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Exploring Vaccination Hesitancy Among Nonmandated Nurses and Health Care Workers

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Abstract

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MPH, Southern New Hampshire University, 2018

BS, University of Cincinnati, 2015

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Public Health

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Abstract

COVID-19 vaccinations have been mandated for most healthcare professionals providing direct patient care, but there are a group of nonmandated healthcare professionals who have been hesitant to receive the vaccine. Given prolonged hesitancy among key health professionals charged with providing direct patient care, it is crucial to understand why they are hesitant; their apprehension may impact the pool of professionals available to provide direct patient care. This is a cross-sectional quantitative study that included an online survey. The health belief model served as the theoretical framework. The research questions addressed whether there is an association between type of patient care and COVID-19 vaccination intent among nonvaccinated health care professionals. The independent variables were the type of care provided, and the dependent variable was intent to receive the COVID-19 vaccine. Data was collected using Survey Monkey. Participants were recruited through Facebook, Instagram, LinkedIn, Amazon's M-Turk, and flyers that were distributed in the local community. A total of 385 participants completed the survey. Multivariable logistic regression showed there was not a statistically significant association between the type of patient care provided and intent to receive the COVID-19 vaccine, even when modified by professional practice degree, years of education, and race/ethnicity. The information revealed within this study has implications for positive social change by helping public health officials create initiatives that can improve COVID-19 vaccination uptake among nonmandated healthcare professionals.

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Dedication

First and foremost, I want to thank God for giving me the strength, guidance, and endurance to persevere throughout my doctoral journey, for through him, all things are possible. This manuscript is dedicated to my loving mother, Connie Nelson, and my two beautiful daughters, Mia and Holly Nelson. Thank you for all the love, understanding, and support that you showed me as I poured countless hours into my research, as well as my entire doctoral journey. To my beloved grandmother, Charity Irving, and loving father, Chester Nelson, I hope that you are in heaven rejoicing with me on this major accomplishment. I love and miss you both dearly.

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Chapter 1: Introduction to the Study

Background

Vaccines are one of the most effective public health interventions to prevent the spread of disease. In chapter one I discuss the ways that vaccines have been used throughout the years to reduce the spread of infectious disease and save lives. Chapter one also highlights the tremendous health burden that vaccine hesitancy places on communities, and especially among healthcare professionals.

According to Callender (2016), due to vaccines, countless lives have been saved and the occurrences of vaccine-preventable diseases are at a fraction of the rates seen before vaccines. After smallpox was eradicated in developed and undeveloped countries by vaccines, the success of smallpox and other scientifically validated vaccinations has been widely implemented in the United States (Callender, 2016). Despite the well-known facts about the efficacy of vaccines, there remains an alarming number of individuals who refuse vaccines for themselves and their children (Callender, 2016). This antivaccination sentiment is commonly referred to as vaccination hesitancy. Common reasons for vaccine hesitancy are safety concerns, cultural, social, and political factors, and general distrust in medicine (Callender, 2016). To increase the uptake of vaccines, especially the Coronavirus disease 2019 (COVID-19) vaccine, there is a need for public health officials to gain a better insight into the reasons why individuals, particularly healthcare workers, refuse vaccinations.

SARS-CoV-2 is the virus that causes the highly infectious COVID-19 and was discovered in Wuhan, China, in December 2019 (Centers for Disease Control and

Prevention [CDC], 2021). It spread worldwide and caused over 1.08 million deaths globally by October 2020 (Ruiz & Bell, 2021). COVID-19 is part of the coronavirus family, which includes many common viruses that cause chest and head colds as well as more severe illnesses like the Middle East Respiratory Syndrome (MERS) and severe acute respiratory syndrome (SARS; CDC, 2021). The coronavirus gets its name from corona, which means a crown, and they appear round with spike proteins covering them (CDC, 2021). COVID-19 is very contagious and is easily spread via droplets and aerosols from infected persons. According to the World Health Organization (WHO, 2021), COVID-19 can be spread from the mouth or nose of infected persons when they sneeze, speak, cough, breath, or sing. While vaccinations have been shown to be highly effective at reducing severe illness and death from COVID-19, vaccination hesitancy is a significant threat to preventing vaccine uptake and, ultimately, otherwise preventable illness and death (Razai et al., 2021).

Problem Statement

Vaccination hesitancy is a growing concern of public health officials, as it delays intervention strategies to prevent the spread of communicable diseases (Williamson & Glaab, 2018). Vaccinations are among the best strategies to combat infectious disease; thus, ensuring vaccination uptake is critical to intervention success, especially among those entrusted to care for sick healthcare professionals due to their increased exposure levels. Therefore, examining the reasons why some nonmandated healthcare professionals may be apprehensive about being vaccinated is an important issue that requires further investigation. The problem is that while COVID-19 vaccinations have

been mandated for most healthcare professionals providing direct patient care, there are a group of nonmandated healthcare professionals who have been hesitant to receive the vaccine. Understanding why they are hesitant is critical, given that prolonged hesitancy among key health professionals charged with providing direct patient care may impact the pool of professionals available to provide direct patient care. In this study, I examined the reasons why healthcare professionals may be hesitant to vaccinate against COVID-19. It remains unknown whether education, race, and professional practice location may be associated with vaccination hesitancy among this population. Persons who are not in nursing or another health profession were excluded from this study.

Purpose of the Study

The purpose of this quantitative, cross-sectional study was to investigate COVID-19 vaccine hesitancy among a group of nonmandated nurses and healthcare professionals charged with providing direct patient care. The main outcome variable was vaccine hesitancy, while the exposure of interest was direct or indirect patient care. The covariates used to build my model included the type of healthcare professional, years of education, location of practice, age of healthcare professional, and race/ethnicity of a healthcare professional. The questions used to build my online study were obtained from the CDC's COVID-19 online question bank (https://www.cdc.gov/vaccines/covid-19/vaccinate-with-confidence/rca-guide/downloads/CDC_RCA_Guide_2021_Tools_AppendixD_Surveys-508.pdf) to. The survey was used to collect data for my study. To examine my main research question, whether there is an association between COVID-19 vaccine hesitancy and type of patient

care, logistic regression was used to assess the primary effects association. Multivariable logistic regression was used to examine whether the main effects association was modified by the type of healthcare worker. Additionally, to control for the effects of confounding, covariates such as level of education, area of practice, and race/ethnicity were built into the model. The data points that were used in the study were COVID -19 vaccination intent (yes; yes, but plans to wait; no; not sure), practice location (private hospital, public hospital, clinic, private practice), education (less than hs, hs or equivalent, some college, bachelor's degree, professional practice degree), race (White, Black/African American, Asian, Other), Ethnicity (Hispanic, Non-Hispanic healthcare role (physician, nurse, nurse practitioner, pharmacist, other healthcare workers).

Research Questions and Hypotheses

RQ1: Is there an association between the type of nonmandated healthcare professional (direct/indirect patient care) and intent to receive COVID-19 vaccination? This question aligns with the health belief model construct of perceived susceptibility. The question seeks to answer if a person perceived a substantial risk of getting COVID-19, would it positively influence their decision to receive the COVID-19 vaccine?

$H_0 1$: There is no association between the type of nonmandated healthcare professional (direct/indirect patient care) and intent to receive COVID-19 vaccination.

H_{a1}: There is an association between the type of nonmandated healthcare professional (direct/indirect patient care) and intent to receive COVID-19 vaccination.

RO2: Is the association between type of nonmandated healthcare professional (direct/indirect patient care) and intent to receive the COVID-19 vaccination modified by healthcare practice degree (MD, RN, LPN)

$H_0 2$: The association between type of nonmandated healthcare professional (direct/indirect patient care) and intent to receive the COVID-19 vaccination is not modified by healthcare practice degree (MD, RN, LPN).

$H_a 2$: There is an association between the type of nonmandated healthcare professional (direct/indirect patient care) and intent to receive the COVID-19 vaccination is modified by healthcare practice degree (MD, RN, LPN).

RQ3: Is the association between type of nonmandated healthcare professional (direct/indirect patient care) and intent to receive the COVID-19 vaccination confounded by (a) practice location, (b) years of education, and (c) race/ethnicity?

$H_0 3$: The association between type of nonmandated healthcare professional (direct/indirect patient care) and intent to receive the COVID-19 vaccination is not confounded by (a) practice location, (b) years of education, and (c) race/ethnicity.

$H_a 3$: The association between type of nonmandated healthcare professional (direct/indirect patient care) and intent to receive the COVID-19 vaccination is confounded by (a) practice location, (b) years of education, and (c) race/ethnicity.

Theoretical Framework

The theory that grounded this study was the health belief model (HBM). Since its early use in the 1950s, the HBM has been modified to be more inclusive and incite interventions to improve health behaviors (Mercadante & Law, 2021). The HBM

theorists posited that individuals would act based on six constructs: (a) risk susceptibility, (b) risk severity, (c) benefits to action, (d) barriers to action, (e) self-efficacy, and (f) cues to action. Risk severity was determined by RQ1, whether direct/indirect patient care and the perceived risk will influence nonmandated nurses' and healthcare professionals' intentions to receive the COVID-19 vaccine. Benefits to action is the construct associated with RQ2. I sought to determine if having higher education, and advanced knowledge of medical interventions such as vaccinations influenced those nonmandated nurses and health care workers' decision to receive the COVID-19 vaccine. Risk susceptibility was associated with RQ3 as I explored whether nonmandated nurses and health care workers are more likely to receive the COVID-19 vaccine based on a perceived risk associated with their race or ethnicity. Alhalaseh et al. (2020) suggested that theories of health behavior change are inadequately being used to understand the reasons for low vaccinations rates among healthcare workers, and the HBM can be employed to predict actual behavior

Research Gap and Relevance of Study

While researchers have investigated vaccination hesitancy in the past, there appears to be a gap in the body of knowledge as it concerns nonmandated nurses and healthcare workers and their intent to receive the COVID-19 vaccine. Information revealed within this study can help public health officials create initiatives that can improve COVID-19 vaccination uptake among nonmandated nurses and healthcare workers. By filling this gap, public health officials will have a better understanding of the reasons associated with vaccination hesitancy. They can improve strategies to increase

COVID-19 vaccination uptake among nonmandated nurses and healthcare workers based on this new knowledge.

Study Limitations

The study's limitation was the use of self-reported surveys, which could have introduced misclassification since some respondents may not remember key information. Another limitation of using a web-based survey is varying functionality among different computer configurations, which could impact the viewing of some participants, causing them to not view the survey normally and resulting in them quitting the survey. However, using an online survey tool was especially convenient to collect data during an ongoing pandemic and allowed me to reach participants that otherwise would have been a geographical challenge. The use of an anonymous and confidential online survey was also a very cost-effective method.

Scope and Delimitations

In this study, I explored the factors and reasons nonmandated nurses and healthcare workers have reservations and are reluctant/ hesitant to receive the COVID-19 vaccine knowing their perceived susceptibility to infection. The fluctuating nature of the COVID-19 pandemic, as well as the ongoing vaccine mandates, could have negatively impacted the number of qualified study participants.

Definition of Terms

Three databases were searched for the literature for the study: Google Scholar, PubMed, and Medline. Search terms used were *vaccine, vaccination, vaccine hesitancy, COVID-19, COVID-19 vaccine, nurse,* and *healthcare workers*.

COVID-19: A respiratory virus caused by SARS-CoV-2 that was discovered in 2019 (CDC, 2021).

COVID-19 vaccine: A substance that contains messenger RNA (mRNA) that gives the human body cells instruction to develop an immune response specifically against COVID-19 (CDC, 2021).

Cues to Action: Factors that trigger action (Health Behavior and Health Education, n.d.).

Healthcare worker: A person who is at risk for exposure to serious and sometimes deadly diseases, including physicians, emergency medical personnel, nurses, dental professionals and students, medical and nursing students, laboratory technicians, pharmacists, administrative staff, and hospital volunteers (CDC, 2016).

Nurse: A person who has completed a program of generalized nursing curriculum and is authorized by appropriate regulating agencies to practice nursing in their country (International Council of Nurses, 2022).

Perceived Barriers: A belief about the potential negative aspects of a particular health action (Health Behavior and Health Education, n.d.).

Perceived Benefits: A belief in the potential positive aspects of a health action. (Health Behavior and Health Education, n.d.).

Perceived Severity: A belief about the seriousness of the condition, or leaving it untreated, as well as its consequences (Health Behavior and Health Education, n.d.).

Perceived Susceptibility: A belief about getting a disease or condition (Health Behavior and Health Education, n.d.).

Self-Efficacy: Belief that one can achieve the behavior required to execute the outcome (Health Behavior and Health Education, n.d.).

Vaccination: The act of introducing a vaccine into the body to produce immunity to a specific disease (CDC, 2021).

Vaccination hesitancy: The reluctance or refusal to vaccinate regardless of the availability of vaccine (Indiana Department of Health, 2020).

Vaccine: A product that stimulates a person's immune system to produce immunity to a particular disease, which offers protection from that disease. Vaccines are usually given via injections but can also be given through nasal spray or by mouth (CDC, 2021).

Assumptions

The instrument I used in the study to determine the intent of receiving the COVID-19 vaccination among nurses and other healthcare professionals assumed that there is a segment of the healthcare sector who has opted not to receive the COVID-19 vaccination. Another assumption was that some healthcare professionals do not trust the safety of the novel vaccine due to the emergent development. A lasting assumption was the use of an online survey would allow global response to vital questions on COVID-19 vaccine intent among healthcare workers in an effort to improve future initiatives.

Social Change Implications

The information revealed within this study may help public health officials create initiatives that can improve COVID-19 vaccination uptake among nonmandated nurses and healthcare workers. By filling this gap, public health officials will better understand

the reasons/factors associated with COVID-19 vaccination hesitancy and create positive social change by helping improve strategies to increase COVID-19 vaccination uptake among nonmandated nurses and healthcare workers based on this new knowledge.

Summary

The SARS COV-2 virus has placed a tremendous burden on the global health care systems, and vaccines are one of the best-known defenses against the spread of the virus. In early 2021, more than 80 million cases and 2 million deaths were reported globally (Chu & Liu, 2021). Early in the pandemic, there was no effective treatment for COVID-2019, but within a year, there was worldwide reliance on prevention tools like a vaccine to control the pandemic. According to the National Institute of Health (2022),

> As of February 11, 2022, the Food and Drug Administration (FDA) issued an Emergency Use Authorization (EUA) for the anti-SARS-CoV-2 monoclonal antibody (mAb) bebtelovimab for the treatment of nonhospitalized patients with mild to moderate COVID-19 who are at high risk of progressing to severe disease. (para. 1). The use of this monoclonal antibody was an effective strategy to minimize deaths.

Despite the overarching body of knowledge around the lifesaving benefits of vaccines, there remain many vital healthcare professionals that are reluctant or refuse to receive the COVID-19 vaccine. This cross-sectional study, grounded on the HBM, aimed to determine if perceived risk and susceptibility can predict the intent of non-mandated healthcare professionals to receive the COVID-19 vaccination. This study is quite relevant as many people rely on healthcare professionals for their medical advice, and if

those healthcare providers are vaccine hesitant, it is unlikely that they will promote

COVID-19 vaccination to patients. Eliminating vaccine hesitancy in this vital population

can greatly impact positive social change and increase vaccine uptake and improve

efforts to achieve herd immunity globally.

Chapter 2: Literature Review

The purpose of this study was to explore vaccine hesitancy among nonmandated nurses and other healthcare professionals that provide patient care. The COVID-19 pandemic that began in 2019 has created a tremendous burden for public health professionals globally. The COVID-19 virus has given rise to a pandemic that has spanned around the world and remains uncontrolled, in part related to the virus and its ability to adapt (Rauseo, O'Halloran, 2021).

Vaccine hesitancy among a vital population, such as nonmandated nurses and healthcare professionals, can create negative ramifications like drastic reductions in a healthy workforce to respond to ongoing COVID-19 surges and modeling behaviors within the general population (Pal et al., 2021). Since the beginning of this novel virus, vaccination efforts have been at the forefront of defense strategies, and low vaccine uptake has thus been a major barrier to achieving herd immunity and containing the pandemic. In a study conducted by Pal et al. (2021), only one-third of healthcare workers were planning to take the COVID-19 vaccine as soon as it became available to them, and the majority chose to wait several months before deciding. This study will be vital in gaining insight into the reasons for vaccination hesitancy among healthcare professionals as they play key roles in the trajectory of the COVID-19 pandemic since they are very influential in medical decisions made by patients. The results of this study are expected to bring positive social change by directing targeted interventions that can increase vaccination uptake among nonmandated nurses and other healthcare professionals.

Literature Search Strategy

Search engines and databases used for the literature review included Medline, Google Scholar, Science Direct, Directory of Open Access Journal, and PubMed. Search terms used within these databases included *vaccination hesitancy, vaccination, COVID-19 vaccine, COVID-19, nurse, beliefs, and healthcare workers*. Search terms were evaluated individually and in various combinations to collect specific articles. The selected articles were published from 2018-2022, and some pertinent background information that was published greater than five years ago was also included. I conducted a thorough literature review of peer-reviewed articles related to overall vaccine hesitancy as well as COVID-19 vaccine hesitancy among healthcare professionals to add to the current body of research.

Theoretical Foundation

The Health Belief Model

The HBM was created in the 1950s by social scientists Hochbaum, Rosenstock, and others while working to explain the failures of people participating in disease prevention programs. (Health Behavior and Health Education, n.d.). The HBM theorists posited that individuals would act based on six constructs: risk susceptibility, risk severity, benefits to action, barriers to action, self-efficacy, and cues to action. The HBM indicates that individuals will positively react to health messages and disease prevention when they feel that they are at risk (perceived susceptibility) and that risk is serious (perceived seriousness). Behavioral change has many benefits to them (perceived

benefits), as well as obstacles to health behaviors can be addressed (perceived barriers; Khorsandi et al., 2020).

The connection between the HBM and my study is that a nonmandated health care worker's perceived risk would likely have a positive influence on their decision to receive the vaccination against COVID-19, and the HBM has consistently been used in the past to predict how people engage in the prevention or controlling the disease. The risk susceptibility construct is vital to this study because health professionals' vaccination behaviors can be influenced by their threat of getting COVID-19. The benefits to action construct speak to the potential positive benefits of acting; this construct is important to this study because it is essential to understand if health professionals view receiving the COVID-19 vaccine as a beneficial action. The barriers to action construct related to any negative attributes that could prevent the health action of interest; this is important to this study because overcoming any barriers to action can potentially increase COVID-19 vaccine uptake.

The self-efficacy construct relates to the ability of an individual to successfully complete the health action despite considered barriers (Jones et al., 2015). The self-efficacy construct is important to my study in that it can reveal if healthcare professionals feel as though self-efficacy contributes to COVID-19 vaccine hesitancy. Self-efficacy was determined via questions asked in the study's participant survey. Lastly, the cues to action construct relate to various factors that might incline an individual to act, and this is important to this study because understanding, if factors exist that could influence health professionals to vaccinate against COVID-19 is essential to increasing vaccine uptake.

All the aforementioned HBM constructs were measured through the questions asked in the study participant questionnaire. In a study conducted by Chen et al. (2021), the authors found that of all the HBM constructs associated with vaccine hesitancy, self-efficacy for COVID-19 was an important predictor of vaccination because it can mediate the influences from cues to action, perceived benefits, and perceived barriers.

Exploring Overall Vaccination Hesitancy

Vaccination hesitancy continues to be a growing public health concern, and this is the problem that inevitably drives the ongoing COVID-19 Pandemic. In this quantitative study, I aimed to examine vaccine hesitancy among nonmandated healthcare professionals charged with providing direct patient care. If healthcare professionals are COVID-19 vaccine-hesitant, this can negatively impact COVID-19 vaccine uptake in the communities in which they serve. Mesch and Schwirian (2019) conducted a study to examine the reasons for vaccination hesitancy surrounding the expectancy of an Ebola outbreak. The authors revealed through their study that fear of getting Ebola disease in the United States would have influenced a respondent's willingness to be vaccinated.

Vaccines are one of the most effective ways to prevent disease, which drives the need for effective strategies to increase vaccine uptake. Fortunately, the field of vaccine acceptance research is growing, and vast measurement tools are being developed to address barriers to vaccine acceptance (Mesch & Schwirian, 2019). Increasing knowledge and understanding of vaccines and their design, as well as the concepts of their protective mechanisms, can increase confidence in the science of vaccination and reduce vaccine hesitancy (Vetter et al., 2018). Researchers Vetter et al. (2018) explored vaccination

designs, types, and the advantages, risks, and background information surrounding the concepts of vaccine protection. Through this investigative study, the authors found that increased knowledge of the basic concepts of vaccines and their recommendations is crucial to understanding the benefits of vaccinations in disease prevention.

As I explored vaccination hesitancy, I examined various variables that may influence an individual's decision regarding vaccination. Burger et al. (2021) conducted a study that examines differences in beliefs about the safety and efficacy of the H1N1 vaccine among race, sex, and socioeconomic status. The investigators found that Black respondents were more likely than White respondents to have reservations about the safety and efficacy of the vaccine, likely due to higher levels of mistrust given the historical discriminatory experiences among African Americans. This data can help public health officials create more successful interventions by identifying the most vulnerable target populations to build trust, increase trust and increase vaccination uptake within those communities. Attwell et al. (2021) highlighted the social and practical factors surrounding vaccination hesitancy, as well as offering strategies to increase vaccine uptake. The researchers found that educating children about vaccines can avoid future vaccine hesitancy, and there is an increased need for effective communication training for healthcare workers as well. The authors recommended information shared from multiple stakeholders' presentations that provide helpful strategies necessary for increasing vaccine uptake. One of the presented strategies was the use of mandatory vaccinations to increase vaccination uptake, which we are currently seeing in the COVID-19 pandemic.

Exploring Covid-19 Vaccination Hesitancy

According to the CDC (2022), as of March 2022, there were 216.4 million people in the United States fully vaccinated against COVID-19, or 65.2% of the United States population. In a study by Reses et al. (2021), the authors found that among 3,357,348 healthcare professionals in 2,086 hospitals, 70% were fully vaccinated; the researchers suggested that additional efforts are needed to improve vaccine uptake among healthcare professionals. According to Ebrahimi et al. (2021), vaccination hesitancy is a significant threat to a successful vaccination rollout. The authors conducted a cross-sectional study that sought to identify the factors associated with vaccination hesitancy and included a large sample population of 4,571 Norwegian adults that were recruited through an online survey between January 23 to February 2, 2021. The results of this study showed that due to the heterogeneity of the range of variables surrounding vaccine hesitancy, further research is warranted to discover additional eradication strategies for vaccination hesitancy.

In a different study, Taylor et al. (2020) identified the motivational factors that lead to COVID-19 vaccination hesitancy and ascertained the best incentives that would lead to improved vaccination uptake once vaccinations became available. The researchers found that 25% of Americans and 20% of Canadians said they would not get vaccinated against SARS-CoV2 if a vaccine were available due to mistrust of vaccine benefits and unforeseen future effects of receiving a novel vaccine. Identifying obstacles (perceived barriers) that could prevent vaccination uptake can lead to improved initiatives that rebuild trust and remove the perceived barriers. The researchers suggested further

research is warranted to reveal if other variables are contributing to COVID-19 vaccination hesitancy.

COVID-19 vaccination hesitancy is not only a problem in the United States, but it is an issue that is a global health threat. A cross-sectional study was conducted in both the United States and China to assess vaccine preferences and factors that may contribute to vaccine acceptance (Liu et al., 2021). Liu et al. (2021) compared the rates of vaccination hesitancy between China and the United States. The researchers found that the United States may have higher rates of vaccine hesitancy; they also concluded that higher income was associated with higher vaccine hesitancy in the United States The authors also found differences in COVID-19 incidence rates due to cultural backgrounds, vaccine roll-out strategies, and availability of COVID-19 vaccines. They noted that as of March 14, 2021, there were over 120 million cumulative COVID-19 cases in China and around 600, 000 cumulative deaths in the United States. The researchers stated that both China and the United States simplified the rollout of the vaccine by making sure the vaccine was made available to everyone free of charge; they also found that COVID-19 vaccine acceptance among U.S. respondents was lower than among respondents from China.

To further the global exploration of COVID-19 vaccine hesitancy, Cordina et al. (2021) conducted a study that explored the attitudes and influencing factors about COVID-19 among people living in the Republic of Malta and the underlying reasons why they are unwilling to receive the COVID-19 vaccine. The researchers found that of their predominantly female respondents, 50% of them declared they were willing to take the vaccine and that those unsure of vaccinating were concerned about the vaccine's safety.

According to Cordina et al. (2021), "A significant factor fueling vaccine hesitancy in the present pandemic is the current misinfodemic, with social media facilitating the spread of misinformation" (p.1). The study's findings validate the need for future interventions to promote the safety of vaccines.

Throughout history, the HBM has been used as a predictor of vaccine intent. In Karlsson, Soveri, et al.'s study (2021), which is aligned with the HBM, the authors explored the perceived risks of COVID-19 disease compared to the safety of the COVID-19 vaccine and the respondents' intentions regarding the vaccine. The authors found that the strongest indicator of intentions to receive the vaccine were respondents that felt the vaccine was safe; also, those who perceived the disease would be more severe than vaccine side effects. Public health officials must have a vast understanding of the underlying reasons that drive vaccination hesitancy to overcome the perceived threats and barriers that impede vaccine uptake. Ruiz and Bell (2021) understood the importance of gaining this insight in the current fight against the COVID-19 pandemic and conducted a study that surveyed 804 U.S. adults regarding their intent to vaccinate when COVID-19 vaccinations became available; they found that approximately 14.8% of the respondents said they were unlikely to vaccinate, and 23% stated that they were unsure. They also found intent to vaccinate was higher among older individuals and men; these demographic findings are essential to public health officials when developing new vaccination strategies and lead the scientific community to an immense understanding of the key demographic characteristics and the specific populations that are most likely to be COVID-19 vaccine-hesitant. With new information and medical therapies being

discovered as the pandemic continues, the views and perceptions of COVID-19 vaccines can change over time, which also makes this study quite relevant to capture the most current views on vaccine intent.

In December 2020, several vaccines were authorized to prevent COVID-19 disease. Although the effectiveness of vaccines in preventing disease is well-known, there remains significant doubt globally about the safety of the novel covid-19 vaccine. Al-Qerem and Jarab (2021) conducted a cross-sectional web-based study to gather information regarding COVID-19 vaccination intentions among Middle Eastern Populations. The authors found that the web-based survey was a cost-effective option that helped gather information from populations that otherwise would have been unreachable. The researchers also concluded that the leading reason for vaccination refusal was safety and efficacy concerns. Taylor et al. (2020) further explored the overall attitudes toward vaccines, specifically the COVID-19 vaccine using the Vaccination Attitudes Examination Scale. The researchers used a cross-sectional study including 3674 Americans and Canadians. The authors found that 25% of Americans and 20% of Canadians stated they would not get the COVID-19 vaccine, with mistrust of the novel vaccine being the main reason for vaccine refusal (Taylor et al., 2020).

Vaccination Hesitancy Among Nurses and Healthcare Professionals

Vaccination hesitancy among nurses and other healthcare professionals is a critical threat to ending the COVID-19 pandemic. According to Gagneux-Brunon et al. (2021), "Protecting healthcare workers (HCWs) from COVID-19 is crucial in the preservation and protection of healthcare systems" (p.169). In an anonymous survey from

March 26 - July 2, 2020, Gagneux-Brunon et al. (2021) explored the COVID-19

vaccination intent of the general healthcare worker population in France. The authors

found that nurses and nurse assistants were less prone to receive COVID-19 vaccination

than doctors. The researchers also found that healthcare workers that provide direct care

to COVID-19 patients considered themselves at increased risk of disease and were more

likely to accept the COVID-19 vaccine. Increasing awareness of these beliefs and

perceptions regarding intent to vaccinate against COVID-19 will help develop future

interventions to increase COVID-19 vaccine uptake. Nurses and healthcare workers are

trusted as subject matter experts in the medical field and have a positive impact on

medical decisions taken by patients and the community, which is why vaccination

hesitancy among this population is a severe threat to COVID-19 vaccine uptake. Kwok et

al. (2021) conducted a cross-sectional online study exploring vaccination behaviors and

intention to vaccinate against COVID-19 among nurses. The authors also examined the

association between work demands and intent to vaccinate; they found that 63% of nurses

surveyed intended to take the COVID-19 vaccine. They also found that potential vaccine

uptake among nurses was suboptimal for achieving herd immunity.

Additionally, the HBM can be used to predict vaccination intent, and Zampetakis

and Melas (2021) explored covid vaccination hesitancy by using insight from the health

belief model, trait theory, and events system theory to predict intent to vaccinate against

COVID-19. The authors used multilevel modeling techniques to conduct data analysis,

and the study revealed that the elements of the HBM have a significant influence on the

intention to vaccinate. When the perceived barriers to getting a covid vaccination are low;

it has a direct positive effect on intent to vaccinate; reinforcing the perceived benefits of receiving the new COVID-19 vaccine is another strategy when people think that their risk of getting COVID-19 is high (Zampetakis & Melas, 2021).

Continuing on the exploration of vaccination hesitancy among nurses, Fakonti et al. (2021) conducted a study to determine the intent to vaccinate for Covid-19 among nurses and midwives in The Republic of Cyprus through a cross-sectional study between December 8-28, 2020, and factors that influenced their intentions. The authors' study revealed that one-third of the study participants planned to vaccinate, and 70% were undecided or did not plan to vaccinate, with the main reason for hesitancy being uncertainty about the quality of the available vaccines. Less than optimal vaccination coverage for routine vaccines was identified among healthcare workers worldwide. Therefore, the intention to receive the COVID-19 vaccination is important, and current literature concerning the healthcare worker's acceptability of COVID-19 vaccination is currently limited (Fakonti et al., 2021). The study provides reasons nurses are reluctant to receive lifesaving vaccines; this information is vital to improving vaccine uptake among this population.

While there has been substantial progress in the COVID-19 vaccination campaigns, healthcare workers' immunizations may be compromised by vaccine hesitancy, characterized by the lack of confidence in or the fear of vaccines (Paris et al., 2021). Paris et al. (2021) conducted a study exploring the intentions of healthcare workers to vaccinate against COVID-19 in a vaccination campaign in France. The researchers' study revealed that Influenza and COVID-19 have similar vaccine hesitancy

patterns, and many participants were influenced by media communications about COVID-19 vaccine side effects and how this affects vaccine hesitancy. This study also revealed considerable differences in COVID-19 intention among HCWs, largely according to occupations.

In a cross-sectional study by Wang, Wong, et al. (2020), the authors explored the intentions of nursing staff to vaccinate during the COVID-19 pandemic and found that there was a large proportion of nurses were hesitant about receiving COVID-19 and Influenza vaccinations; this was an important finding because maintaining the health of health care workers during the pandemic is vital to pandemic preparedness. Lastly, Biswas et al. (2021) conducted a global assessment of COVID-19 vaccination hesitancy among healthcare workers; the researchers' study consisted of 35 studies with sample sizes ranging from 123 to 16,158. The results of the study revealed that most older age males and doctorate degree holders were more likely to vaccinate; other variables like perceived risk of getting COVID-19, history of influenza vaccination, and direct patient contact were also positively associated with intent to vaccinate.

Vaccine Hesitancy and Years in Practice

Despite the well-known effectiveness of vaccines in reducing the number of preventable diseases, vaccine hesitancy continues to threaten public health globally (Lin et al., 2021). This study aims to determine if the number of years in healthcare practice has an association with vaccination intention. In a study by Baniak et al. (2021), the researchers found that healthcare workers having greater than ten years of experience was associated with uptake and found to be a new finding that warranted further research.

Vaccine Hesitancy and Professional Degree

COVID-19 vaccine hesitancy among nurses and healthcare professionals is a growing global concern among public health officials. There is an overarching need to resolve the reasons for vaccine hesitancy and increase vaccine uptake in this critical population. In alignment with the HBM knowledge regarding the perceived risks and susceptibility, healthcare workers were investigated in a study by Karlsson, Lewandowsky, et al. (2019), in which they found that those with higher degrees (more education) perceived vaccinations to be safe and beneficial. Browne et al. (2021) surveyed nurses, medical doctors (MD), Doctor of Medicine (DO), and physician assistants (PA) and found that nurses were the most vaccine-hesitant among these job categories. The authors stated the reasons for vaccine hesitancy among the nurses were vaccine side effects, the newness of vaccines, and effectiveness (Browne et al., 2021).

Vaccine Hesitancy and Practice Type

There is a limited body of knowledge regarding COVID-19 vaccination hesitancy among nonmandated nurses and other health care professionals and their practice location. In a cross-sectional study conducted by Amuzie et al. (2021), the researchers revealed that nurses and healthcare workers working in a clinical patient-facing settings were less COVID-19 vaccine hesitant than those in non-patient-facing settings. Further research is warranted to fill the gap in the current body of knowledge regarding vaccine hesitancy and practice type.

Vaccine Hesitancy and Years of Education

One of the questions that this study seeks to answer is whether or not there is an association between vaccination hesitancy and years of education. "Existing literature points out that the low willingness among nurses to be vaccinated may be related to their knowledge level" (Wang, Feng, et al. 2021, p. 2931). In a study by Wang, Feng, et al. (2021), the authors found that nurses had a lower willingness to receive the COVID-19 vaccine than doctors. The existing body of knowledge suggests that lower health literacy levels are related to a lower willingness to vaccinate against COVID-19 (Wang, Feng, et al. 2021). Wang, Feng, et al. (2021) suggested that further research is needed to explore vaccination hesitancy and years of education.

Vaccine Hesitancy and Race/Ethnicity

Understanding and minimizing vaccination hesitancy is vital to ending the COVID-19 pandemic. In December 2020, COVID-19 was a leading cause of death in the United States, and communities of color were disproportionately affected (Willis et al., 2021). In the same study, the researcher found that people who were Black/African Americans, had a lower income, and had some college or technical degrees were found to have higher rates of vaccine hesitancy. This research was conducted among the general population, and further research is warranted to determine if race and ethnicity confound the relationship between nonmandated nurses and other healthcare professionals and the intent to vaccinate against COVID-19.

Vaccine Hesitancy and Practice Location

This study also sought to understand if the location where healthcare professionals work could possibly influence their decision to vaccinate against COVID-19. After an extensive search of the literature, there seems to be a gap in the body of knowledge regarding the topic; and this finding further supports the need for a study of this nature.

Summary

COVID-19 vaccination hesitancy among healthcare professionals is a growing concern globally. Many researchers have studied vaccine hesitancy in the past and discussed the importance of vaccines in preventing infectious diseases. My literature review on the topic discussed the past and current approaches researchers have taken to combat the issue. The HBM has consistently been used to predict health behaviors concerning vaccine intent. The literature review presented in this chapter also highlighted the need for further research on COVID-19 vaccination hesitancy among healthcare professionals. While COVID-19 vaccine hesitancy has been discussed in previous studies, the pandemic is ongoing, and it's possible that individuals' vaccination intentions have changed since the beginning of the pandemic, and this information can be invaluable to the current body of knowledge.

Chapter 3: Research Method

The purpose of this study was to explore the intent of nonmandated nurses and other healthcare professionals to vaccinate against the COVID-19 virus and determine if associations with certain variables such as type of care provided, location of practice, years in practice, or race/ethnicity contribute to decisions. Despite the overwhelming mortality rates for COVID-19 disease, there remains a large proportion of healthcare workers that remain uncertain or refuse to receive the COVID-19 vaccine (Toth-Manikowski et al., 2022). In this study, I used a quantitative, cross-sectional online anonymous survey to collect data on the vaccine intent of nonmandated healthcare providers between the ages of 18 -70. The topics covered in Chapter 3 are as follows: research design and rationale, methodology and study population, sample size, procedures for sampling and recruitment of study participants, variable, the data collection process, instrumentation, data analysis plan, research questions, and hypothesis, threats to validity, and descriptions of how the study aligns with the HBM.

Research Design and Rationale

Cross-sectional designs are observational in nature, and the researcher measures outcomes and exposures in the study participants at the same time or for a specific period (Setia, 2016). A quantitative cross-sectional research design was employed because it was the best design to answer my research questions and reveal if there is an association between type of patient care and COVID-19 vaccination intent. This research design was also used to explore the reasons and factors contributing to COVID-19 vaccination hesitancy among nonmandated nurses and other healthcare professionals. The cross-

sectional design is often used to analyze the prevalence of disease or traits, attitudes, and knowledge in validation and in reliability studies (Kesmodal, 2018). Therefore, A cross-sectional design was used for the study to assess the attitudes of healthcare workers who are hesitant about COVID-19 vaccination at a specific point in time.

Population

The study's population was gathered from an online solicitation of nonmandated nurses and other healthcare workers to answer questions about COVID-19 vaccine hesitancy and their intentions to receive the vaccine. The online solicitation included a brief introduction of the study, informed consent, and a link to the online questionnaire. The questionnaire was aligned with the HBM, as it is commonly used as a predictor of health decisions. I chose to conduct a web-based survey as opposed to face-to-face interviews for convenience and the opportunity to geographically reach participants that otherwise would have been impossible with a face-to-face model. The study's participants consisted of males and females between the ages of 18 -70 years of age in nursing and healthcare professions. Potential study participants were sought on Facebook, Instagram, LinkedIn, Amazon's M-Turk, and Walden's research study participant pool's online platforms using a convenience and snowballing sample collection.

Sampling and Sampling Procedures

Sample Size

I used an online survey along with convenience and snowballing data collection methods to solicit nonmandated nurses and other health care professionals between 18 and 70 years of age. Research flyers were also distributed in community centers within

the Saint Louis, Missouri area to recruit additional study participants between April and May 2022. The study included a minimum sample size of 385 nonmandated healthcare professionals between the ages of 18 and 70 years of age. Sample size calculations were performed using G*Power, the following input parameters were selected for the study, p values less than .05 were considered statistically significant, a 95% confidence level, power level of .80, and alpha probability of error of .05. The chosen data points values were set based on standard scientific levels and to ensure study validity. The decision to use an online data collection sampling method was based on its convenience and safety due to the current coronavirus pandemic's high risk of transmission.

Study participants completed an anonymous voluntary electronic survey powered by Survey Monkey. They were invited to complete the anonymous online survey and were presented with a brief overview of the study's details, as well as a statement of informed consent. If potential participants met the criteria for the study (nonmandated healthcare professionals between 18-70 years of age), they were allowed to proceed to the survey link to complete the questionnaire. After completing their surveys, the study participants were asked to share the study's link on their social media pages to gather additional participants. Sample collection continued until the minimum required study participants of 385 was reached. There was a brief pilot study of the above-described data collection methods, which consisted of approximately 10 surveys completed in test mode to ensure that the respondents successfully completed inclusion questions and informed consent before being allowed to take the actual surveys. The pilot study accurately measured the time it took to complete the study questionnaire and ensured functionality

was not compromised for participants who were using a cell phone or tablet. Once the pilot study was successfully completed, the actual data collection began and continued until a minimum of 385 qualifying questionnaires were completed. The purpose of the pilot study was to catch any technical issues before the actual go-live launch of the study's data collection.

The questionnaire consisted of a series of multiple-choice questions from the CDC's COVID-19 question bank. This tool was used to collect data on the reasons for reluctance and or refusal to receive the COVID-19 vaccine. The selected questions were the best items that would reveal the factors for vaccine hesitancy. The answers received from the web-based questionnaire helped to answer the study's research questions specific to the HBM as it relates to COVID-19 vaccine hesitancy among health care professionals.

Sample Calculation Formula

$$n = \frac{z^2 \times \hat{p}(1-\hat{p})}{\varepsilon^2}$$

The above formula is based on an unlimited population where z is the z score, ε is the margin of error, N is the population size, and $\hat{p}$ is the population proportion.

$$n = [1.96\char`^2 \times 0.50 \times (1 - 0.50)] / 0.05\char`^2$$

$$= [3.8416 \times 0.5 \times 0.5] / 0.0025$$

$$= 384.16$$

Procedures for Recruitment, Participation, and Data Collection

Recruitment

An invitation to participate in an online survey was published to multiple social media platforms, including Facebook, Instagram, LinkedIn, Amazon's M-Turk, and Walden University's pool research participants. Participation in the data collection was based on the respondent meeting the nonmandated nurse or healthcare worker's vaccine status. The study's participants had to answer qualifying preliminary questions and informed consent and disclosure of the voluntary nature of the study before being allowed to complete a series of multiple-choice web-based questions powered by Survey Monkey that were directly related to the HBM constructs as they related to COVID-19 vaccine hesitancy. After completion of the survey, respondents were asked to share the study link on their social media pages to gather more study participants who would be prescreened in the same manner before Survey Monkey would allow them to take the actual survey. URL tracking was used to prevent multiple survey completions by the same respondents.

Study participants' data was protected by secure data encryption provided through Survey Monkey. The online questionnaire tool was created using questions from the CDC's United States Vaccine Confidence Survey Question Bank. After selecting the questions that I needed to answer my research questions, I formatted the questionnaire in Survey Monkey, ensuring that the study results were encrypted and password protected. Once the data collection period was complete, I cleaned the data by removing any

surveys that were incomplete or had missing information. This data will be password protected, stored, and maintained by me for 5 years.

Data Analysis Plan

IBM SPSS statistical software (version 27) was used for statistical data analysis and storage. Statistical parameters that were used in the study included mean, median, standard deviation, and 95% confidence interval. I used logistic regression to determine if there was an association between the type of patient care provided and intent to receive COVID-19 vaccination. Multivariable logistic regression was used to examine whether the association between the type of patient care provided and intent to receive the COVID-19 vaccine was modified by the type of professional practice degree. Lastly, multivariable logistic regression was used to determine whether the association between the type of patient care provided and intent to receive the COVID-19 vaccine was confounded by years of education, practice location, and race/ethnicity. Statistical significance was set at $p < .05$.

Research Questions

RQ1: Is there an association between the type of nonmandated healthcare professional (direct/indirect patient care) and intent to receive COVID-19 vaccination? This question aligns with the health belief model construct of perceived susceptibility. The question seeks to answer if a person perceived a substantial risk of getting COVID-19, would it positively influence their decision to receive the COVID-19 vaccine?

$H_0 1$: There is no association between the type of nonmandated healthcare professional (direct/indirect patient care) and intent to receive COVID-19 vaccination.

H_{a1}: There is an association between the type of nonmandated healthcare professional (direct/indirect patient care) and intent to receive COVID-19 vaccination. I conducted a logistic regression for RQ1 and its hypotheses.

RQ2: Is the association between type of nonmandated healthcare professional (direct/indirect patient care) and intent to receive the COVID-19 vaccination modified by healthcare practice degree (MD, RN, LPN)

$H_0 2$: The association between type of nonmandated healthcare professional (direct/indirect patient care) and intent to receive the COVID-19 vaccination is not modified by healthcare practice degree (MD, RN, LPN).

$H_a 2$: The association between the type of nonmandated healthcare professional (direct/indirect patient care) and intent to receive the COVID-19 vaccination is modified by healthcare practice degree (MD, RN, LPN).

A multivariable logistic regression was conducted to test RQ2 and its hypotheses.

RQ3: Is the association between type of nonmandated healthcare professional (direct/indirect patient care) and intent to receive the COVID-19 vaccination confounded by (a) practice location, (b) years of education, and (c) race/ethnicity?

$H_0 3$: The association between type of nonmandated healthcare professional (direct/indirect patient care) and intent to receive the COVID-19 vaccination is not confounded by (a) practice location, (b) years of education, and (c) race/ethnicity.

$H_a 3$: The association between type of nonmandated healthcare professional (direct/indirect patient care) and intent to receive the COVID-19 vaccination is confounded by (a) practice location, (b) years of education, and (c) race/ethnicity.

I conducted a multivariable logistic regression for RQ3 and its hypotheses.

Table 1

Analysis Parameters

Independent variable	Dependent Variable	Covariates	Statistical Analysis
Type of nonmandated healthcare professional	Intent to receive COVID-19 vaccine	N/A	Logistic regression
Type of nonmandated healthcare professional	Intent to receive COVID-19 vaccine	Healthcare practice Degree	Multivariable logistic regression
Type of nonmandated healthcare professional	Intent to receive COVID-19 vaccine	Years of education, race/ ethnicity, and practice location	Multivariable logistic regression

Threats to Validity

The use of an online-based study that employed web-based recruitment will most likely impact the range of responses as a result of self-selection to participate. There is also the possibility that some study participants may have answered questions based on what they think may be the socially acceptable answer rather than answering truthfully. With the use of web-based platforms, there may have been some challenges in digital delivery and ensuring surveys reach potential participants. Lastly, because this study is a

cross-sectional research design, it may not capture fluctuations in feelings due to the nature of the ongoing pandemic and the rapid exchange of newly developing information.

Ethical Procedures

Ensuring the study was conducted with the highest ethical standards is a vital concern in this study. To ensure this study was conducted in an ethical manner, study participants were required to complete informed consent. They were informed that their participation was voluntary and anonymous, and they could choose to end participation at any time. No personal identifiable information was collected, and no coercion or reward for completing the survey was provided. All data collected from study participants was data-encrypted and password protected through Survey Monkey and will be maintained password protected for five years. The researcher declares there are no conflicts of interest in this study. All research steps of this study were approved by Walden University's Institutional Review Board before any data collection began.

Summary

Vaccination hesitancy among nonmandated nurses and healthcare workers is a critical threat to public health globally. These individuals are charged with providing care and delivering potentially lifesaving advice to patients and their communities. If these individuals are vaccine-hesitant, they would be less likely to encourage patient populations to receive lifesaving vaccines and achieve herd immunity to halt the COVID-19 pandemic. This study aimed to explore the reasons why nurses and other healthcare professionals, despite knowing the perceived risk and susceptibility of acquiring SARS-CoV-2 disease in their line of work, remain vaccine-hesitant. The results of this study

will be used to create positive social change by adding to the current body of knowledge as it concerns nonmandated nurses and other healthcare professionals' reasons for vaccine hesitancy that can help create highly targeted future interventions for this vital population.

Chapter 4: Results

The purpose of this quantitative cross-sectional online study was to explore the thoughts/feelings and intent of nurses and other healthcare professionals about the COVID-19 vaccine. The HBM was used to also predict the intent of theses healthcare professionals to vaccinate against COVID-19. The independent variables included type of nonmandated healthcare professional, years of education, race, ethnicity, healthcare practice degree, and practice location. I evaluated the relationship between the type of patient care provided (direct/ indirect) and intent to vaccinate. The following research questions were used to gain a better understanding of the reasons for vaccination hesitancy among this critical population:

RQ1: Is there an association between type of patient care provided (direct/ indirect care) and intent to receive COVID-19 vaccination?

RQ2: Is the association between type of patient care provided and intent to receive COVID-19 vaccine modified by the type of professional practice degree?

RQ3: Is the association between type of patient care provided and intent to receive COVID-19 vaccine confounded by years of education, practice location and race/ethnicity?

Chapter 4 will include and introduction and overview of the study, also the pilot study, the details of the data collection, and lastly, the results and the summary.

Pilot Study

A brief pilot study was conducted after the institutional review board (IRB) was approved and before data collection began. The pilot study was conducted by testing the

survey link and instrument on multiple devices to ensure functionality and detect any technical issues before publishing the survey to the public. The pilot study tested the survey tool on cell phones, laptops, and tablets to ensure the survey was accessible from various device types. The pilot test was successful and there were not abnormal findings regarding the functionality of the various electronic devices.

Data Collection

After receiving IRB approval, research flyers were distributed on various social media platforms, as described in Chapter 3. The data collection period commenced on May 5, 2022 and concluded on June 14, 2022. The data was collected on SurveyMonkey, and the participant recruitment took place on Facebook, Instagram, and LinkedIn during the collection period. Before being allowed to participate in the survey, potential participants were requested to sign an informed consent. The survey was designed to disqualify participants from proceeding to the survey if they did not meet the study's requirements and agreed to the informed consent. A power analysis was conducted using G* Power with a 95% confidence interval, and a .05 margin of error identified a recommended sample size of a least $n= 385$ participants. At the end of the data collection period, the data was exported from Survey Monkey into SPSS. After I obtained the data set from the surveys, I cleaned the data by removing any incomplete or missing entries.

Several demographic variables were collected in the survey: education level, race, ethnicity, age group, gender, and work role. The demographic variables are summarized in frequency tables. Demographic information was collected to verify the population of the survey respondents. The survey results showed various zip codes throughout the

United States. Generalizations should be made cautiously when comparing results to the wider population. This study being a voluntary online survey, could have reduced the homogeneity between the sample and the general population. The basic univariate analysis justified the inclusion of the covariates. When a univariate analysis was performed, the results showed that a healthcare professional's role (e.g., nurse, physician) was not statistically significant ($p=.492$), and also the type of care the healthcare professional provided was also not significant ($p=.761$), but when the variables current role and type of care provided were combined, they were found to be significant ($p=.006$).

Results

After data collection was completed, the survey data revealed, as seen in Table 2, that most of the respondents identified themselves as Black or African American (50.06 %), followed by White or Caucasian (37.4 %), Asian (5.7 %), something else (2.9 %), Native Hawaiian or other Pacific Islander (1.3%), American Indian of Alaska Native (1.6 %), and Do Not Want to Say (.5%). Survey respondents were asked what sex they were assigned at birth. 30.1% reported as male, and 69.4% reported as female. When asked about their ethnicity, 5.7% said they were Hispanic/or Latino, and 94.3% stated they were not Hispanic / or Latino. The survey results also revealed that 14.3% of respondents were between 18-30 years of age, 18.4% of respondents were between 31-40 years of age, 33.0% of respondents were between 41-50 years of age, 25.7% of respondents were between 51-60 years of age, and 8.6% of respondents were between 61-70 years of age. The survey showed that 1.6% of respondents were physicians, 14.0% were nurses, 2.9%

were nurse practitioners, 20.5% were Allied health, 1.3% were pharmacists, and 59.6%

were other health workers.

Table 2

Descriptive Statistics of Survey Demographics

	n (%)
American Indian or Alaska Native	1.3
Asian or Asian American	5.2
Black or African American	51.8
Native Hawaiian or Other Pacific Islander	1.3
White or Caucasian	36.5
Something else	3.3
Don't want to say	.7
Physician	1.6
Nurse	14.0
Nurse Practitioner	2.9
Allied Health	20.5
Pharmacist	1.3
Other Health Worker	3.3

When respondents were asked what describes their current industry, 44.2% stated they provided direct medical care, 25.2% stated they did not provide direct patient care, 13.5% stated that they were essential frontline workers that frequently contact the public, 6.8% stated they were non-frontline essential workers who do not have regular contact with the public, 7.5% reported that they work in "other," 1.6% stated they were not sure, and 1.3% stated they rather not say. The results of the survey also showed that 1.8% of the respondents were physicians, 14.3% were nurses, 3.1% were nurse practitioners, 21.8% were allied health professionals, 1.0% were pharmacists, and 57.9% were other health professionals.

When respondents were asked what their highest level of education was, 1.0% stated they had less than high school education, 6.2% reported that they had a high school diploma or equivalent, 34.8% claimed to have had some college, including associate degree or trade school, and 57.9% stated that they had a bachelor's degree or higher. When asked, "Do you work in any of the following locations?" respondents stated (63.4%) hospital, (14.8%) physician's office, (1.0 %) dental office, (1.0%) pharmacy, (4.9%) nursing home, (10.6%) home health agency, and (4.2%) EMS. The survey results also showed that 86.6% of respondents had received the COVID-19 vaccine, and 11.4% reported they had not received the COVID-19 vaccine. When study participants were asked if a COVID-19 vaccine were available to them, would they get it, 64.2% stated yes, would get as soon as possible, 18.4% stated yes, but planned to wait to get it, 12.7% replied no, 4.7% said they were not sure.

The respondents were also asked how much they trust the public agencies that recommend people get a COVID-19 vaccine, 12.5% stated not at all, 20.3% stated a little, 41.6% said moderately, and 25.7% said very much. The appropriate assumption testing was conducted prior to the logistic and multivariable regression to include tests for multicollinearity, homoscedasticity, and multivariate normality, as well as ensuring a linear relationship exists between the predictor and response variables. Tests for collinearity were performed, and the VIF for the independent variables resulted in race (1.069), type of patient care (1.216), ethnicity (1.047), current role (1.220), and level of education (1.059). These values were between 1 and 5, indicating that the variables were only moderately correlated and should not be a problem for the model.

Table 3

Case Processing Summary

	N	Marginal Percentage
If a COVID-19 vaccine were available to you, would you get it?		
Yes, would get it as soon as possible	247	64.2%
Yes, but plan to wait	71	18.4%
No	49	12.7%
Not Sure	18	47%
Which of the following best describes your current industry?		
Provide direct medical care to patients (e.g., physician, nurse, physician assistant, dentist, therapist, home healthcare	170	44.2%

	Do not provide direct medical care to patients, but work or volunteer in a healthcare facility (e.g., patient transport	97	25.2%
	Frontline essential worker (worker who regularly comes into contact with the public, such as firefighter, police officer	52	13.5%
	Non-frontline essential worker (worker who does not regularly come into contact with the public but works in a critical	26	6.8%
	Other work or volunteer activities	29	7.5%
	Not sure	6	1.6%
	Rather not say	5	1.3%
What is your race?			

	American Indian or Alaska Native	6	1.6%
	Asian or Asian American	22	5.7%
	Black or African American	195	50.6%
	Native Hawaiian or other Pacific Islander	5	1.3%
	White or Caucasian	144	37.4%
	Something else	11	2.9%
	Don't want to say	2	0.5%
What is your ethnicity?			
	Hispanic	22	5.7%
	Non-Hispanic	363	94.3%
Valid		385	100%
Missing		0	
Total		385	

Research Question 1

To approach RQ1, I conducted a logistic regression analysis to evaluate the dependent variable, COVID-19 vaccine intent, and the independent variable, type of patient care provided. The results of the logistic regression model showed that there is not a statistically significant association between the type of patient care provided and the intent to receive COVID-19 vaccination ($p= .475$). The null hypothesis (H_01: There is no association between the type of patient care provided and intent to receive COVID-19 vaccination) was therefore accepted, and the alternative hypothesis is rejected. Table 4 illustrates the results of the logistic regression analysis that was performed.

Table 4

Coefficients- Type of Care Provided/Intent to Vaccinate

	B	*SE*	Sig.	Exp(B)	Collinearity Statistics VIF
(Constant)	1.134	.059	<.001		
Which of the following best describes your current industry?	.028	.039	.475	.037	1.000

a. Dependent Variable: If a COVID-19 vaccine were available to you, would you get it?

Supplemental Analysis

Supplemental analysis was conducted to analyze respondents' thoughts and feelings on the COVID-19 vaccine and its safety (perceived risk). The results of this analysis can be found in Table 5. I also conducted analysis of survey responses to determine if respondents mistrusted the COVID-19 vaccine, and 62.1% of the

respondents' state that they don't trust the COVID-19 vaccine. The results of this analysis

can be found in Table 6. Lastly table 7 shows a breakdown of study respondents that

perceived susceptibility of getting COVID-19.

Table 5.

Perceived risk of getting COVID-19

If a COVID-19 vaccine were available to you, would you get it?	Not at all concerned	A little concerned	Moderately concerned	Very concerned	Not applicable	Total
No % Of total	2.3 %	1.3%	1.6%	4.9%	7.3%	17.48%
Yes % Of total	9.1 %	14.5%	21.6%	35.8%	1.6%	82.6%

Table 6

Mistrust of COVID-19 Vaccine

How safe do you think the COVID-19 vaccine will be for you?		Total
	Trust vaccine	37.9%
	Do not trust vaccine	62.1%

Table 7.

Perceived Susceptibility of Getting COVID-19

If a COVID-19 vaccine were available to you would you get it?	Not at all concerned	A little concerned	Moderately concerned	Very concerned	Not applicable	Total
No % of total	3.6%	1.0%	2.3%	2.9%	7.5%	17.48%
Yes % of total	0.8%	1.8%	0.8%	2.3%	76.9%	82.6%

Research Question 2

To approach RQ2 I conducted a multivariable regression analysis to evaluate the dependent variable, "if a COVID-19 vaccine were available would you get it", and independent variables what type of care provided (direct/ or indirect care), and covariate professional practice degree. Table 8 shows the results of this analysis; where the type of care provided was not significant (p=.859), and professional practice degree was also not significant (p=.300). An interaction variable was created with a professional degree and type of patient care provided to determine if there was a moderating effect present, and the results of the moderation analysis showed that there was not a statistically significant association between type of care provided and intent to receive the COVID-19 vaccine, (p=.085) further this relationship was slightly modified by the interaction variable, control variable RQ2 (p=.085) but it was not a statistically significant association. Therefore, the null hypothesis ($H_0$2: The association between type of patient care provided and intent to receive COVID-19 vaccine is not modified by the type of professional degree) was accepted.

Table 8

Coefficient- Type of Care Provided/Intent to Vaccinate/Professional Practice Degree

Model	B	Std. Error	Beta	Sig.	Collinearity Statistics VIF
1 (Constant)	1.094	.070		<.001	
Which of the following best describes your current industry?	.008	.044	.010	.859	1.248
What is your current role?	.014	.014	.059	.300	1.248
2 (Constant)	.722	.226	.432	.002	
Which of the following best describes your current industry?	.331	.192		.085	24.176
What is your current role?	.086	.044	.357	.050	12.713
Interaction Variable /Type Care /Vaccine Intent/ Professional Degree	-.061	.035	-.622	.085	49.856

a. Dependent Variable: If a COVID-19 vaccine were available to you, would you get it?

Research Question 3

To approach RQ3- (Is the association between type of patient care provided and intent to receive COVID-19 vaccine modified by years of education, practice location, and race/ethnicity?). A multivariable regression analysis was conducted to evaluate the relationship between the dependent variable, if a COVID-19 vaccine were available, would you get it, and the independent variable, type of patient care provided, and covariates race, ethnicity, years of education, and practice location. An interaction variable was created and run in the analysis, Interaction variable/ Type of Care / Vaccine Intent / Education / Practice Location / Race / Ethnicity (p=.171); this variable was not statistically significant, nor did it have a moderating effect. Table 9 illustrates the results of the modification analysis between years of education (p=.062) which was not significant, and type of patient care provided (p=.358), which was also not a statistically significant association with intent to receive the COVID-19 vaccine.

The analysis revealed that practice location (p=.011) was statistically significant, and the results can be seen in Table 10. While the variable location was found to be statistically significant, it does not appear to have a moderating effect on the association between the type of care provided and intent to receive the COVID-19 vaccine. The results of the modification analysis for race are displayed in Table 11; although race (p= <.001) was found to be statistically significant when a new interaction variable was created and tested, it did not have a modifying effect on intent to receive the COVID-19 vaccine (p=.152). Table 12 reveals the results of the modification analysis for ethnicity (p=.704) and the newly created interaction variable, Interaction Variable / Type Care /

Vaccine Intent/ Ethnicity ($p=.431$), which was not statistically significant, but there is

slight modification but not enough to have a statistically significant association between

type of patient care provided and ethnicity and intent to receive the COVID-19 vaccine.

Table 13 shows the correlation between the type of care provided and intent to

vaccinate, and years of education, practice location, and race/ ethnicity. To answer RQ3,

the type of care provided and intent to receive the COVID-19 vaccine were not modified

by years of education, practice location, or race/ethnicity. Therefore, the null hypothesis

(H_{03}: The association between type of patient care provided and intent to receive COVID-

19 vaccine is not confounded by years of education, practice locations, and

race/ethnicity) is therefore accepted.

Table 9

Coefficient- Type of Care/Vaccinate Intent/Education

	B	Std. Error	Beta	Sig.	Collinearity Statistics VIF
(Constant)	.930	.124		<.001	
Which of the following best describes your current industry?	.036	.039	.047	.358	1.012
What is your highest level of education completed?	.055	.029	.096	.062	1.012
(Constant)	1.366	.341		<.001	
Which of the following best describes your current industry?	-.245	.209	-.320	.241	23.734
What is your highest level of education completed?	-.069	.095	0.120	.468	10.650
Interaction Variable- Type Care/ Vaccine Intent / Education	.081	.059	.411	.171	34.756

a. Dependent Variable: If a COVID-19 vaccine were available to you, would you get it?

Table 10

Coefficients- Type of Care/Vaccine Intent/Practice Location

	B	Std. Error	Sig.	Collinearity Statistics VIF
(Constant)	1.077	.063	<.001	
Which of the following best describes your current industry?	.030	.039	.442	1.000
Do you currently work in any of the following locations?	.025	.010	.011	1.000
(Constant)	1.086	.088	<.001	
Which of the following best describes your current industry?	.023	.058	.691	2.247
Do you currently work in any of the following locations?	.021	.030	.483	9.150
Interaction Variable- Type Care / Vaccine Intent / Practice Location	.003	.020	.878	10.273

a. Dependent Variable: If a COVID-19 vaccine were available to you, would you get it?

Table 11

Coefficients- Type of Care/Vaccine Intent/Race

	B	Std. Error	Sig.	Collinearity Statistics VIF
(Constant)	.879	.086	<.001	
Which of the following best describes your current industry?	.034	.038	.374	1.002
What is your race?	.065	.016	<.001	1.002
(Constant)	.624	.197	.002	
Which of the following best describes your current industry?	.212	.130	.103	11.394
What is your race?	.132	.050	.008	9.352
Interaction Variable / Type Care / Vaccine Intent / Race	-.047	.033	.152	18.986

a. Dependent Variable: If a COVID-19 vaccine were available to you, would you get it?

Table 12

Coefficients- Type of Care/Vaccine Intent/Ethnicity

	B	Std. Error	Sig.	Collinearity Statistics VIF
(Constant)	1.075	.167	<.001	
Which of the following best describes your current industry?	.026	.040	.514	1.021
What is your Ethnicity?	.032	.084	.704	1,021
(Constant)	1.500	.565	.008	
Which of the following best describes your current industry?	-3.47	.474	.465	146.157
What is your Ethnicity?	-1.84	.287	.521	11.820
Interaction Variable/ Type Care / Vaccine Intent/ Ethnicity	.189	.240	.431	168.258

a. Dependent Variable: If a COVID-19 vaccine were available to you, would you get it?

Table 13

Correlations Between Type of Care/Education/Race/Ethnicity/Location

		If a COVID-19 Vaccine were available to you. Would you get it?	Which of the following best describes your current industry?	What is your highest level of education completed?	What is your race?	What is your Ethnicity?	Do you currently work in any of the following locations?
Pearson Correlation	If a COVID-19 vaccine were available to you, would you get it?	1.00	.037	.091	.198	.024	.129
	Which of the following best describes your current industry?	0.37	1.000	-.110	-.041	.143	-.019
	What is your highest level of education completed?	.091	-.110	1.000	.182	-.103	-.091
	What is your race?	.198	-.041	.182	1.000	-.181	-.092
	What is your ethnicity?	.024	.143	-.103	-.181	1.000	.023
	Do you currently work in any of the following locations?	.129	-.019	-.091	-.092	.023	1.000
Sig. (1-tailed)	If a COVID-19 vaccine were available to you, would you get it?		.237	.038	<.001	.316	.006
	Which of the following best describes your current industry?	.237		.015	.213	.002	.353
	What is your highest level of education completed?	.038	.015		.000	.022	.038

	What is your race?	.000	.213	.000		.000	.036
	What is your ethnicity?	.316	.002	.022	.000		.330
	Do you currently work in any of the following locations?	.006	.353	.038	.036	.330	
N	If a COVID-19 vaccine were available to you, would you get it	385	385	385	385	385	385
	Which of the following best describes your current industry?	385	385	385	385	385	385
	What is your highest level of education completed?	385	385	385	385	385	385

Summary

The results of this study fully supported the null hypothesis, and the null hypothesis was retained for all three of the research questions. For RQ1, there was not a statistically significant association between the type of care provided and intent to receive the COVID-19 vaccine. The results of my supplemental analysis revealed that 37.9% of the respondents trust the safety of COVID-19 vaccine, and 62.1% of respondents do not trust the COVID-19 vaccine. The results of my supplemental analysis also revealed that 82.6% of respondents perceived a risk of getting COVID-19. RQ2, there was not a statistically significant association found between the type of care provided and intent to receive the COVID-19 vaccine modified by professional practice degree. For RQ3, there was not a statistically significant association between the type of care provided (direct/

indirect) and intent to receive the COVID-19 vaccine confounded by practice location, years of education, or race/ethnicity. Continued discussions regarding this study and its limitations, recommendations, and implications are presented in Chapter 5.

Chapter 5: Discussion, Conclusion, and Recommendations

The purpose of this study was to explore vaccination hesitancy among nonmandated nurses and healthcare professionals and evaluate if the type of care provided influenced intent to receive the COVID-19 vaccine. The aim of this study was to gather information surrounding reasons for vaccination hesitancy in this critical population to help create better healthcare initiatives in the future, increase vaccine uptake, and reduce overall cases of COVID-19. The survey data was collected from nonmandated healthcare professionals of multiple races and ethnicities between 18-70 years of age. The dependent variable was intended to receive the COVID-19 vaccine, and the independent variables were the type of patient care provided (direct/indirect), practice location, race/ethnicity, and professional practice degree. The study revealed that there is not a significant association between the type of care provided and intent to receive the COVID-19 vaccine. The study revealed that there is a significant association between intent to receive the COVID-19 vaccine and race. Lastly, the study revealed that there was not a significant association between the type of care provided and intent to receive the COVID-19 vaccine modified by professional practice, degree, years of education, and race/ethnicity. Chapter 5 covers interpretations of the study findings, as well as study limitations, potential contributions to positive social change, suggestions for continued research, and lastly, a conclusion.

Interpretation of the Findings

There is a wealth of information in the literature regarding vaccination hesitancy, and I felt it was quite relevant to dive further into vaccination hesitancy among the

critical population of healthcare professionals. After a thorough literature review, I found a gap in the body of knowledge as it pertained to the type of care provided and the COVID-19 vaccination intent of nonmandated nurses and healthcare professionals. I sought to answer three research questions:

RQ1: Is there an association between type of patient care provided (direct/ indirect care) and intent to receive COVID-19 vaccination?

RQ2: Is the association between type of patient care provided and intent to receive COVID-19 vaccine modified by the type of professional practice degree?

RQ3: Is the association between type of patient care provided and intent to receive COVID-19 vaccine confounded by years of education, practice location and race/ethnicity?

For RQ1, the results of the logistic regression analysis revealed that the null hypothesis was accepted, and there was no association between the type of care provided (direct/indirect) and intent to receive the COVID-19 vaccine. In Chapter 2, I discussed an article by Zampetakis and Melas (2021) where they examined COVID-19 vaccination hesitancy by using insight from the HBM to predict intent to vaccinate against COVID-19. Similarly, to this study, the researchers used multilevel modeling techniques to conduct data analysis, and their study revealed that the elements of the HBM do, in fact, have an influence on healthcare workers' intention to vaccinate.

The results of the multivariable regression analysis for RQ2 revealed that there was no association between the type of patient care provided and intent to receive COVID-19 modified by professional practice degree, and the null hypothesis was

accepted. Just as I considered education in this study, in Chapter 2, authors Karlsson, Lewandowsky, et al. (2019) conducted a study on vaccination hesitancy among healthcare workers and years of education. The study found that those with higher degrees perceived vaccinations to be beneficial and safe, also aligning with the HBM and perceived risk and susceptibility.

For RQ3, the results of the multivariable regression analysis revealed that the association between type of patient care provided and intent to receive the COVID-19 vaccine was not confounded by years of education, practice location, or race/ethnicity; therefore, the null hypothesis was accepted. Race and professional practice location were the only predictor variables that were found to have a statistically significant association with intent to receive the COVID-19 vaccine, although they did not have a modifying effect.

My study can be compared to the study by Willis et al. (2021) in that both studies found that race was statistically significant to healthcare workers' vaccination intent and suggested that further research on the topic is warranted. In similar findings to Cordina et al. (2021), my study results also revealed a predominately female population that stated they would take the COVID-19 vaccine. The study's findings align with the theoretical framework, further proving that the HBM does help predict health behaviors, whereas practice location and race were found to have a statistically significant association with intent to receive the COVID-19 vaccine. Throughout history, the HBM has largely been used to examine relationships between health behaviors and the use of health services (Shmueli, 2021). This study shows that most healthcare workers' vaccine intent was

influenced by their perceived risk, as the HBM suggests. The study results showed that 82.6% of study respondents perceived themselves at risk of getting COVID-19.

Limitations of the Study

The data for this study was collected through an online self-report survey powered by Survey Monkey. Due to the nature of this type of data collection method, one of its limitations is response bias. The respondents may have answered questions untruthfully or with an answer they felt was socially acceptable. Many of the respondents were females and African Americans, which limits the generalizability of the study. Due to these demographic factors, the generalizability of results should be interpreted with caution. Based on the reduced generalizability, further research is warranted.

Recommendations

The results of this study shed some insights into the thoughts and feelings of healthcare professionals on the COVID-19 vaccine. The outcome of this study highlights the significant impact that practice location and race play in the intention to vaccinate against COVID-19 from a nonmandated healthcare workers' perspective. The information revealed in this study will help public health officials have a better understanding of intentions to receive the COVID-19 vaccine in order to create better initiatives in the future. Additional qualitative research is recommended to include a more diverse and larger population in order to increase generalizability. A qualitative study could possibly reveal more specific reasons for hesitancy in this critical population. Speaking with participants in a more intimate setting may produce better answers to why some health care workers are vaccine hesitant.

Implications

This study has the potential to impact positive social change by helping public health officials better understand the reasons for vaccine hesitancy and identify specific populations in which it most exists. Dissemination of the study results can possibly increase vaccine uptake and help reduce the number of COVID-19 cases in communities. Knowing that race and practice location plays an important role, public health officials can create more targeted initiatives that aim to reach the groups which were most vaccine hesitant.

Conclusion

The HBM is fully supported in context with the results of this study, the health professionals that perceived themselves at the highest risk of getting COVID-19 stated that they were likely to get the COVID-19 vaccine. Vaccines are one of the most effective methods of preventing the spread of communicable diseases if used. Having health professionals that are vaccine-hesitant can greatly impact the uptake of necessary vaccinations, which makes studies like this so relevant. The more public health officials understand the reasons individuals are vaccine-hesitant, they can plan for better initiatives targeted at these specific populations. Hopefully, this study will create positive social change by adding to the current body of knowledge on vaccine hesitancy among nurses and healthcare professionals. Public health officials and the community at large must continue to raise awareness of the importance of vaccines and counteract any barriers to uptake, such as vaccine hesitancy, to help create healthier communities. No one is

protected until we all are protected and increasing vaccine uptake is the best way to accomplish this goal.

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Appendix A: Operationalization of Variables

Operational Measures for Independent, Dependent, and Covariate Variables

Variables	Survey Questions	Data Code	Variable Type
Age	1.What is your Age?	N/A	Scale
Sex	2. What was sex assigned at birth?	1= Male 2= Female 3= Rather not say 4= Don't know	Categorical
Ethnicity	3.What is your ethnicity?	1=Hispanic or Latino 2= Non-Hispanic/Latino 3= Other	Categorical/ Covariate
Race	4.What is your Race?	1= American Indian or Alaska Native 2= Asian 3= Black or African American 4= Native Hawaiian or Other Pacific Islander 5= White 6= Something else 7= Don't want to say	Categorical/ Covariate
Geography	5.What is your zip code?	N/A	Categorical

Education	6. Highest level of Education?	1= Less than high school	Ordinal/ Covariate
		2= High school or equivalent (e.g., GED)	
		3= Some college, including associate degree or trade school	
		4= Bachelor's degree or higher	
Work Category	7. Which of the following describes your current industry	1= Provide direct medical care to patients (e.g., physician, nurse, physician assistant, dentist, therapist, home healthcare provider or worker, or emergency responder)	Categorical / Predictor
		2= Do not provide direct medical care to patients, but work or volunteer in a healthcare facility (e.g., patient transport driver, administrator, janitor, food preparer, volunteer, or other in a hospital, doctor's office, dentist's office, clinic, nursing home, or residential care home)	
		3= Frontline essential worker (worker who regularly comes into contact with the public, such as firefighter, police officer, corrections officer, food and agricultural worker, United States Postal Service worker, manufacturing worker, grocery store worker, public transit worker, taxi/rideshare driver, or work in the	

educational sector [teacher, support staff, or day care worker], etc.)

4= non-frontline essential worker (worker who does not regularly come into contact with the public but works in a critical industry, such as transportation and logistics, food service, housing construction, finance, information technology, communications, energy, law, media, public safety, waste and wastewater, public health, etc.)

5= Other work or volunteer activities

6= Not sure

7= Rather not say

Health Worker Role	8. What is your current role?	1= Physician (MD/DO) 2= Nurse 3= Nurse practitioners 4= Allied health (e.g., MAs, tech, CNAs) Community health worker 5= Pharmacist 6= Other health worker	Ordinal/ Predictor
Health worker setting	9. Do you currently work in any of the	1= Hospital	Categorical/ Covariate

		2= Physician's office, or other non-hospital setting (e.g., medical clinic, urgent care outpatient surgery center, or any other outpatient or ambulatory care setting)	
	following locations?	3= Dentist office or dental clinic	
		4= Pharmacy	
		5= Nursing home, assisted living facility, or other long-term care facility	
		6= Home health agency or home health care	
		7= Emergency medical service (EMS) setting (e.g., pre-hospital EMS setting, ambulance, paramedic, or patient transport service, or fire department)	
		8= Other	
Vaccine Experience	10. Have you received a COVID-19 vaccine?	0= No 1= Yes	Categorical/ Outcome
Perceived Self Risk	11. If you received vaccine, how concerned were you about getting COVID-19?	1= Not at all concerned 2= A little concerned 3= Moderately concerned 4= Very concerned	Categorical

COVID-19 Perceived Susceptibility	12. If you have not received the vaccine, how concerned are you about getting COVID-19	1= Not at all concerned 2= A little concerned 3= Moderately concerned 4= Very concerned	Categorical
Vaccine Safety (Perceived barriers)	13. If you have not been vaccinated, how safe do you think a COVID-19	1= Not at all safe 2= A little safe 3= Moderately safe 4= Very safe	
COVID-19 Vaccine Intention	14. If a COVID-19 vaccine were available to you, would you get it?	1= Yes, would get it as soon as possible 2= Yes, but plan to wait to get it 3= No 4= Not sure	Categorical/ Outcome
Motivation (Cues to Action)	14. What would motivate you to get vaccinated?	1= Protect my health 2= Protect health of family/friends 3= Protect health of coworkers 4= Protect health of community 5= To get back to work/school 6= To resume social activities 7= To resume travel 8= Because others encouraged me to get vaccinated	Categorical

9= Other

0= Not sure

Self-Efficacy	How easy do you think it will be to get a COVID-19 vaccine for your-self?	1= Very easy 2= Somewhat easy 3= Somewhat difficult 4= Very difficult 5= Not sure	Categorical
Social Norms	How much do you trust the public agencies that recommend you get a COVID-19 vaccine?	1= Not at all 2= A little 3= Moderately 4= Very much	Categorical

Appendix B: Research Invitation Flyer

New Online Study seeks Nurses and other Healthcare Professionals that Were Not Mandated to Receive COVID-19 Vaccine

This new study is called *"Exploring COVID-19 Vaccine Hesitancy Among Nurses and Healthcare Professionals"* that could help public health officials better understand reasons for vaccine hesitancy in this vital population. For this study, you are invited to answer several multiple-choice questions, after completing the survey, you are asked to share the survey with family and friends.

This survey is part of the doctoral study for Germaine Nelson, MPH, a Ph.D. candidate at Walden University.

<u>**About the study:**</u>
- One 15-minute online survey
- To protect your privacy, no names will be collected

<u>**Volunteers must meet these requirements:**</u>
- Between 18-70 years of age
- Work as a Nurse or other Healthcare Professional
- You were not mandated by an employer to receive the COVID-19 vaccine

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To confidentially volunteer, click the following link:
https://www.surveymonkey.com/r/F5PPD9M