

**Do sources of health information regarding COVID-19 differ among vaccinated
and unvaccinated nursing students?**

By

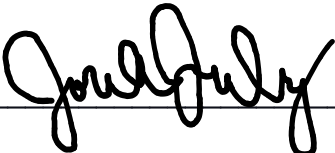
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Abstract

Background: Vaccine hesitancy among nurses can contribute to patient hesitancy about the need for and safety of COVID-19 vaccination. Understanding and addressing vaccine hesitancy among nurses is a critical public health issue. **Purpose:** The current study aims to identify factors related to COVID-19 vaccine hesitancy among nursing students attending the University of Michigan-Flint. **Methods:** Secondary data analysis was conducted using an online survey distributed to nursing students. A total of two hundred and thirty surveys were received, but after removing incomplete surveys, the final sample size was (n = 194). Descriptive statistics were conducted and analyzed to identify the relationship between COVID-19 vaccination and reported sources of health information. **Results:** In this study, 87% of nursing students were vaccinated, and 12% were not. Unvaccinated nursing students (UNS) were older with a mean age of 40 vs 35 (p < .001). The majority of UNS identified as having an “other” political affiliation compared to 41% of vaccinated nursing students who identified as Democrat/Liberal (33%) (p < .001). Vaccinated (73.4%) and unvaccinated (62.5%) nursing students both reported the CDC as their primary source of health information regarding COVID-19. Yet, a much larger percent of vaccinated nursing students (89.3% vs 58.3%) agreed/strongly agreed the CDC was a source of creditable and accurate health information (p < .001). **Implications:** To address vaccine hesitancy among nursing students, socio-demographic factors such as political affiliation and trust in governmental agencies need to be addressed.

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Dedication

I must express my profound gratitude to my family, especially my husband, children, and parents, for providing unfailing support and continuous encouragement throughout my years of education and through the process of researching and writing this paper. This accomplishment would not have been possible without them. Thank you.

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I would also like to thank the students before me who took part in the survey and research for the dataset. Without their time and patience, I would not have the information needed to complete the research necessary for my ILE. I would also like to acknowledge Professor July at the University of Michigan – Flint as the second reader of my paper. I am gratefully indebted to her for her valuable time and the comments she provided on this paper.

Introduction

The outbreak of COVID-19 has significantly changed the lives of millions worldwide (Khan et al., 2020). COVID-19 has caused 6,584,104 deaths since the end of 2019 (WHO Coronavirus (COVID-19) Dashboard, n.d.). The discovery of the COVID-19 vaccine is one of the most effective ways of managing this infectious disease (Paterson et al., 2016). According to Watson et al. (2022) an estimated 14.4 million deaths have been prevented because of the COVID-19 vaccine.

The World Health Organization recognized vaccine hesitancy as a top threat to global health in 2019 (Leung et al., 2022). Vaccination is needed to minimize the risk of transmitting the infection (whether COVID-19 or other illnesses) and reach herd immunity (McElfish et al., 2021). To achieve population or herd immunity, 75% to 90% of the population needs to have immunity via natural infection or vaccination (McElfish et al., 2021).

There are many reasons why a person may be vaccine hesitant such as a lack of confidence in the vaccine and/or accessibility (Gerretsen et al., 2022). Where one seeks health information is also likely to influence their attitudes, beliefs, and behaviors regarding vaccination (Larson et al., 2015). The current research aims to understand vaccine hesitancy among nursing students. Specifically, this study examines the relationship between COVID-19 vaccination and reported sources of health information. Understanding the relationship between COVID-19 vaccination and reported sources of health information among nursing students is important for improving vaccination education and promotion efforts among nursing students and healthcare providers more generally.

Literature Review

Vaccine hesitancy is the delay or refusal to administer or obtain vaccines despite available services for healthcare providers and the general public (Leung et al., 2022). According to Gerretsen et al. (2021), vaccine hesitancy appears when individuals (1) lack confidence in the safety and effectiveness of the vaccine; (2) are complacent and do not believe the vaccine-preventable disease is severe, and the consequences of the vaccine outweigh the benefits; and (3) when individuals experience access issues, high medical costs, and/or discomfort from the vaccine.

In an international study (2013) from different countries within the American and European regions, the three main reasons for vaccine hesitancy were: (1) beliefs (about vaccine safety and efficacy), attitudes (trust in the vaccines), and motivation about health/prevention: (2) risk/benefit (side effects vs disease control); and (3) communication within the media (influence of anti-vax reports) (Larson et al., 2015). According to a meta-analysis conducted in November 2020 about the COVID-19 vaccine, the main reasons for vaccine hesitancy are (1) against vaccines in general, (2) concerns about safety and efficacy (the vaccine was made too fast), (3) the vaccine is useless (COVID-19 is harmless), and (4) believed to be already immunized from previously having COVID-19 (Troiano & Nardi, 2021).

Healthcare providers (HCPs) have one of the strongest influences on vaccine recommendations (Paterson et al., 2016) since they build trust and rapport with their patients. Many healthcare providers are more likely to recommend vaccination when vaccinated, while other healthcare providers believe vaccination is a personal choice and that their patients should decide on their own (Paterson et al., 2016).

Sociodemographic Factors and Vaccine Hesitancy

Vaccine hesitancy and trust in vaccines vary significantly among different sociodemographic groups (McElfish et al., 2021). Vaccine attitudes are associated with sociodemographic factors such as age, sex, race, and education level (McElfish et al., 2021). A study conducted in the U.S. and Canada (2020-2021) showed that 13% of vaccine hesitancy was explained by sociodemographic characteristics (Gerretsen et al., 2021). Researchers such as McElfish et al. (2021) found that younger individuals, those with less education, and those with lower incomes all report higher levels of vaccine hesitancy (McElfish et al., 2021).

Race/ethnicity is also associated with vaccine attitudes, beliefs, and behaviors. According to Stroope et al. (2021), African Americans have high levels of medical mistrust and express greater hesitancy toward government-mandated vaccines. *Medical mistrust* is “the tendency to mistrust medical systems and personnel believed to represent the dominant culture in a given society” (Ash et al., 2021). Vaccine hesitancy among African Americans stems from the mistreatment of Blacks in medicine (Restrepo & Krouse, 2022). Regarding race/ethnicity and COVID-19 vaccination, African Americans are three times more likely to report being vaccine hesitant than whites (McElfish et al., 2021).

Vaccine *confidence* (i.e., trust in vaccine safety, effectiveness, and healthcare systems), *convenience* (i.e., physical, availability, affordability, and accessibility), and *complacency* (i.e., low perceived risks of the disease or not value the vaccine) are the “3 C’s” used to understand vaccine hesitancy (Huang & Green, 2022). When looking into the 3 Cs for African Americans, 65.7% reported a lack of confidence, 33% lack of

convenience, and 8.1% reported complacency (Huang & Green, 2022). Individuals may simultaneously fall into two or more categories when explaining why they are hesitant to receive the vaccine (Huang & Green, 2022).

Concerning vaccines overall, the Kaiser Family Foundation (KFF) has noted that vaccination rates have narrowed between Blacks, Hispanics, and Whites (Latest data on COVID-19 vaccinations by Race/Ethnicity, 2022). As of July 11, 2022, the vaccination gap between Whites and Blacks fell 14% (38% vs. 24%) to 5% (64% vs. 59%). Importantly, while vaccination rates increased among both groups, the race/ethnicity vaccination gap has narrowed (Latest data on COVID-19 vaccinations by Race/Ethnicity, KFF.org, 2022).

Vaccine Hesitancy in Nurses

There are many reasons why nurses are vaccine hesitant. According to Patterson (2016), some reasons nurses may be vaccine hesitant are because of individual/social-group influences, while other reasons for vaccine hesitancy include vaccine and vaccination-specific issues, such as concerns about vaccine side effects. Social norms play a crucial role in how individuals perceive health information and act upon the information they receive (Paterson et al., 2016); nurses are no different (Paterson et al., 2016). Using the Strategic Advisory Group of Experts (SAGE), the WHO has found some reasons behind vaccine hesitancy among healthcare providers, which include: (1) contextual influences (i.e., influential leaders and individuals), (2) individual/social groups (i.e., personal experience) and struggling with trusting the healthcare system, and (3) vaccine and vaccination-specific issues (Paterson et al., 2016).

Vaccination-specific issues are an important reason for vaccine hesitancy among nurses and other healthcare providers (HCPs). Nurses see the best and the worst of different healthcare practices, losing trust in certain aspects of the healthcare system (Paterson et al., 2016). Vaccine effectiveness, schedule, mode of administration/delivery, reliability of vaccine supply, tailoring of vaccines, and inadequate training or information support are some ways nurses can lose trust in the healthcare system (Paterson et al., 2016).

Many factors related to general vaccine hesitancy are relevant for understanding COVID-19 vaccine hesitancy among nurses and the general public. Vaccines have been around for over two centuries and are why many infectious diseases have been eradicated (“brief history of vaccination,” 2020). COVID-19 vaccines were approved in late 2020 and started being administered in early 2021 (Biswas et al., 2021). COVID-19 vaccines were used with the science and information gained over the years. A Kaiser Family Foundation Study found that roughly 29% of HCPs were reluctant to receive the COVID-19 vaccine compared to 27% of the public (Biswas et al., 2021). Within nursing homes in the U.S., more than three-fourths (77.8%) of the residents received at least one dose of the vaccine compared to just over one-third (37.5%) of the staff (Biswas et al., 2021). According to researchers Biswas et al. (2021), most nurses who are COVID-19 vaccine-hesitant have concerns about safety, efficacy, and side effects (>75%).

Healthcare workers, including nurses, are the most influential in advocating and providing patients with information about the COVID-19 vaccine (Curtin, 2021). Steven Brandenburg was a pharmacist in Wisconsin who did not believe in the vaccine. He deliberately removed 570 doses of Moderna’s COVID-19 vaccine from refrigeration and

left it out to become room temperature, making the vaccine ineffective (Curtin, 2021). Brandenburg believed the vaccine would change people's DNA (Curtin, 2021). When individuals see media postings and news articles about healthcare workers not wanting the vaccine or destroying vaccines, this can decrease public trust in vaccination, resulting in vaccine hesitancy (Curtin, 2021).

Misinformation vs. Disinformation

Misinformation and disinformation are two communication factors that can contribute to vaccine hesitancy (Dib et al., 2022). *Misinformation* is untrue or inaccurate information without being intentionally misleading or harmful; in other words, it is inaccurate information (Hameleers et al., 2022). In comparison, *disinformation* is information that is deliberately misleading and false (Hameleers et al., 2022). In addition, disinformation is used to change political attitudes and behaviors by raising political mistrust (Hameleers et al., 2022). The World Health Organization (WHO) has described the field of vaccination as an "uncontrolled dissemination of misinformation" and as an urgent health challenge for the next decade (Dib et al., 2022). Some online health information has been the source of vaccine hesitancy through spreading misinformation and disinformation about the risks and benefits of COVID-19 vaccines (Dib et al., 2022). The spread of misinformation about COVID-19 has been labeled as a "crisis of trust" (Lockyer et al., 2021). The decline in trust has been reinforced by public criticism of government responses making individuals unsure of where to go for credible health information regarding COVID-19 (Lockyer et al., 2021). For example, when searching for vaccine information on the internet, individuals who search for "vaccination risks" are 3.6 times more likely to find vaccine misinformation and are 4.8

times more likely to encounter vaccine misinformation than individuals who use neutral terms such as “vaccine-related risks” (i.e., neither related to risks or benefits) (Dib et al., 2022).

According to Dib et al. (2022), not only is the world currently in a pandemic but also in an *infodemic*, “the overabundance of information – some accurate and some not – that occurs during an epidemic” (Dib et al., 2022). Echo chambers can also contribute to vaccine hesitancy. Echo chambers have become a significant outlet for misinformation and can distort an individual’s perspective, causing difficulty considering other viewpoints (“Digital media literacy: What is an echo chamber?,” n.d.). An *echo chamber* is an environment where individuals encounter information or opinions that reinforce their own (“Digital media literacy: What is an echo chamber?,” n.d.). Since the start of the COVID-19 vaccine, 85,000 anti-COVID-19 vaccine Facebook accounts have been developed, with approximately 60 million followers (Hernandez et al., 2021). Echo chambers are powered by confirmation bias and the likelihood the information will favor and reinforce one’s existing beliefs (“Digital media literacy: What is an echo chamber?,” n.d.). Filters based upon algorithms to keep track of what information a person looks at and will continue to give them the same content, which can isolate them from other information and opinions (“Digital media literacy: What is an echo chamber?,” n.d.).

Changing messages/recommendations

In the U.S., managing the COVID-19 pandemic has been a significant challenge. Conflicting information causes vaccine hesitancy, and throughout the pandemic, both (conflicting messages and vaccine hesitancy) have been on the rise. Conflicting information is two or more health-related propositions that are inconsistent (Nagler et

al., 2020). Politicians and health experts are the two biggest culprits of conflicting health messages (Nagler et al., 2020). Recommendations about mask-wearing, social distancing, and vaccinations are a few of the most common topics in which conflicting messages have surfaced during the COVID-19 pandemic (Nagler et al., 2020).

A study by the Pew Research Center found that 26% of Americans reported conflicting messages/facts about COVID-19 while watching the news (Nagler et al., 2020). When healthcare issues have been politicized, the likelihood of conflicting messages is enhanced—one message from politicians and another from healthcare experts.

Political affiliation reflects ideologies based on family history, religious affiliation, and in-group formations (Howard, 2022). Masks have been essential in minimizing the spread of COVID-19, but many feel face masks are ineffective and refuse to wear them (Nagler et al., 2020). Republicans have been more reluctant to wear face masks than other political parties (Howard, 2022). The Republican administration has proposed face mask-wearing as a symbol of poor public health management, causing republicans to downplay the overall severity of COVID-19 (Howard, 2022). The spread of negative information regarding face masks is more likely to be portrayed in republican oriented media, which caused republicans to believe and share more damaging details on face masks (masks don't work or they are going to cause more harm than good) (Howard, 2022). Most individuals actively seek "positive information" regarding their political party, including misinformation, and are less likely to remember "negative information" and within the Republican party many think that not having to wear a face mask is positive information (Howard, 2022). Members of the Republican party are more likely to be

influenced by their political affiliation and dismiss their feelings about COVID-19 because of the “positive information” that is found on the internet (Howard, 2022).

Vaccinations are also highly politicized, and the harmful attention/refusal to receive an immunization from non-credible sources significantly impacts the public health response (Howard, 2022). There are many websites and “news articles” that provide misinformation and disinformation to turn people away from the vaccine which, in turn, is harming the public health response. Republicans have downplayed the overall severity of the pandemic and contributed to vaccine hesitancy (Howard, 2022). In a study done by the Kaiser Family Foundation (KFF), 40% of Republicans “don’t plan” to get vaccinated, compared to 26% of Independents and 3% of Democrats (Galston, 2022). In the same study, 23% of Republicans stated they will “definitely not” get vaccinated, versus 11% of Independents and 4% of Democrats (Galston, 2022). Howard (2022) found that political party affiliation has a stronger relationship than political ideology to vaccine hesitancy (Howard, 2021). According to Howard (2022), many individuals will stop or change their health behavior based on political messages (Howard, 2022).

Throughout the early part of the pandemic, President Trump was criticized for his attempts to manage the public health crisis (Gao & Radford, 2021). The former president publicly disagreed with health experts causing republican governors and states with more Trump supporters to slowly adapt to social distancing (Gao & Radford, 2021). In April 2020, many political leaders deliberately went against public health officials by “relaxing” and reducing public health measures to minimize the spread of COVID-19 (Gao & Radford, 2021). Rather than an unformed response, the public

received mixed messages from federal, state, and local governments about the health-protective actions they should take during the pandemic (Gao & Radford, 2021). By September 2020, former President Trump admitted to the downplay of his COVID-19 response to try and reduce panic, which in turn caused higher rates of COVID-19 infections and fatalities within the counties who voted for him (Gao & Radford, 2021).

Democrats are more likely to engage in health-protective behaviors, be more concerned about COVID-19, and support public health policies implemented to slow the spread of COVID-19 (Gao & Radford, 2021). On the other hand, Republicans are less concerned and less likely to follow public health policies; they are also less likely to search for information regarding COVID-19 and are less likely to follow social distancing protocols (Gao & Radford, 2021). Moreover, data collected from Johns Hopkins University showed that among the 21 states with vaccination rates above the national average, Joe Biden carried 20 of them. Of the 29 states below the national average, Donald Trump carried 24 of them during the November election (Galston, 2022). Differences in political affiliation and vaccination behaviors are not unique to the COVID-18 pandemic. During swine flu (H1N1), Republicans were also found to be less likely to be vaccinated than their democratic counterparts (Gao & Radford, 2021).

Summary

Vaccine hesitancy is not a new phenomenon, but one that has been around since the introduction of vaccines in 1798 (Lavigne, 2021). The COVID-19 vaccine has been no different, and with the involvement of social media, the spread of misinformation and disinformation is at an all-time high. As stated above, there are

many different reasons behind vaccine hesitancy, but is knowing where to find credible information another reason for vaccine hesitancy?

- H1: It is hypothesized that sources of health information regarding COVID-19 will differ among vaccinated and unvaccinated nursing students. Those who report accessing health information from health-based organizations and professionals (i.e., PCP, CDC, Dr. Fauci, etc.) will report higher vaccination rates than those who report accessing health information from non-health-based organizations and professionals.
- **Methods**

A cross-sectional online survey was distributed to nursing students attending the University of Michigan – Flint, where data was collected between December 10th, 2021, and January 28th, 2022. Thirty-five questions were included in the online survey, including demographic characteristics, personal health status, employment status, work conditions, COVID-19 knowledge, primary sources of COVID-19 information, and vaccination behaviors. To participate in the study, participants had to be students at the University of Michigan – Flint and in the Registered Nursing (RN) to Bachelor of science in nursing (BSN) program. Nursing students were recruited by nursing program faculty via email and classroom announcements. As an incentive, three \$50 gift cards were given to three randomly picked students. A total of two hundred and thirty surveys were submitted. However, after removing incomplete surveys, the sample size was reduced to (n = 194). This research study was approved by the Institutional Review Board (IRB) of the University of Michigan – Flint.

The current research involves secondary data analysis. The purpose is to explore the relationship between COVID-19 vaccination and sources of health information among nursing students. Variables of the study included participant demographics, reported sources of health information, and attitudes and beliefs about accurate and credible health information sources.

Measures

The demographic variables for this study include age, which was self-reported in number of years; gender (Male, Female, Transgender, other, prefer not to say); primary race/ethnicity (Black/African American, Hispanic/Latinx, Hawaiian or Pacific Islander, other, and care not to respond); religion (Catholic, Mormon, Jehovah's witness, non-denominational, Jewish, Muslim, Buddhist, Hindu, Atheist, other, and care not to respond); and political affiliation (Republican/conservative-leaning, Democrat/Liberal-leaning, Independent, other, none, and care not to respond).

Reported sources of health information were measured with a single item that asked survey respondents to write in the top three places they went to obtain COVID-19 information.

Attitudes and beliefs about sources of accurate and credible health information were measured by asking respondents how much they agreed/disagreed with fifteen different sources of health information such as the CDC, Dr. Fauci, Former President Trump/Republican Leadership, Michigan Governor Whitmer/Democratic Leadership, etc.

Analytic Plan

All analyses were conducted using the Statistical Package for the Social Sciences (SPSS) version 26. Descriptive statistics were conducted and analyzed to identify factors related to COVID-19 hesitancy. Frequencies were run for dichotomous and categorical variables, i.e., COVID-19 vaccine (dependent variable), top three places I go for information (independent variable), sources of credible information (independent variable), as well as gender, primary race/ethnicity, religion, and political affiliation (covariates). Mean, and standard deviation (SD) were generated for age (continuous variable). Bivariate analyses were conducted to examine the relationship between COVID-19 vaccine history and age, gender, primary race/ethnicity, religion, political affiliation, top 3 places I go for information, and sources of credible information.

Results

Table 1: Demographic Profile of Study Participants (N = 193)

	Vaccinated (n = 169)	Unvaccinated (n = 24)	P-value
Age	M35.08(SD9.52)	M39.96(SD8.07)	<0.001***
Gender			0.559

Male	23(13.6%)	1(4.2%)	
Female	144(85.2%)	23(95.8%)	
Other	1(0.0%)	0(0.0%)	
Primary Race/Ethnicity			0.28
White/Caucasian	142(84.0%)	15(62.5%)	
Black/African American	8(4.7%)	3(12.5%)	
Other	18(10.7%)	6(25.0%)	

Religion			0.622
Christian (any)	93(55.0%)	15(62.5%)	
Atheist	18(10.7%)	0(0.0%)	
Other Religion	34(20.2%)	4(16.6%)	
Refused	23(13.6%)	5(20.8%)	
Political Affiliation			0.001***
Republican/ Conservative	44(26.0%)	5(20.8%)	

Democrat/Liberal	69(40.8%)	4(16.7%)	
Independent	13(7.7%)	0(0.0%)	
Other	30(17.8%)	8(33.3%)	

*Denotes $p < .05$, ** $p < .01$, *** $p < .001$

Presented in Table 1 are the mean, standard deviation (SD), and percentages for the variables included in the analysis. The mean age for vaccinated nursing students was 35.08, with an SD of 9.52 years. In contrast, the mean age for unvaccinated students was almost 40 (39.96), with an SD of 8.07 years. The study sample included 167 female nursing students (86.5%) and 24 male students (12.4%), with the other 1.1% accounting for students who identify as a different gender or preferred not to say. Of the 167 female students, 144 (86.2%) were vaccinated, whereas 23 (95.8%) male students were vaccinated. Most of the vaccinated nursing students identified as white (84%), Christian (55%), and Democratic/Liberal (40.8%). On the other hand, many of the unvaccinated students also identified as white (62.5%) and Christian (62.5%) but identified as other (33.3%) for political affiliation, which means they identify as something other than what is listed.

A T-test assessed the relationship between age and COVID-19 vaccine history and found a significant relationship between the two variables ($r=-0.075$, $n=192$, $p<0.001$). A Chi-square was used to assess the relationship between COVID-19 vaccine history and gender, primary race/ethnicity, religion, political affiliation, the top three places I go to for COVID-19 information, and attitudes and beliefs regarding sources of accurate and credible COVID-19 information. Besides age, two of the demographic variables were found to have had statistical significance: race/ethnicity, with a negative association ($r=-0.072$, $n=193$, $p=0.028$) and political affiliation ($r=0.258$, $n=192$, $p=0.001$). **Table 2: Top 5 Sources Used for Accessing COVID-19 Information**

	Vaccinated (n = 169)	Unvaccinated (n = 24)
Top Places for Information		
CDC	124(73.4)	15(62.5)
Other	43(25.4)	12(50.0)

Health Department	39(23.1)	6(25.0)
Scholarly Articles	36(21.3)	5(20.8)
WHO	34(21.1)	3(12.5)

*Denotes $p < .05$, ** $p < .01$, *** $p < .001$

In regard to reported sources used to access COVID-19 information, written responses were coded into 13 different categories: CDC, WHO, NIH, Health department, hospital, employer, healthcare workers, news, scholarly articles, vaccine manufacturer, UM resources, other, and not sure. The “other” category contains many different sources which did not fall into the categories. Some of the sources in the “other” category included the local city pages, webpages, nursing websites, joint commission, and the Michigan board of nursing. The top five categories for reported sources used to access COVID-19 information are reported in Table 2.

For vaccinated and unvaccinated nursing students, the Center for Disease Control and Prevention (CDC) was the primary source reported as being used to find COVID-19, 73.4% and 62.5% respectively. Cell sizes were too small to run bivariate analyses difference between the top 5 sources of credible information among vaccinated and unvaccinated nursing students.

Table 3: Attitudes and Beliefs Regarding Sources of Credible and Accurate COVID-19 Information

Sources of Accurate and Credible COVID-19 Information (Strongly Agree/Agree)			
The Centers for Disease Control and Prevention (CDC)	151(89.3)	14(58.3)	<0.001***
Religion	11(6.5)	5(20.8)	0.005**
CNN	29(17.2)	1(4.2)	0.063
Dr. Fauci, Director of the National Institute of Allergy and Infectious Diseases	112(66.3)	8(33.3)	0.002**
State Health Department such as MDHHS	148(87.6)	14(58.3)	0.002**

Family Members and Friends	16(9.5)	2(8.3)	0.937
Former President Trump or other Republican Leadership	10(5.9)	0(0.0)	0.011*
Fox News	8(4.7)	1(4.2)	0.633
Michigan Governor Whitmer or other Democratic Leadership	58(34.3)	5(20.8)	0.412
Healthcare Colleagues such as Nurses and Physicians	123(72.8)	18(75.0)	0.353
Local Health Department Website	138(81.7)	15(62.5)	0.008**
My Primary Care Physician	138(81.7)	15(62.5)	0.008**

Nightly News Reports/Websites such as MLive	21(12.4)	1(4.2)	0.016*
NPR	41(24.3)	1(4.2)	0.009**
Social Media such as Facebook, Instagram, Tik Tok, Twitter	1(0.6)	0(0.0)	0.855
Work/School Newsletters and Announcements	63(37.3)	6(25.0)	<0.001***

*Denotes $p < .05$, ** $p < .01$, *** $p < .001$

Attitudes and Beliefs Regarding Sources of Credible and Accurate COVID-19 Information are reported in Table 3. Many variables showed statistical significance such as Dr. Fauci ($r=0.257$, $n=193$, $p=0.002$), state health department ($r=0.257$, $n=192$, $p=0.002$), local country health department and primary care physician ($r=0.200$, $n=193$, $p=0.008$), nightly news ($r=0.195$, $n=193$, $p=0.016$), NPR ($r=0.220$, $n=193$, $p=0.009$), work/school ($r=0.199$, $n=193$, $p=0.001$), and the CDC had the highest statistical significance ($r=0.293$, $n=193$, $p<0.001$). With religion ($r=-0.234$, $n=190$, $p=0.005$) and Republican leadership ($r=-0.093$, $n=192$, $p=0.011$), there was a negative association with statistical significance.

Discussion

The purpose of this study was to determine if reported sources of accessing information about COVID-19 affected vaccination status. Based upon the findings of the current study, nursing students at the University of Michigan – Flint, vaccinated and unvaccinated students, reported using the same top five credible sources when looking for information regarding COVID-19. Thus, we reject our hypothesis that sources of health information regarding COVID-19 will differ among vaccinated and unvaccinated nursing students.

The negative association between vaccine hesitancy and race/ethnicity correlates with existing research. McElfish et al. identified African Americans as three times more likely to report COVID-19 vaccine hesitancy. COVID-19 vaccine hesitancy was statistically significant among Blacks in a pool of multiple studies (Sharma et al., 2021). Reduced access to health care, lower awareness/education, and the history of the Tuskegee Syphilis Study are some reasons why African Americans are vaccine-hesitant and struggle with trusting medical advice (Sharma et al., 2021).

A statistically significant relationship ($p=0.011$) was also found between vaccine hesitancy and Republican affiliation within this study. This finding is consistent with other research that finds Republicans are less likely to get the COVID-19 vaccine, as well as other vaccines, and generally display low levels of pro-vaccine attitudes (Fridman et al., 2021).

Limitations

One limitation of this research study is that most participants were vaccinated before filling out the survey. In the nursing program at the University of Michigan – Flint, many were required to be vaccinated from their current place of employment. Almost 88% of the study participants were vaccinated, making the analysis more informative about those who are vaccinated than those who aren't. Future studies should include a larger sample size with many unvaccinated participants. Having a large portion of unvaccinated participants will help figure out if unvaccinated participants know where to find credible information. Knowing where individuals find information regarding COVID-19 will help provide help to inform future interventions aimed at reducing vaccine hesitancy and increasing vaccine uptake. As previously discussed, some individuals may be lost in an information echo chamber and only see certain information. Providing nursing students and other health professionals with strategies to identify accurate health information can prevent vaccine hesitancy and increase overall vaccination rates.

Anti-vaxxers have received a lot of criticism over the years due to their lack of intent/willingness to get vaccinated. COVID-19 causing a global pandemic the indirect effect of anti-vaxxers' may influence and weigh on the mortality from COVID-19 (Adesokan & Obeid, 2021). This study being advertised and conducted by the nursing faculty may have caused certain biases. Since the survey was self-reported data, some students may have provided false information to eliminate any biases from the nursing faculty and to remain in the socially desirable group.

Recommendations

Vaccine hesitancy was recognized as a top threat to global health in 2019, according to the WHO (Leung et al., 2022). But vaccinations are one of the most

effective ways to control an infectious disease (Paterson et al., 2016). Minimizing vaccine hesitancy needs to become a priority to help control the spread of COVID-19. Addressing individuals' concerns, minimizing mistrust in the medical field, and having politicians and public health officials on the same page are a few places to start.

Institutional distrust can accumulate over time and be transferred from one generation to the next due to continuing injustice and unreconciled history (Best et al., 2021). Best et al. (2021) recommend admitting to untrustworthy actions towards African Americans as a start to the reconciliation process. Institutions also need to take measurable steps to rectify the injustice brought upon the African American Community, the Flint water crisis is just one example of institutional untrustworthiness (Best et al., 2021). The Flint water crisis changed their water source in April 2014, causing distribution pipes to corrode and leach lead and other contaminants into the citizen's drinking water ("Flint water crisis," 2020). Flint is a primarily African American community still struggling with the Flint water crisis eight years later, causing a public health crisis within the community. Increasing awareness of structural barriers and systemic racism within medical institutions must be prioritized (Best et al., 2021).

Another recommendation to improve trust is to engage the communities most burdened by COVID-19. COVID-19 disproportionately affects disadvantaged and vulnerable communities, the individuals who are generally left out of the process of identifying strategies to minimize the spread of COVID-19 (Best et al., 2021). Dr. Georges C. Benjamin, one of the nation's most influential physician leaders and Executive Director of the American Public Health Association, states that there is a lot of misinformation circulating through the African American community, and the African

American community needs to make sure their trusted institutions, clinicians of color, churches, and community organizations are better educated (Best et al., 2021). Incorporating members of those communities will help engage the community to participate and follow recommendations from individuals they trust within their communities. Incorporating trusted community members will increase the visibility of trusted sources (Best et al., 2021). The African American community has been a major part of what the WHO is describing as an infodemic, and they need access to more trustworthy sources (Best et al., 2021).

Throughout the pandemic, public health officials and the Republican party have had different views on controlling and treating COVID-19. Everyone will have their own opinions and ideas, but when it comes to a public health crisis, public health officials should lead the movement. Politicians should back their recommendations to do what is best for the public, even if it is against their beliefs. Doing this, it can help send one message out and improve vaccination rates by everyone being on the same page. Individuals are more likely to follow suit if everyone is on the same page compared to if there are multiple options out there, and when it comes to a global pandemic, there shouldn't be multiple options.

Implications

Existing research indicates how certain socio-demographics can affect vaccine hesitancy. This research study highlights vaccine hesitancy in African American and Republican communities. More services and information must be provided to these communities to reduce vaccine hesitancy and improve vaccination rates. The survey asked where students looked for credible information about COVID-19, but everyone

has different ideas of credible information. Providing education and training for health professionals on where to find accurate and credible information will help patients and community members. Many conform to their beliefs or those of their families, friends, and political leaders. This research study also does not explain echo chambers or filter bubbles. Both echo chambers and filter bubbles are important to know about because when an individual looks up information based on those around them, the internet will use an algorithm to only show information related to previous searches. They will continue only to see information based on their views and enhance vaccine hesitancy. There is extensive research about echo chambers and how they work, yet it is something that is not widely known. There needs to be a way to minimize or eliminate the programming for echo chambers and filter bubbles so that individuals can receive all of the information instead of just the information that conforms to their biases.

Improving trust is a priority, and future studies must investigate how to improve trust between these communities, medical personnel, and government officials. Future studies should use community-based participatory research (CBPR) techniques within the two groups with the highest vaccine hesitancy. CBPR techniques include 1.) recognizing the community as a whole, 2.) building strengths and resources within the community, 3.) promoting co-learning, and 4.) achieving a balance between the community and science (Holkup et al., 2004). CBPR techniques will help promote a trusting relationship, which will help minimize vaccine hesitancy and improve vaccination rates.

Applied Public Health Competencies

Analyze quantitative data using biostatistics, informatics, computer-based programming and software, as appropriate*

With the information I obtained in Biostatistics for Health Professionals – HED 547, I analyzed quantitative data using biostatistics and computer-based programming software (SPSS 28) to answer my public health research question: *Do sources of health information regarding COVID-19 differ among vaccinated and unvaccinated nursing students?* Specifically, I analyzed whether reported COVID-19 information sources differ among vaccinated and unvaccinated nursing students.

Interpret results of data analysis for public health research, policy, or practice

I interpreted the results of my descriptive and bivariate analyses to answer the following public health research question: *Do sources of health information regarding COVID-19 differ among vaccinated and unvaccinated nursing students?* The results of this public health research project helped determine differences in information-seeking behaviors among vaccinated and unvaccinated nursing students, which can be used to inform interventions aimed at improving information-seeking behaviors and vaccination rates among nursing students. I did so using the skills I learned in Biostatistics for Health Professionals – HED 547. Lessons in Program Planning and Program Implementation – HCR 384 helped me determine which analyses were appropriate for my study's variables. **Advocate for political, social, or economic policies and programs that will improve health in diverse populations***

In the introduction and discussion sections of my research work, I used existing literature to draw connections between the vaccine beliefs and behaviors of nurses and vaccination beliefs and behaviors among the general population. Noting the significant role nurses play in educating and advocating for vaccine adherence, I advocated for policies and programs that can improve information-seeking behaviors and vaccination adherence among nursing students and other health professionals.

Select communication strategies for different audiences and sectors *

As part of my research project, I selected a second reader from the nursing profession. The guidance and recommendations from my second reader helped to ensure the the research study, its findings, and implications are applicable to the nursing profession as well as my professional field, public health.

Examine factors that impede the process of health education/promotion & influence the process by which people learn **

To answer my public health research question: *Do sources of health information regarding COVID-19 differ among vaccinated and unvaccinated nursing students?* I examined the primary sources of COVID-19 information nursing students reported and how nursing students rank various sources of health information in terms of accuracy and credibility. By examining these patterns by COVID-19 vaccination status, I identified key differences in information seeking, including sources and mediums for acquiring health information (i.e., mass media, interpersonal communication, etc.). The results from this study provided insight into how unvaccinated nursing students prefer to obtain health information. This insight helped make intervention recommendations to improve

information-seeking behaviors and vaccination adherence among nursing students and other health professionals.

References

Adesokan, A., & Obeid, M. (2021). A review of COVID-19 vaccines strategies and anti-vaxxers theories. *African Journal of Clinical and Experimental Microbiology*, 22(2), 117-123. <https://doi.org/10.4314/ajcem.v22i2.3>

Ash, M. J., Berkley-Patton, J., Christensen, K., Haardörfer, R., Livingston, M. D., Miller, T., & Woods-Jaeger, B. (2021). Predictors of medical mistrust among urban youth of color during the COVID-19 pandemic. *Translational behavioral medicine*, 11(8), 1626-1634. <https://doi.org/10.1093/tbm/ibab061>

Best, A. L., Fletcher, F. E., Kadono, M., & Warren, R. C. (2021). Institutional distrust among African Americans and building trustworthiness in the COVID-19 response: Implications for ethical public health practice. *Journal of Health Care for the Poor and Underserved*, 32(1), 90-98. <https://doi.org/10.1353/hpu.2021.0010>

Biswas, N., Mustapha, T., Khubchandani, J., & Price, J. H. (2021). The Nature and Extent of COVID-19 Vaccination Hesitancy in Healthcare Workers. *Journal of community health*, 46(6), 1244-1251. <https://doi.org/10.1007/s10900-021-00984-3>

Curtin, L. (2021). Nurses and vaccine hesitancy: You're too important not to get vaccinated. *American nurse today*, 16(3), 56.

Dib, F., Mayaud, P., Chauvin, P., & Launay, O. (2022). Online mis/disinformation and vaccine hesitancy in the era of COVID-19: Why we need an eHealth literacy revolution. *Human vaccines & immunotherapeutics*, 18(1), 1-3. <https://doi.org/10.1080/21645515.2021.1874218>

Digital media literacy: What is an echo chamber? (n.d.). GCFGlobal.org.

<https://edu.gcfglobal.org/en/digital-media-literacy/what-is-an-echo-chamber/1/>

Flint water crisis. (2020, May 28). Centers for Disease Control and Prevention.

https://www.cdc.gov/nceh/casper/pdf-html/flint_water_crisis_pdf.html#:~:text=On%20April%2025%2C%202014%2C%20the,contam

Fridman, A., Gershon, R., & Gneezy, A. (2021). COVID-19 and vaccine hesitancy: A longitudinal study. *PLOS ONE*, *16*(4), e0250123.

<https://doi.org/10.1371/journal.pone.0250123>

Galston, W. A. (2022, March 9). For COVID-19 vaccinations, party affiliation matters more than race and ethnicity. *Brookings*.

<https://www.brookings.edu/blog/fixgov/2021/10/01/for-covid-19-vaccinations-party-affiliation-matters-more-than-race-and-ethnicity/>

Gao, J., & Radford, B. J. (2021). Death by political party: The relationship between COVID-19 deaths and political party affiliation in the United States. *World medical and health policy*, *13*(2), 224-249. <https://doi.org/10.1002/wmh3.435>

Gerretsen, P., Kim, J., Caravaggio, F., Quilty, L., Sanches, M., Wells, S., . . . Graff-Guerrero, A. (2021). Individual determinants of COVID-19 vaccine hesitancy. *PloS one*, *16*(11), e0258462-e0258462. <https://doi.org/10.1371/journal.pone.0258462>

Grafova, I. B., Pogorzelska-Maziarz, M., Johansen, M. L., Manning, M. L., Crincoli, S., & de Cordova, P. B. (2022). Racial and ethnic differences in vaccine hesitancy Among registered nurses in New Jersey: A cross-sectional survey. *American journal of infection control*, *50*(5), 572-574.

<https://doi.org/10.1016/j.ajic.2022.02.007>

- Hameleers, M., Brosius, A., & de Vreese, C. H. (2022). Whom to trust? Media exposure patterns of citizens with perceptions of misinformation and disinformation related to the news media. *European journal of communication (London)*, 37(3), 237-268. <https://doi.org/10.1177/026732312111072667>
- Hernandez, R. G., Hagen, L., Walker, K., O'Leary, H., & Lengacher, C. (2021). The COVID-19 vaccine social media infodemic: healthcare providers' missed dose in addressing misinformation and vaccine hesitancy. *Human vaccines & immunotherapeutics*, 17(9), 2962-2964. <https://doi.org/10.1080/21645515.2021.1912551>
- Holkup, P. A., Tripp-Reimer, T., Salois, E. M., & Weinert, C. (2004). Community-based participatory research. *Advances in Nursing Science*, 27(3), 162-175. <https://doi.org/10.1097/00012272-200407000-00002>
- Howard, M. C. (2022). Are face masks a partisan issue during the COVID-19 pandemic? Differentiating political ideology and political party affiliation. *International journal of psychology*, 57(1), 153-160. <https://doi.org/10.1002/ijop.12809>
- Khan, M., Adil, S. F., Alkhatlan, H. Z., Tahir, M. N., Saif, S., Khan, M., & Khan, S. T. (2020). COVID-19: A global challenge with old history, epidemiology and progress so far. *Molecules*, 26(1), 39. <https://doi.org/10.3390/molecules26010039>
- Larson, H. J., Jarrett, C., Schulz, W. S., Chaudhuri, M., Zhou, Y., Dube, E., Schuster, M., MacDonald, N. E., & Wilson, R. (2015). Measuring vaccine hesitancy: The

development of a survey tool. *Vaccine*, 33(34), 4165-4175.

<https://doi.org/10.1016/j.vaccine.2015.04.037>

Latest data on COVID-19 vaccinations by race/Ethnicity. (2022, July 14). *KFF*.

<https://www.kff.org/coronavirus-covid-19/issue-brief/latest-data-on-covid-19-vaccinations-by-race-ethnicity/>

Lavigne, S. E. (2021). Vaccine hesitancy: Root causes and possible solutions. *Can J Dent Hyg*, 55(2), 79-82.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8219067/?report=reader>

Leung, C. L. K., Li, K.-K., Wei, V. W. I., Tang, A., Wong, S. Y. S., Lee, S. S., & Kwok, K. O. (2022). Profiling vaccine believers and skeptics in nurses: A latent profile analysis. *International journal of nursing studies*, 126, 104142-104142.

<https://doi.org/10.1016/j.ijnurstu.2021.104142>

Lockyer, B., Islam, S., Rahman, A., Dickerson, J., Pickett, K., Sheldon, T., . . . Sheard, L. (2021). Understanding COVID-19 misinformation and vaccine hesitancy in context: Findings from a qualitative study involving citizens in Bradford, UK. *Health expectations: an international journal of public participation in health care and health policy*, 24(4), 1158-1167. <https://doi.org/10.1111/hex.13240>

McElfish, P. A., Willis, D. E., Shah, S. K., Bryant-Moore, K., Rojo, M. O., & Selig, J. P. (2021). Sociodemographic Determinants of COVID-19 Vaccine Hesitancy, Fear of Infection, and Protection Self-Efficacy. *Journal of primary care & community health*, 12, 215013272110407-21501327211040746.

<https://doi.org/10.1177/21501327211040746>

- Nagler, R. H., Vogel, R. I., Gollust, S. E., Rothman, A. J., Fowler, E. F., & Yzer, M. C. (2020). Public perceptions of conflicting information surrounding COVID-19: Results from a nationally representative survey of U.S. adults. *PloS one*, *15*(10), e0240776-e0240776. <https://doi.org/10.1371/journal.pone.0240776>
- Paterson, P., Meurice, F., Stanberry, L. R., Glismann, S., Rosenthal, S. L., & Larson, H. J. (2016). Vaccine hesitancy and healthcare providers. *Vaccine*, *34*(52), 6700-6706. <https://doi.org/10.1016/j.vaccine.2016.10.042>
- Restrepo, N., & Krouse, H. J. (2022). COVID-19 Disparities and Vaccine Hesitancy in Black Americans: What Ethical Lessons Can Be Learned? *Otolaryngology-head and neck surgery*, *166*(6), 1147-1160. <https://doi.org/10.1177/019459982111065410>
- Stroope, S., Kroeger, R. A., Williams, C. E., & Baker, J. O. (2021). Sociodemographic correlates of vaccine hesitancy in the United States and the mediating role of beliefs about governmental conspiracies. *Social science quarterly*, *102*(6), 2472-2481. <https://doi.org/10.1111/ssqu.13081>
- Sharma, M., Batra, K., & Batra, R. (2021). A theory-based analysis of COVID-19 vaccine hesitancy among African Americans in the United States: A recent evidence. *Healthcare*, *9*(10), 1273. <https://doi.org/10.3390/healthcare9101273>
- Troiano, G., & Nardi, A. (2021). Vaccine hesitancy in the era of COVID-19. *Public Health*, *194*, 245-251. <https://doi.org/10.1016/j.puhe.2021.02.025>
- Watson, O. J., Barnsley, G., Toor, J., Hogan, A. B., Winskill, P., & Ghani, A. C. (2022). Global impact of the first year of COVID-19 vaccination: A mathematical

modelling study. *The Lancet Infectious Diseases*, 22(9), 1293-1302.

[https://doi.org/10.1016/s1473-3099\(22\)00320-6](https://doi.org/10.1016/s1473-3099(22)00320-6)

(n.d.). WHO Coronavirus (COVID-19) Dashboard. <https://covid19.who.int/>