); race/ethnicity (ref: European Americans); statistical test to reject Null = Logistic Regression.

Table 3

Summary of Analyses and Variables

Research Questions	Independent Variable	IV Level of Measurement	Dependent Variable	DV Level of Measurement	Statistical Analysis
RQ1	Beliefs	Binomial	Vaccination Uptake	Binomial	Logistic Regression
RQ2	Perceptions	Binomial	Vaccination Uptake	Binomial	Logistic Regression
RQ3	Beliefs & Perceptions	Binomial	Vaccination Uptake	Binomial	Logistic Regression

Protection of Human Participants

This study used archival data collected by the CDC. The NHFS data is the cross-sectional household survey and secondary analysis posed no foreseeable risk to the participants, as there were no personal identifiers, such as name, address, birth date, etc. associated with the respondent's answers. The fundamental principle of NHFS was to protect the confidentiality of the respondents' information. All responses were anonymous (CDC, 2012). In order to contribute to Walden's social change, this study may promote positive social change and have an impact on the community. Plans to disseminate the findings from this study include community presentations and submissions to peer-reviewed journals.

Threats to Validity

The validity of the study can cause an error due to outside factors or its study design. Some of the common threats to validity for the study included selection bias, measurement biases, such as the interviewer and self-reported measures. Analytic bias was considered (Zaza, et. al., 2008).

Summary and Transition

The purpose of this quantitative study was to examine the differences between older adult African and Hispanic Americans compared to European Americans in their beliefs and perceptions of the influenza vaccination and how these perceptions and beliefs influence vaccination uptake among these groups. This dissertation used pre-existing archival data that helped to explain the disparities in non-institutionalized United States residents for the year 2009-10 influenza seasons. This study used a cross-sectional

design to examine 2009-10 NHFS survey for independent, dependent and control variables using logistic regression and multivariable logistic regression to test the hypotheses. The results from the proposed methodology are presented in Chapter 4, and Chapter 5 will conclude with results and significance of the research study.

Chapter 4: Results

Introduction

The purpose of this quantitative study was to examine the differences between older adult African and Hispanic Americans compared to European Americans in their beliefs and perceptions of the influenza vaccination and how these perceptions and beliefs influence vaccination uptake among these groups. This chapter describes the secondary data analyses of the 2009 NHFS to answer research questions proposed in Chapter 3. The dependent variable examined was vaccination uptake, and the independent variables included beliefs and perceptions. The predisposing variables included gender and race. The statistical analyses to test the hypotheses were conducted by using the IBM SPSS Statistics (Version 21.0) software. The first section presents the frequency distribution of the unweighted and weighted race, gender, and vaccination uptake. Bivariate analysis compares the personal beliefs and perceptions on vaccination uptake by race/ethnicity, as well as reasons for not receiving flu vaccine. The effect of personal beliefs and perceptions on vaccination uptake was tested using logistic regression analysis.

Descriptive Analysis

The study sample included 13827 older adults interviewed as part of the 2009 NHFS who identified as African, Hispanic or European Americans; the weighted sample represents about 36 million respondents 65 years of age and older in the U.S. population. The unweighted and weighted distribution is presented in Table 4. More than half of the sample (57.1%) was female and 85.0 % European American. When responders were

asked whether they received the seasonal flu vaccine in the last year, 67.4 % responded affirmatively, and 32.6% had not been vaccinated. There were significant differences between demographic variables and vaccination uptake using chi-square test ($p < .0001$). The representative weighted population indicated that males were underrepresented and females overrepresented in the unweighted sample. It is common for national multi-stage designs to over sample minority populations. The weighted percent for African Americans and Hispanic Americans indicates that both groups better characterized their representation after weighting the data. The descriptive statistics present both unweighted and weighted distributions to inform on the actual number of participants interviewed and the population they represent. The remainder of the tables will only include the weighted distributions.

Table 4

Unweighted and Weighted Frequency Distribution by Demographic Factors

	Unweighted N	Unweighted %	Weighted %	*p*-value
Gender				
Male	(4938)	35.7	42.9	.0001
Female	(8889)	64.3	57.1	
Race				
European Americans	(12501)	90.4	85.0	.0001
African Americans	(957)	6.9	9.8	
Hispanic Americans	(369)	2.7	5.2	
Vaccinated				
Yes	(9392)	67.9	67.4	.0001
No	(4435)	32.1	32.6	
Total Sample of Older Adults	(13827)	100.0	100.0	

*Note. S*ignificance calculated based on Pearson Chi-square

The frequency distribution of personal beliefs, perceptions, and vaccination uptake are presented for the three race/ethnicity groups in Table 5. All the associations by race/ethnicity were statistically significant ($p < .0001$) except for plans to vaccinate next season ($p < .950$). African Americans (41.5%) and Hispanic Americans (37.6 %) were more likely to not be vaccinated compared to 31.3 % European Americans ($p<.0001$). Almost half of African Americans (48.0%) and Hispanic Americans (45.2%) who saw their health professional in the last year were less likely to have their health professional recommend the flu vaccine, compared to 51.9% of Europeans Americans. About three-fourths of African Americans (83.3%) and 76.2% Hispanic Americans felt that vaccine was very or somewhat effective in preventing influenza infection compared to 84.4% European Americans. Minority groups were almost twice as likely to worry about getting sick from receiving the flu vaccine. About 43.4% African Americans and 29.5% of Hispanic Americans were not at all worried about getting sick from the vaccine compared to 52.3% of European Americans.

Table 5

Distribution of Personal Beliefs and Perceptions of Older Adults by Race/Ethnicity

Beliefs and Perceptions	African Americans %	Hispanic Americans %	European Americans %
Vaccine Uptake in 2009-2010*			
Yes	58.5	62.4	68.7
No	41.5	37.6	31.3
Plan to get vaccination next season**			
Probably/Definitely Not Get One	25.1	25.0	23.2
Probably/Definitely Get One/Unknown	76.8	75.0	76.8
Seen HP last year and HP recommended vaccine*			
Yes	48.0	45.2	51.9
No	52.0	54.8	48.1
Worried about getting sick from vaccine*			
Not at all worried	43.4	29.5	52.3
Not too/Somewhat/Very worried	56.6	70.5	47.7
Perceived vaccine effective in preventing flu*			
Very/Somewhat effective	76.2	84.4	83.3
Not too/Not at all effective	23.8	15.6	16.7

Note. Weighted frequencies; HP = Health Professional, **p*=.0001, ***p*=*n.s.*, significance calculated based on Pearson Chi-square. The proportion of participants reporting unknown for their plans to get vaccination was almost half for all racial groups.

Reasons for Not Receiving Vaccination

Table 6 illustrates the distribution of those not vaccinated by race/ethnicity. Respondents provided several reasons why they did not receive the vaccine, including side effects, effectiveness, cost, availability, and other reasons. Respondents not vaccinated were asked about their perceptions of the chances of getting sick with the flu. African Americans were more likely to not vaccinate because they feared side effects (20.8%) compared to Hispanics (15.4%) and European Americans (15.2%). Minority groups were less likely to feel vulnerable to getting the flu if they had not vaccinated. About a fifth of African (20.5%) and Hispanic (19.8%) Americans stated that they had

somewhat high and very high chances of getting the flu because they were not vaccinated, compared to 29.2% of European Americans.

Table 6

Distribution of Reasons for Not Getting the Seasonal Flu Vaccine (N = 4,435)

Did Not Get Seasonal Flu Vaccine	African Americans %	Hispanic Americans %	European Americans %
Reasons for Not Getting a Vaccine*			
Side Effects	15.8	18.4	16.0
Effectiveness	20.8	15.4	15.2
Cost	0.4	0.0	3.4
Availability	8.4	7.8	4.2
Other Reasons	34.2	43.1	47.8
Already Vaccinated	20.4	15.3	13.4
Not vaccinated and chances of getting Flu*			
Very Low	38.5	42.0	39.0
Somewhat low	33.0	26.2	25.7
Somewhat high	17.4	13.2	14.8
Very high	3.1	6.6	14.4
Unknown	8.0	12.0	6.1
Already vaccinated	0.0	0.0	0.0

*Note. Weighted frequencies; *p< .0001, significance calculated based on Pearson Chi-square*

Figure 3 illustrates the reasons why older adults did not try to get the flu vaccine by race/ethnicity. Cost did not seem to be an issue. All three groups reported side effects from the vaccine, and African Americans were slightly more concerned about the effectiveness of the vaccine. The survey did not capture well the reasons for not receiving the vaccine as over a third of the participants had other reasons for not getting the influenza vaccine, or they were already vaccinated.

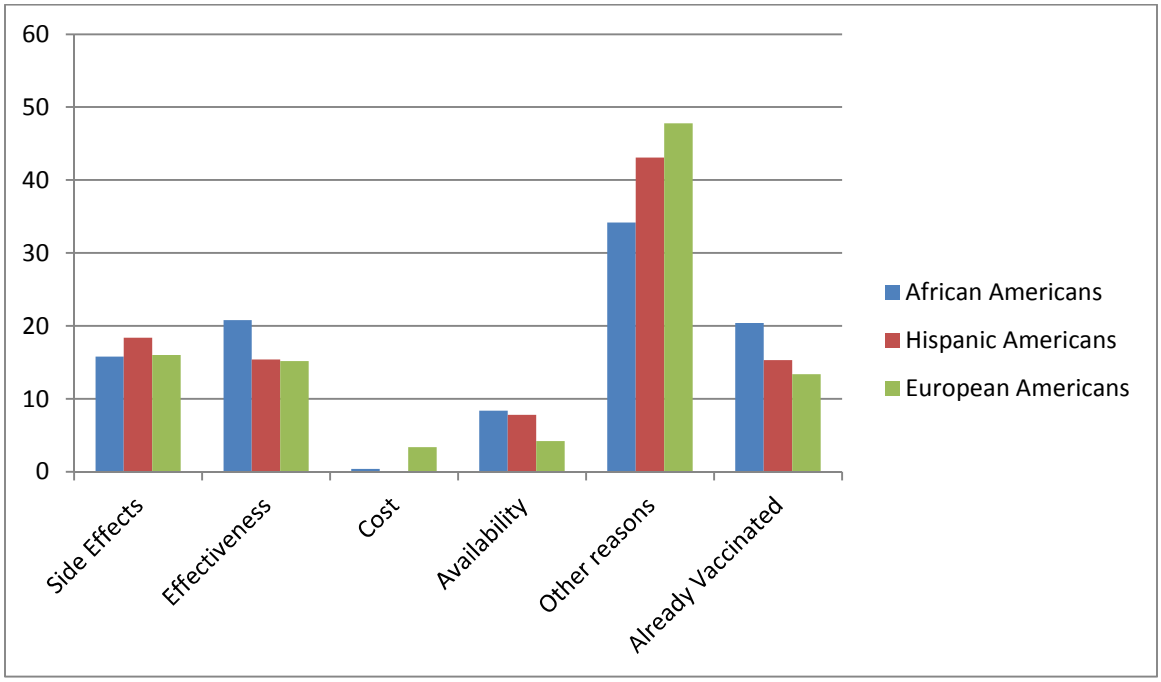


Figure 3. Reasons for Not Getting Seasonal Flu Vaccine, 2009 NHFS

Multivariate Analyses

This study examined three research questions to determine whether personal beliefs and perceptions predict vaccination uptake among African American and Hispanic Americans compared to European Americans. To estimate the prevalence of vaccine uptake representative of the U.S. older adult population, the sampling weight was applied in the analyses. Each adult who completed the interview had a sampling weight called FLUWT. When FLUWT was applied, the sample weight incorporated the adjustments for unequal selection probabilities and for certain types of nonresponse demographic and socioeconomic variables. The corresponding hypotheses were tested using logistic regression models.

Research Questions and Hypotheses

1. Are there differences in personal beliefs and influenza vaccination uptake in older African American and Hispanic American adults compared to European Americans?

H_01: There are no differences in beliefs and influenza vaccination uptake in older African American and Hispanic American adults compared to European Americans.

H_a1: There are differences in beliefs and influenza vaccination uptake in older African American and Hispanic American adults compared to European Americans.

Logistic regression analysis was used to test hypothesis 1, whether there were differences in personal beliefs (independent variables) and influenza uptake (dependent variable), controlling for race and gender. The reference categories were male for gender and European Americans for race. Table 7 shows the logistic regression results including odds ratios and 95% confidence intervals. The control variables entered in the logistic regression were gender and race. Personal belief predictors were plans to get vaccinated next season, having seen a health professional in the last year and receiving vaccine recommendation from HP, and not worried at all about getting sick with the vaccine. The dependent variable was vaccination uptake.

The logistic regression analysis indicated that all three belief predictors, race and gender were statistically significant ($p = .0001$) in predicting vaccination uptake. Both minority groups, African Americans (OR=1.104) and Hispanic Americans (OR=1.111) were significantly more likely to be vaccinated compared to European Americans if they stated they were planning to get vaccinated next season. On the other hand, African

Americans (OR=0.855) and Hispanic Americans (OR=0.766) were less likely to get vaccinated compared to European Americans if they saw a health professional in the last year and the health professional recommended the flu or seasonal vaccine. African Americans (OR=0.697) and Hispanic Americans (OR=0.382) were less likely to get vaccinated compared to European Americans if they were not at all worried about getting sick with the flu vaccine. The logistic model was significant for research question 1 and the null hypothesis was rejected. There were differences in beliefs and influenza vaccination uptake in older African American and Hispanic American adults compared to European Americans.

Table 7

Perceived Belief Predictors of Vaccination Uptake, Adjusted for Gender and Race

	Plans to Get Vaccination Next Season			Saw HP Last Year and HP Recommended Vaccine			Not Worried at All about Getting Sick with the Flu Vaccine		
	p	OR	95 % CI	*p*	OR	95 % CI	*p*	OR	95 % CI
Gender									
Male									
Female	.0001	0.900	[0.899,0.902]	.0001	0.945	[0.993, 0.996]	.0001	0.975	[0.975, 0.978]
Race									
European American									
African American	.0001	1.104	[1.100,1.107]	.0001	0.855	[0.853, 0.857]	.0001	0.697	[0.697,0.700]
Hispanic American	.0001	1.111	[1.108,1.113]	.0001	0.766	[0.764, 0.769]	.0001	0.382	[0.381,0.384]

Note. Logistic Regression Analysis. HP = Health Professional; OR = Odds Ratio; CI = Confidence Interval

Research Question 2. Are there differences in perceptions and vaccination uptake in older African American and Hispanic American adults compared to European Americans?

H_02: There are no differences in perceptions and vaccination uptake in older African American and Hispanic American adults compared to European Americans?

H_a2: There are differences in perceptions and vaccination uptake older African American and Hispanic American adults compared to European Americans.

Logistic regression analysis was performed to test hypothesis 2, whether there were differences between perceptions of vaccine effectiveness (independent variable) and influenza uptake (dependent variable). Table 8 shows the logistic regression results including odds ratios and 95% confidence intervals. The analysis was controlled by gender and race. The logistic regression analysis indicated that perception of vaccine effectiveness (very/somewhat) predicted vaccine uptake ($p=.001$). Compared to European Americans, African Americans were less likely (OR=0.639) to get vaccinated if they perceived that the effectiveness of the flu vaccine was somewhat or very effective, but Hispanic Americans slightly more likely (OR=1.079). Based on the findings, the null hypothesis 2 was rejected; there were differences in perceptions of vaccine effectiveness and vaccine uptake in older adults for African Americans and Hispanic Americans compared to European Americans.

Table 8

Perceptions of Vaccine Effectiveness as Predictor of Vaccination Uptake in Older Adults

Variables in the Model	p-value	Odds Ratio	95% Confidence Interval
Female	0.0001	1.037	[1.025, 1.028]
African Americans	0.0001	0.639	[0.638, 0.641]
Hispanic Americans	0.0001	1.079	[1.075, 1.083]

Note. Logistic Regression Analysis. Vaccine effectiveness included those that said "very or somewhat effective"

Research Question 3. Are there differences in personal beliefs and perceptions of influenza vaccination uptake in older African American and Hispanic American adults compared to European Americans?

$H_0 3$: There are no differences in personal beliefs and perceptions of influenza vaccination uptake in older African American and Hispanic American adults compared to European Americans.

$H_a 3$: There are differences in personal beliefs and perceptions of influenza vaccination uptake in older African American and Hispanic American adults compared to European Americans.

Unadjusted and Adjusted Odds Ratios

It is noteworthy to discuss the differences between the unadjusted odds ratios for personal beliefs (Table 7) and perceptions in (Table 8) with the adjusted individual effects predicting vaccine uptake (Table 9) when controlling for all variables. The unadjusted odds for Hispanic Americans decreased after adjusting for race and gender for

personal belief to plan to get a vaccine next season (from OR=1.111 to OR=0.729), and also decreased for the odds of perceiving the flu vaccine as somewhat or very effective (from OR=1.079 to OR=0.727). The unadjusted odds for African Americans for plans to get vaccination next season also decreased as with Hispanic Americans (from OR=1.104 to OR=0.614), but did not change for personal belief of having a health professional recommend the vaccine in the last year.

The unadjusted odds ratios for personal belief of not worrying at all about getting sick with the vaccine decreased somewhat (OR=0.855) compared to the adjusted odds ratio (OR=0.659) for African Americans, as well as decrease in odds for plans to get a vaccination in the season (unadjusted OR=1.104 to adjusted OR=0.614). Odds ratios for Hispanic Americans had larger magnitude in increases after adjustment for not worrying at all about getting sick (OR=0.766 to OR=0.801), and much more for having a health professional recommend the vaccine in the last year (OR=0.382 to OR=0.801) compared to European Americans.

For hypothesis 3 logistic regression analysis was performed to test whether there were differences in vaccine uptake controlling for individual effects of gender, race, and both personal beliefs and perceptions of influenza uptake in older African Americans and Hispanic Americans compared to European Americans. The adjusted logistic regression analysis (Table 9) indicated that there were significant differences (p=.0001) in vaccine uptake between African Americans and Hispanic Americans compared to European Americans, controlling for all personal beliefs, perception of effectiveness, and gender. The null hypothesis 3 was rejected.

Table 9 shows the separate models representing variable combinations entered one at a time, and the odds ratios corresponding to each model and race. The difference in odds ratios for African Americans and Hispanic Americans represents the comparison to European Americans. For example, the race, gender model indicated that African American females had lower odds (OR=0.645) of getting the vaccine compared to males (p=.0001). Whereas Hispanic American females had lower odds (OR=0.758) compared to their male counterparts but not as low as African Americans.

The differences in odds ratios between African Americans and Hispanic Americans compared to European Americans for the four personal beliefs varied in magnitude. Adjusted effects of for those who planned to get vaccinated next season indicated a negative difference in odds ratios between both African Americans (-0.031) and Hispanic Americans (-0.029). The adjusted effects for not worrying at all about getting sick with the vaccine indicated a positive difference in the odds ratio among African Americans (0.014) and a higher positive difference for Hispanic Americans (0.043). The adjusted effects for having a health professional recommend the vaccine in the last year also indicated a positive difference in odds ratio among African Americans (0.010) and a higher positive difference for Hispanic Americans (0.043). The adjusted effects for perceiving the flu vaccine as somewhat or very effective indicated a positive difference in the odds ratio among African Americans (0.054) but a negative difference in the odds ratio for Hispanic Americans (-0.031).

Table 9

Individual Effects of Personal Beliefs and Perceptions Predicting Vaccine Uptake

	African American			Hispanic American		
Variables included in the model	*p*	OR	Difference in OR (Compared to reference category)	*p*	OR	Difference in OR (Compared to reference category)
Race, Gender (compared to reference category)	.0001	0.645		.0001	0.758	
Race, Gender, Plan to get vaccination next season	.0001	0.614	-0.031	.0001	0.729	-0.029
Race, Gender, Not at all worried about getting sick with the vaccine	.0001	0.659	0.014	.0001	0.801	0.043
Race, Gender, Has seen HP last year and HP recommended vaccine	.0001	0.655	0.010	.0001	0.801	0.043
Race, Gender, Perceived flu vaccine is somewhat/very effective	.0001	0.699	0.054	.0001	0.727	-0.031

Note. Logistic Regression Analysis; HP = Health Professional, OR = Odds Ratio

Figure 4 illustrates the negative and positive magnitude calculating odds ratio differences in personal beliefs and perception between African Americans and Hispanic Americans compared to European Americans. Both African Americans and Hispanic Americans were less likely to receive vaccination this season if they had mentioned plans to get vaccinated next season compared to European Americans. A negative odds ratio difference decreased -0.029 indicates that Hispanic Americans were slightly less likely than European Americans to vaccinate this season even if they stated they planned to get vaccinated next season. African Americans had minimal differences compared to

European Americans to vaccinate this season if they were not worried at all about getting sick from the vaccine and getting vaccine recommendation from their health provider in the last year. On the other hand Hispanic Americans were more likely to vaccinate this season if their odds ratio differences were 0.043 higher compared to European Americans for these two beliefs. However, the perception that the vaccine was somewhat or very effective influenced African Americans and Hispanic Americans in an opposite manner; African Americans were more likely than European Americans (odds ratio difference=0.052) and Hispanic Americans were less likely (odds ratio difference=-0.031).

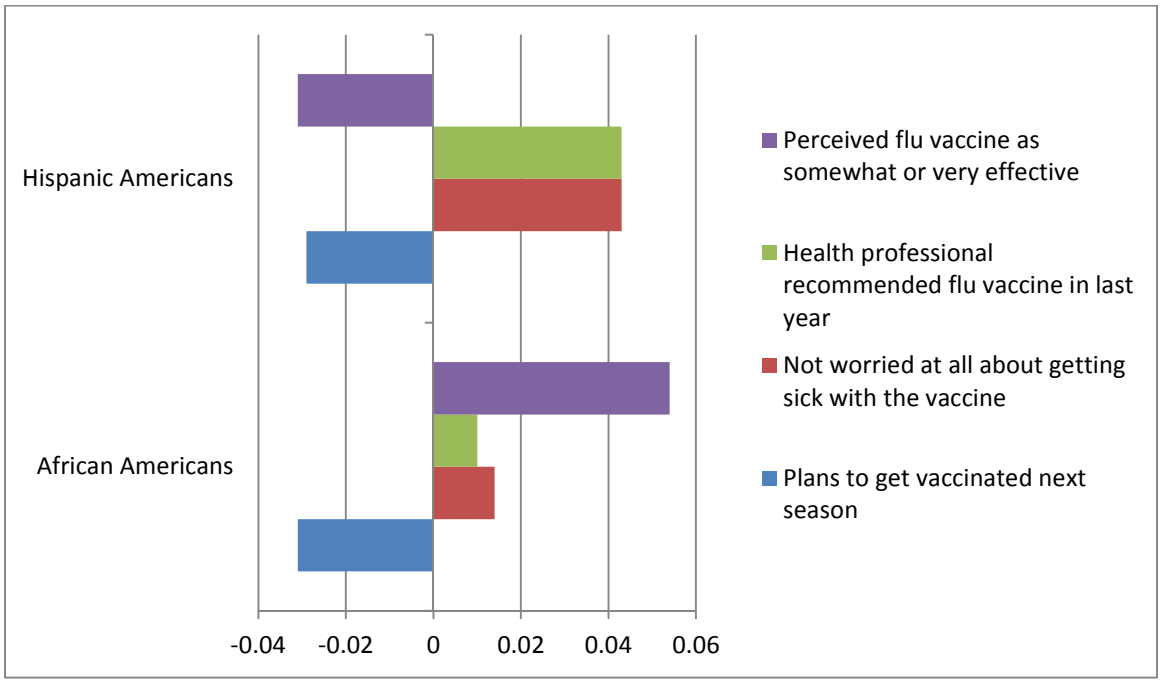


Figure 4. Odds Ratio Differences for Personal Beliefs and Perception between African and Hispanic Americans compared to European Americans. Odds difference value ranged from Low = 0.1 to High = 0.5.

Summary and Transition

The overall results indicated that there were differences in personal beliefs and perceptions of influenza vaccination uptake in older African American and Hispanic American adults compared to European Americans. The results from logistic regression indicate that all three null hypotheses were rejected. The study used logistic regression models to predict dependent variables using predisposing variables utilized in the study. Chapter 5 includes the summary of results, social implications of the study and recommendations for future research.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The purpose of this study was to examine the differences between older adult African American and Hispanic Americans compared to European Americans in their personal beliefs and perceptions of influenza vaccination uptake and how these perceptions and beliefs influence vaccination uptake among these groups. Logistic regression predicted vaccination uptake. This chapter includes interpretation of findings, implications for social change, study limitations and recommendations for future research. Chapter 5 concludes with summary and discussion on how to increase influenza vaccination uptake in older adults 65 and older, which may result in increasing positive social change. Each research question is explained further in this chapter along with the hypotheses and interpretation of findings.

Summary of Findings

First research question examined whether there were differences in personal beliefs and influenza vaccination uptake in older African American and Hispanic American adults compared to European Americans. Results from hypothesis 1 suggested that null hypothesis was rejected and all three belief predictors, race and gender were statistically significant ($p = .0001$) in predicting vaccination uptake. There were differences in beliefs and influenza vaccination uptake in older African American and Hispanic American adults compared to European Americans.

Second research question sought to determine whether there were differences in perceptions and vaccination uptake in older African American and Hispanic American

adults compared to European Americans. The logistic regression analysis indicated that perception of vaccine effectiveness (very/somewhat) predicted vaccine uptake (*p=.0001)*. The findings from logistic model for this study were significant and the null hypothesis was rejected for hypothesis 2. There were differences in perceptions and vaccination uptake in older African American and Hispanic American adults compared to European Americans.

The third and last research question determined whether there were differences in both personal beliefs and perceptions of influenza vaccination uptake in older African American and Hispanic American adults compared to European Americans. The results for this research question indicated that all belief and perception variables were significant and null hypothesis was rejected. There were differences in personal beliefs and perceptions of vaccination uptake in older African American and Hispanic American adults compared to European Americans.

Interpretation of Findings

Vaccination is the most effective public health action to prevent may infectious diseases in older adult populations. Vaccination rates in the United States among older adults who were 65 and older were consistent below the national target (CDC, 2012). Data from this study indicated that all three-race groups were still below the 90% national goal of Healthy People 2020 for adults aged 65 and older. However, prevalence of vaccination uptake among African Americans and Hispanic Americans was lower than European Americans. In this study, 59 % of African Americans and 62 % of Hispanics reported being vaccinated in the past flu season compared to 69 % of European

Americans. Similar results were reported by Chen et al. (2007); 46% of African Americans, 44 % of Hispanic Americans received the seasonal vaccine in comparison to 71% of European American respondents.

Research Question 1 examined whether there were differences between personal beliefs and influenza vaccination uptake in older African Americans and Hispanic American adults compared to European Americans. All the personal beliefs significantly predicted influenza vaccination uptake. Compared to European Americans, African Americans and Hispanic Americans were slightly more likely to vaccination uptake if they planned to get vaccinated next season. A study by Chen et al. (2007) has indicated that the need to educate patients and health care professionals with awareness, educational campaigns to reduce potential barriers to vaccination and increase positive vaccination uptake decisions. Educational attainment has also been associated with beliefs about vaccination behavior (Wooten et al., 2012). Wooten et al. (2012) identified that vaccination uptake was lower in older African American and Hispanic American adults who had lower education levels and had a differing beliefs and attitudes of influenza vaccination uptake.

In this study, African Americans and Hispanic Americans were significantly less likely to vaccinate if they saw their provider at least once last year and if their provider recommended the vaccination compared to European Americans. A study conducted by Coe et al. (2012) indicated that participants were more likely to vaccinate if physicians, pharmacist or nurses recommended vaccination. Findings by Chen et al. (2012) indicated that Hispanics reported the primary reasons for not being vaccinated included cost, lack

of insurance, no transportation, no health care provider, and not knowing where to go. In this study, African Americans and Hispanic Americans were significantly less likely to vaccinate if they were not at all worried about getting sick with the vaccination compared to European Americans. Findings by Chen et al. (2012) indicated that nearly half of African Americans and Hispanic Americans were more likely to report not being at all concerned about getting influenza vaccine compared to European Americans. The results are supported by findings from Chen et al. (2012) which indicated that African Americans who believed that the flu vaccine caused disease or serious side effects were less likely to vaccinate compared to European Americans. Health insurance status and cost barrier had been the most significant perceived barrier among Hispanic Americans who vaccinated compared to European Americans (Chen et al., 2012).

Research Question 2 examined whether there were differences between personal perceptions and influenza vaccination uptake in older African Americans and Hispanic American adults in comparison to European Americans. Results in this study have indicated that African Americans were less likely to vaccinate if they perceived that the vaccine was somewhat or very effective in preventing the influenza infection compared to European Americans. In a previous study, Cheney and John (2013) has indicated that African Americans had strong concerns about influenza vaccination due to lack of trust in government institutions, medical research industries or health providers stemming from discrimination in the U.S. healthcare system and this caused lack of trust among African Americans. African Americans were also concerned that if they had received vaccination they were at a higher risk of contracting the influenza infection. African Americans were

slightly more concerned about the effectiveness of the vaccine (Chen et al., 2012). On the other hand, Hispanic Americans in this study perceived that the flu vaccine was effective and was safe in preventing the influenza infection and were likelihood of vaccination about the same as European Americans. A previous study by Wooten et al. (2012) specified that African Americans and Hispanic Americans believed that influenza vaccine was not effective and believed that people can get the influenza infection from a flu vaccine compared to its counterpart European Americans. Another previous study by Chen et al. (2012) Hispanic Americans believed that influenza vaccine caused flu, had side effects, and was not effective in preventing the flu.

Finally, results associated with Research Question 3 suggested that both the belief and perception variables were predictors of influenza vaccination uptake and were statistically significant ($p < .0001$) when adjusting for both variables in the logistic model. African Americans were less likely to vaccinate even if they perceived the vaccine to be effective or safe compared to European Americans. A study by Chen et al (2007) indicated that African Americans were concerned that influenza vaccine would cause disease and serious side effects. Compared to European Americans, Hispanic Americans were more likely to vaccinate when they stated they were not at all worried about getting sick with the seasonal flu vaccine, or their health professional recommended the vaccine in the last year. A study conducted by Komaromy et al. (1996) reported that African Americans and Hispanic Americans from socioeconomically disadvantaged and low level of education, and those uninsured were worst off in obtaining access to care or health care provider and likely to vaccinate. A study conducted by Lillie-Blanton and Hoffman

(2005) indicated three-fourths of African Americans and Hispanic Americans who were not vaccinated did not have insurance and had income below 200 percent of the federal poverty level in comparison to uninsured European Americans.

The health belief model was the theoretical framework in this study to examine the personal beliefs and perceptions of African Americans and Hispanic Americans health behavior towards vaccine uptake. According to the health belief model, individuals are inclined to engage in constructive, healthy behavior when they choose to assume that they can reduce the risk that is likely to cause serious adverse complications. Applying the health belief model as shown in Figure 5, perceived severity, perceived benefits, and cues to action were the most important predictors of vaccination uptake in this study. African Americans were less likely to perceive that the flu vaccine was somewhat or very effective and more likely to vaccinate compared to European Americans. Hispanic Americans were less likely to vaccinate if they did not worry at all about getting sick with the vaccine, and more likely to vaccinate if their health professional recommended vaccination in the last year, compared to European Americans. The external cues to action for vaccinated participants was that they recognized their vaccination was motivated through interpersonal influences such as family, peers, neighbors, doctors, and nurses (Kwong et al., 2010). The health belief model helped determine why there may have been low levels of vaccination rates and why this has been a persistent gap between the older minority groups. The health belief model can be useful in explaining health behaviors, predicting underlying vaccination behavior in older African Americans and Hispanic American adults. The health belief model provided an adequate framework for

public and health care professionals.

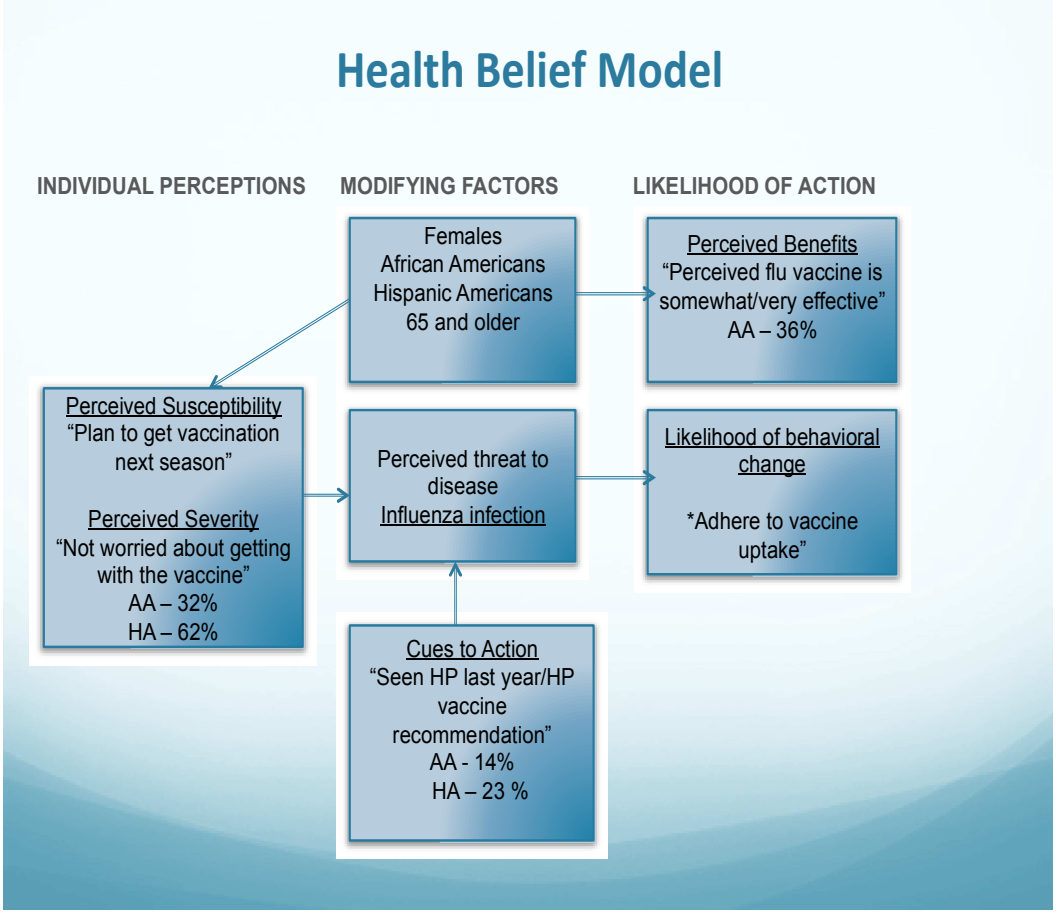


Figure 5. Health Belief Model predicting vaccination behavior between African and Hispanic Americans compared to European Americans. AA= African American, HA = Hispanic American

Limitations of the Study

The following limitations were considered in this study because data were compiled from secondary data analysis. Confirmation and validation of self-reported data were not verified against respondents' medical records, or with their vaccination records. Since respondents' medical charts did not confirm the results of this study, this would have caused confusion in respondents' answers if they had received the vaccination in the

past (Santibanez et al., 2012). The self-report of influenza vaccination was susceptible to recall bias and had relatively small variation rates in different surveys (Pearson et al., 2011). The survey also did not collect information about whether the respondents received the vaccination at the time they saw their doctor or health professional about their health. Thus, it is unknown if their health care professional or doctor offered the vaccination at the physician's office or if the respondent refused to get the vaccination at the time of the visit. The use of archival data poses additional barriers. Because respondents self-reported their vaccination status, it may not always be accurate and is subject to recall bias. Another limitation to consider would be not finding the correct questions to measure the variables. This study is cross-sectional, and the Spanish language preference decreased receipt of influenza vaccination (Pearson et al., 2011). Interviews were conducted in English and Spanish, and the respondents' accuracy of responses was subject to bias. Language preference was measured through respondent's choice of taking the survey in Spanish or English, and studies have shown that language preference was associated with adverse health outcomes (Pearson et al., 2011).

Recommendations for Future Research

Based on data collected in 2009-2010, the study indicated that the vaccination rate among older Americans (67.4%) was below the target for Healthy People 2020, which is to increase influenza vaccination to 90% among adults 65 and older. To determine why older African American and Hispanic American have not met vaccination guidelines, more studies are needed to understand this concern. Furthermore, health belief model constructs within this study may provide a better understanding of vaccination decisions

between older African American and Hispanic American adults. Future research is needed to understand the cultural sensitivities of African Americans and Hispanic Americans concerning beliefs and perceptions of vaccination uptake in general.

In an attempt to improve vaccination uptake in older African American and Hispanic American adults, it is recommended that mediation should be developed and implemented in the public health sector. More strategic guidelines are needed for each group to increase vaccination rates. Health professional should record immunization needs in patient assessment notes. Educating patients with language-appropriate vaccination recommendations should be considered for patients who have limited English fluency. Patients registering in immunization registries for reminder calls would benefit and increase vaccination uptake. Implementation of immunization education and training to patients will increase vaccination uptake. Insurers and the entities that cover immunization services should assure and remind timely immunization information will increase vaccination uptake in older adults (National Vaccine Advisory Committee, 2014).

Social Change

Healthy People 2020 goals for influenza vaccination are to increase 90% of influenza vaccination uptake among adults 65 and older. The World Health Organization (WHO) estimated 5% -10% of adults and 20% - 30% of children have influenza infections, resulting in 3 to 5 million cases of illness and 250,000 – 500,000 deaths. This study may increase knowledge and strategies of influenza vaccination uptake and decrease its barriers and preventable diseases. Implementing suggestions from this study

can promote positive social change in the healthcare sector and include expansion of programs and development of effective strategies for increasing vaccination rates in minority groups. Moreover, this allows for choosing positive health behaviors and thereby potentially decreasing morbidity and mortality in these subsets of the U.S. population. The results from this study may contribute to the understanding of why there have been lower vaccination rates in African American and Hispanic American adults who are 65 and older. The implications of positive social change were to provide a better understanding of the possible barriers that influence African and Hispanic Americans older adults in receiving the flu vaccination. Furthermore, how public health providers can increase positive beliefs and increase knowledge in regards to increasing vaccination uptake. This understanding can thus decrease the risk of infections, mortality, and morbidity in older African American and Hispanic American adults. This study will contribute to Walden's social change, and this study will promote positive social change and impact in the community. The study results will be disseminated in peer-reviewed journals.

Conclusion

Influenza has caused unnecessary hospitalizations and deaths in the United States among older adults and vaccination uptake among older African American and Hispanic American adults remains consistently low. Although the Healthy People 2020 goal to increase influenza vaccination among older adults to 90% was not met vaccination improved the health of elderly minorities and decreased health disparities.

The purpose of this study was to examine the differences between beliefs and perceptions of influenza vaccination uptake among African American and Hispanic American adults 65 years and older and to fill the gap in the literature. The HBM guided the study where perceived susceptibility (plans to get vaccine next season), perceived severity (worried about getting sick with vaccine), perceived benefits (effectiveness of vaccine), and cues to action (health professional recommended vaccine in past year) significantly predicted vaccine uptake among African and Hispanic Americans compared to European Americans. This study identified that while perceived severity and cues to action positive influenced vaccination uptake, the role of perceived susceptibility (plans to get vaccine next season) was less effective in increasing vaccination among both groups, and an opposite prediction was seen for perceived benefit (vaccine effectiveness) among Hispanic and African Americans. Beliefs and perceptions were predictors of vaccination uptake, and these results may clarify perceptions and increase positive interventions to increase vaccination uptake in older African American and Hispanic American population. While both personal beliefs and perceptions were significantly associated with vaccine uptake, the magnitude and direction of the adjusted odds ratios varied by specific belief and by racial/ethnic group. Implementing recommendations from this study can promote positive social increase vaccination rates in older minority groups 65 and older.

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Appendix A: National 2009 H1N1 Flu Survey (NHFS)

Influenza Vaccination - Adult

Ask HQ2_INTRO through HQ8A if H1N1 vaccine is released [H1N1 FLAG=1].

HQ2_INTRO. **IF HFLUOVER or FLUOVER flag=1, then display:** During the past flu season, there were two kinds of flu vaccines available, the seasonal flu vaccine, and the 2009-H1N1 flu vaccine. I will first ask you questions about the vaccine for H1N1 flu, which is sometimes called swine flu or pandemic flu, and then ask you questions about the seasonal flu.

Else display: There are currently two kinds of flu vaccines available, the seasonal flu vaccine, and the 2009-H1N1 flu vaccine. I will first ask you questions about the vaccine for H1N1 flu, which is sometimes called swine flu or pandemic flu, and then ask you questions about the seasonal flu.

HQ1. You may have gotten a shot card for the H1N1 and seasonal flu vaccinations. Have you received this shot card?
READ IF NECESSARY: A shot card is a piece of paper used to record vaccination dates and types. The shot card we are asking about is produced by the CDC and is sometimes handed out at places where people receive flu vaccinations.

(1) YES
(2) NO **[SKIP TO HQ2]**
(77) DON'T KNOW **[SKIP TO HQ2]**
(99) REFUSED **[SKIP TO HQ2]**

CARD. The next few questions will be about flu vaccinations. Since some of the vaccinations are difficult to remember it would be helpful if you could refer to your shot card.
READ IF NECESSARY: I'll be happy to wait while you go and get it.
(1) R GETS SHOT CARD
(2) R DOES NOT GET SHOT CARD/CAN'T LOCATE SHOT CARD

HQ2. Since September 2009, have you had an H1N1 flu vaccination? There are two types of H1N1 flu vaccinations. One is a shot and the other is a spray, mist or drop in the nose.

(1) YES
(2) NO **[SKIP TO HQ7_INT]**
(77) DON'T KNOW **[SKIP TO HQ7_INT]**
(99) REFUSED **[SKIP TO HQ7_INT]**

HQ2_A. How many H1N1 vaccination doses have you received?

(1) 1 VACCINATION OR DOSE
(2) 2 OR MORE VACCINATION DOSES
(77) DON'T KNOW **[SKIP TO HQ5]**
(99) REFUSED **[SKIP TO HQ5]**

HQ2_B1_M. During what month did you receive [your/your first] H1N1 flu vaccine?

_ _ [enter month]
(77/7777) DON'T KNOW
(99/9999) REFUSED

HQ2_B1_C. That was [FILL IN MONTH] of [FILL IN YEAR], correct?

(1) YES
(2) NO **[SKIP TO HQ2_B1]**

If HQ2_B1_M=CURRENT MONTH, then ask HQ2_B1_D, else skip to HQ2_TYPE1.

HQ2_B1_D. On what day of the month did you receive [your/your first] H1N1 flu vaccine?

IF RESPONDENT SAYS DON'T KNOW SAY: I understand you might not know the exact date, but I'm required to enter a number. Can you give me a best guess?

_ _ [enter day] [RESTRICTED TO BETWEEN 1 AND CURRENT DAY]
(77) DON'T KNOW
(99) REFUSED

HQ2_TYPE1. Was this a shot or the spray in the nose?
(1) FLU SHOT
(2) FLU NASAL SPRAY
(77) DON'T KNOW
(99) REFUSED

If HQ2_A = 2, then ask HQ2_B2.

HQ2_B2_M. During what month did you receive your second H1N1 flu vaccine?

_ __ [enter month]
(77/7777) DON'T KNOW
(99/9999) REFUSED

HQ2_B2_C. That was [FILL IN MONTH] of [FILL IN YEAR], correct?

(1) YES
(2) NO **[SKIP TO HQ2_B2]**

If HQ2_B2_M=CURRENT MONTH, then ask HQ2_B2_D, else skip to HQ2_TYPE2.

HQ2_B2_D. On what day of the month did you receive your second H1N1 flu vaccine?

IF RESPONDENT SAYS DON'T KNOW SAY: I understand you might not know the exact date, but I'm required to enter a number. Can you give me a best guess?

_ _ [enter day] [RESTRICTED TO BETWEEN 1 AND CURRENT DAY]
(77) DON'T KNOW
(99) REFUSED

HQ2_TYPE2. Was this a shot or the spray in the nose?

(1) FLU SHOT
(2) FLU NASAL SPRAY
(77) DON'T KNOW
(99) REFUSED

HQ5. At what kind of place did you get your most recent H1N1 flu vaccination?
[READ ONLY IF NECESSARY]

(1) DOCTOR'S OFFICE	**[SKIP TO Q2_INTRO]**
(2) HEALTH DEPARTMENT	**[SKIP TO Q2_INTRO]**
(3) CLINIC OR HEALTH CENTER	**[SKIP TO Q2_INTRO]**
(4) HOSPITAL	**[SKIP TO Q2_INTRO]**
(5) OTHER MEDICALLY-RELATED PLACE	**[SKIP TO Q2_INTRO]**
(6) PHARMACY OR DRUG STORE	**[SKIP TO Q2_INTRO]**
(7) WORKPLACE	**[SKIP TO Q2_INTRO]**
(8) ELEMENTARY/MIDDLE/HIGH SCHOOL	**[SKIP TO Q2_INTRO]**
(9) OTHER NONMEDICALLY-RELATED PLACE	**[CONTINUE TO Q5_OTH]**
(77) DON'T KNOW	**[SKIP TO Q2_INTRO]**
(99) REFUSED	**[SKIP TO Q2_INTRO]**

HQ5_OTH. [BACK CODE ALL VERBATIM ANSWERS]
[SPECIFY]:_____
[SKIP TO Q2_INTRO]

If HFLUOVER flag=1, skip HQ7_INT and continue to HQ10
HQ7_INT. How likely are you to get a H1N1 flu vaccination between now and the end of June? Would you say you:

(1) will definitely get one
(2) will probably get one
(3) will probably not get one
(4) or, will definitely not get one
(77) DON'T KNOW
(99) REFUSED

HQ10. **If HFLUOVER flag=0 display:** There are many reasons why people don't get flu vaccinations. What is the main reason you [will not get/will probably not get/have not yet gotten] an H1N1 flu vaccination this flu season?
If HFLUOVER flag=1 display: There are many reasons why people don't get flu vaccinations. What is the main reason you did not get an H1N1 flu vaccination this past flu season?

[INTERVIEWER INSTRUCTION: IF MORE THAN ONE MENTION, PROBE 'WHAT IS THE MAIN REASON?']
[INTERVIEWER INSTRUCTION: IF 'I NEVER GET ONE', PROBE FOR MORE DETAIL]

(1) CONCERNS ABOUT SIDE EFFECTS OR SICKNESS	**[SKIP TO Q2_INTRO]**
(2) THINK VACCINES DO NOT WORK	**[SKIP TO Q2_INTRO]**
(3) VACCINATION IS NOT NEEDED	**[SKIP TO Q2_INTRO]**
(4) ALLERGIC TO THE VACCINE	**[SKIP TO Q2_INTRO]**
(5) COSTS TOO MUCH TO GET THE VACCINE	**[SKIP TO Q2_INTRO]**
(6) BECAUSE I ALREADY HAD H1N1 FLU	**[SKIP TO Q2_INTRO]**
(7) VACCINE NOT AVAILABLE	**[SKIP TO Q2_INTRO]**
(8) TRIED TO GET IT BUT COULDN'T	**[SKIP TO Q2_INTRO]**
(9) DON'T KNOW WHERE TO GO/WHO TO CALL	**[SKIP TO Q2_INTRO]**
(10) HAVEN'T GOTTEN TO IT YET/NO TIME	**[SKIP TO Q2_INTRO]**
(11) NOT IN A PRIORITY GROUP	**[SKIP TO Q2_INTRO]**
(12) SOME OTHER REASON	**[CONTINUE TO HQ10_OTH]**
(77) DON'T KNOW	**[SKIP TO Q2_INTRO]**
(99) REFUSED	**[SKIP TO Q2_INTRO]**

HQ10_OTH. [SPECIFY]:_____

Q2_INTRO. Now I'm going to ask you about the seasonal flu vaccine. This is the vaccine that is available every year around September for the flu season.

Q2. Since August 2009, have you had a seasonal flu vaccination? There are two types of seasonal flu vaccinations. One is a shot and the other is a spray, mist or drop in the nose.

(1) YES	
(2) NO	**[SKIP TO Q7_INT]**
(77) DON'T KNOW	**[SKIP TO Q7_INT]**
(99) REFUSED	**[SKIP TO Q7_INT]**

Q2_B_M. During what month did you receive your most recent seasonal flu vaccine?

_ _ [enter month]
(77/7777) DON'T KNOW
(99/9999) REFUSED

Q2_B_C. That was [FILL IN MONTH] of [FILL IN YEAR], correct?

(1) YES	
(2) NO	**[SKIP TO Q2_B]**

If Q2_B_M=CURRENT MONTH, then ask Q2_B_D, else skip to Q3.

Q2_B_D. On what day of the month did you receive most recent seasonal flu vaccine?
IF RESPONDENT SAYS DON'T KNOW SAY: I understand you might not know the exact date, but I'm required to enter a number. Can you give me a best guess?

_ _ [enter day] [RESTRICTED TO BETWEEN 1 AND CURRENT DAY]
(77) DON'T KNOW
(99) REFUSED

Q3. Was your most recent seasonal flu vaccine a shot, or the spray in the nose? The seasonal flu vaccine can be given either as a shot or a nasal spray, also called "FluMist®".

(1) SHOT
(2) SPRAY
(77) DON'T KNOW
(99) REFUSED

Q5. At what kind of place did you get your most recent seasonal flu [vaccination]?
[READ ONLY IF NECESSARY]

(1) DOCTOR'S OFFICE	**[SKIP TO CARD_2]**
(2) HEALTH DEPARTMENT	**[SKIP TO CARD_2]**
(3) CLINIC OR HEALTH CENTER	**[SKIP TO CARD_2]**
(4) HOSPITAL	**[SKIP TO CARD_2]**
(5) OTHER MEDICALLY-RELATED PLACE	**[SKIP TO CARD_2]**
(6) PHARMACY OR DRUG STORE	**[SKIP TO CARD_2]**
(7) WORKPLACE	**[SKIP TO CARD_2]**
(8)ELEMENTARY/MIDDLE/HIGH SCHOOL	**[SKIP TO CARD_2]**
(9) OTHER NONMEDICALLY-RELATED PLACE	**[CONTINUE TO Q5_OTH]**
(77) DON'T KNOW	**[SKIP TO CARD_2]**
(99) REFUSED	**[SKIP TO CARD_2]**

Q5_OTH. [BACK CODE ALL VERBATIM ANSWERS]
[SPECIFY]:_____
[SKIP TO CARD_2]

Ask CARD_2 if HQ1=1 AND HQ2=1 AND Q2=1, else SKIP CARD_2 and go to HQ8.

CARD_2. Earlier you mentioned having a shot card for your flu vaccinations. Did you get this card after getting a seasonal flu vaccine, an H1N1 flu vaccine, or both?"

(1) SEASONAL	**[SKIP TO Q9]**
(2) H1N1	**[SKIP TO Q9]**
(3) BOTH	**[SKIP TO Q9]**
(77) DON'T KNOW	**[SKIP TO Q9]**
(99) REFUSED	**[SKIP TO Q9]**

If FLUOVER flag=1, skip Q7_INT and continue to Q10

Q7_INT. How likely are you to get a seasonal flu vaccination between now and the end of June? Would you say you:

(1) will definitely get one
(2) will probably get one
(3) will probably not get one
(4) or, will definitely not get one
(77) DON'T KNOW
(99) REFUSED

Q10. **If FLUOVER flag=0 display:** There are many reasons why people don't get flu vaccinations. What is the main reason you [will not get/will probably not get/have not yet gotten] a seasonal flu vaccination this flu season?
If FLUOVER flag=1 display: There are many reasons why people don't get flu vaccinations. What is the main reason you did not get a seasonal flu vaccination this past flu season?

[INTERVIEWER INSTRUCTION: IF MORE THAN ONE MENTION, PROBE 'WHAT IS THE MAIN REASON?']
[INTERVIEWER INSTRUCTION: IF 'I NEVER GET ONE', PROBE FOR MORE DETAIL]

(1) CONCERNS ABOUT SIDE EFFECTS OR SICKNESS	**[SKIP TO Q9]**
(2) THINK VACCINES DO NOT WORK	**[SKIP TO Q9]**
(3) VACCINATION IS NOT NEEDED	**[SKIP TO Q9]**
(4) ALLERGIC TO THE VACCINE	**[SKIP TO Q9]**
(5) THE VACCINE COSTS TOO MUCH	**[SKIP TO Q9]**
(6) VACCINE NOT AVAILABLE	**[SKIP TO Q9]**
(7) TRIED TO GET IT BUT COULDN'T	**[SKIP TO Q9]**
(8) HAVEN'T GOTTEN TO IT YET/NO TIME	**[SKIP TO Q9]**
(9) DON'T KNOW WHERE TO GO/WHO TO CALL	**[SKIP TO Q9]**
(10) SOME OTHER REASON	**[CONTINUE TO Q10_OTH]**
(77) DON'T KNOW	**[SKIP TO Q9]**
(99) REFUSED	**[SKIP TO Q9]**

Q10_OTH. [SPECIFY]:_____

Q9. Since this past August, 2009, have you seen a doctor or other health professional about your own health at a doctor's office, hospital, clinic, or some other place?

(1) YES	**[CONTINUE TO Q9_NUM]**
(2) NO	**[SKIP TO HQ8]**
(77) DON'T KNOW	**[SKIP TO HQ8]**
(99) REFUSED	**[SKIP TO HQ8]**

Q9_NUM. How many times did you see a doctor or other health professional about your own health since August 2009?
[ENTER NUMBER]_____

IF H1N1 flag=1, then ask HQ8, else ask HQ8_1.

HQ8. Since August 2009, did your doctor or other health professional personally recommend that you get an H1N1 flu vaccination or a seasonal flu vaccination?

[INTERVIEWER INSTRUCTION: POSTED SIGNS, NEWSLETTERS, PAMPHLETS, OR TELEVISION AND RADIO ADS SHOULD NOT BE CONSIDERED A RECOMMENDATION]
[INTERVIEWER INSTUCTION: IF R SAYS "YES" PROBE TO FIND OUT WHICH VACCINES WERE RECOMMENDED]

(1) H1N1 flu vaccination
(2) Seasonal flu vaccination
(3) Both vaccinations
(4) Neither vaccination
(77) DON'T KNOW
(99) REFUSED

Ask HQ8_1 if H1N1 vaccine is not released [H1N1 FLAG=0].

HQ8_1. Since August 2009, did your doctor or other health professional personally recommend that you get a seasonal flu vaccination?
[INTERVIEWER INSTRUCTION: POSTED SIGNS, NEWSLETTERS, PAMPHLETS, OR TELEVISION AND RADIO ADS SHOULD NOT BE CONSIDERED A RECOMMENDATION]

(1) YES
(2) NO
(77) DON'T KNOW
(99) REFUSED

NEXTFLU. Please think ahead to the upcoming flu season, that is, the flu season that will begin in the fall of 2010. How likely are you to get a flu vaccination during the upcoming flu season? Would you say you:

(1) will definitely get one
(2) will probably get one
(3) will probably not get one
(4) or, will definitely not get one
(77) DON'T KNOW
(99) REFUSED

PNEU_INTRO. The next few questions are about the pneumonia vaccination. A pneumonia shot is usually given only once or twice in an adult's life and protects against pneumonia. It is also called the pneumococcal vaccination. Have you ever had a pneumonia vaccination as an adult?

(1) YES	**[CONTINUE TO PNEU1]**
(2) NO	**[SKIP TO PAN12/HQ23]**
(77) DON'T KNOW	**[SKIP TO PAN12/HQ23]**
(99) REFUSED	**[SKIP TO PAN12/HQ23]**

PNEU1. How many of these pneumonia vaccinations have you received?

(1) 1 vaccination or dose
(2) 2 vaccination doses
(3) 3 or more vaccination doses
(77) DON'T KNOW
(99) REFUSED

PNEU2. How old were you when you received your most recent pneumonia vaccination?
____ YEARS **[CONTINUE TO PAN 12]**

If H1N1 IS NOT RELEASED [FLAG=0], then ask:

PAN12. Now I'm going to ask you your opinion about the H1N1 flu vaccine. When the H1N1 flu vaccine is available this fall, how likely would you be to get this vaccination? Would you say that you are very likely, somewhat likely, somewhat unlikely, or very unlikely to get this vaccination?

(1) VERY LIKELY	**[SKIP TO Q23]**
(2) SOMEWHAT LIKELY	**[SKIP TO Q23]**
(3) SOMEWHAT UNLIKELY	**[SKIP TO Q23]**
(4) VERY UNLIKELY	**[SKIP TO Q23]**
(77) DON'T KNOW	**[SKIP TO Q23]**
(99) REFUSED	**[SKIP TO Q23]**

If H1N1 is released [H1N1 FLAG=1], then ask HQ23, else skip to Q23.

HQ23. Now I'm going to ask you for your opinions about the H1N1 flu vaccine **[IF HFLUOVER flag=1, then display:** that was available this past flu season**]**. How effective do you think the H1N1 flu vaccination is in preventing the H1N1 flu? Would you say:

(1) Very effective,
(2) Somewhat effective,
(3) Not too effective
(4) Or, not at all effective?
(77) DON'T KNOW
(99) REFUSED

HQ24. IF HFLUOVER=0: If you [had not gotten/do not get] an H1N1 flu vaccination this fall or winter, what [would have been/are] your chances of getting sick with the H1N1 flu? Would you say:

(1) Very high,
(2) Somewhat high,
(3) Somewhat low,
(4) Or, very low?
(77) DON'T KNOW
(99) REFUSED

IF HFLUOVER=1 and HQ2=1: Before you got the H1N1 flu vaccination, did you think your chances of getting sick with the H1N1 flu were very high, somewhat high, somewhat low, or very low?

IF HFLUOVER=1 and HQ2=2, 77, 99: Earlier you told me that you did not get an H1N1 flu vaccination. Did you think your chances of getting sick with the H1N1 flu this past season were very high, somewhat high, somewhat low, or very low?

(1) VERY HIGH
(2) SOMEWHAT HIGH
(3) SOMEWHAT LOW
(4) VERY LOW
(5) ALREADY HAD H1N1 FLU
(77) DON'T KNOW
(99) REFUSED

HQ24_B. How worried [were/are] you about getting sick from the H1N1 flu vaccine? Would you say:

(1) Very worried,
(2) Somewhat worried,
(3) Not too worried,
(4) Or, not at all worried about getting sick from the flu vaccination?
(77) DON'T KNOW
(99) REFUSED

Q23. How effective do you think the seasonal flu vaccination [was/is] in preventing the seasonal flu? Would you say:

(1) Very effective,
(2) Somewhat effective,
(3) Not too effective
(4) Or, not at all effective?
(77) DON'T KNOW
(99) REFUSED

Q24. If FLUOVER=0: If you [had not gotten/do not get] a seasonal flu vaccination this fall or winter, what [would have been/are] your chances of getting sick with the seasonal flu? Would you say:

(1) Very high,
(2) Somewhat high,
(3) Somewhat low,
(4) Or, very low?
(77) DON'T KNOW
(99) REFUSED

IF FLUOVER=1 and Q2=1: Before you got the seasonal flu vaccination, did you think your chances of getting sick with the seasonal flu were very high, somewhat high, somewhat low, or very low?

IF FLUOVER=1 and Q2=2, 77, 99: Earlier you told me that you did not get a seasonal flu vaccination. Did you think your chances of getting sick with the seasonal flu this past season were very high, somewhat high, somewhat low, or very low?

(1) VERY HIGH
(2) SOMEWHAT HIGH
(3) SOMEWHAT LOW
(4) VERY LOW
(5) ALREADY HAD SEASONAL FLU
(77) DON'T KNOW
(99) REFUSED

Q24_B. How worried [were/are] you about getting sick from the seasonal flu vaccine? Would you say:

(1) Very worried,
(2) Somewhat worried,
(3) Not too worried,
(4) Or, not at all worried about getting sick from the flu vaccination?
(77) DON'T KNOW
(99) REFUSED

From "National 2009 H1N1 Flu Survey (NHFS): The Q2/2010 Questionnaire" by Centers for Disease Control and Prevention, National Center for Immunization and Respiratory Diseases, and National Center for Health Statistics, 2012. Retrieved from

ftp://ftp.cdc.gov/pub/Health_Statistics/NCHS/Dataset_Documentation/NIS/nhfs/nhfspuf_QUEX.PDF

Appendix B: Permission to include Health Belief Model Schematic

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