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ORIGINAL ARTICLE | COVID-19 VACCINE PERCEPTIONS

The Role of Perceived Susceptibility, Perceived Severity, Perceived Barriers and Benefits in COVID-19 Vaccine Hesitancy and Uptake Among Outpatient Surgery Nurses in the United States: A Qualitative Study

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ABSTRACT

Background and Objective: This qualitative study explores outpatient nurses' perceptions of coronavirus disease 2019 (COVID-19) and the COVID-19 vaccine, aiming to inform future research and health education strategies for reducing vaccination hesitancy among healthcare workers, particularly nurses. The nurses recruited for this study were all registered nurses (RNs). Studies have shown that registered professional nurses consistently display higher vaccination hesitancy versus other healthcare groups, specifically doctors. Little is known about the vaccine acceptance disparities that exist among healthcare workers, or why nurses appear to consistently display higher rates of vaccine hesitancy, versus other healthcare groups, especially doctors.

Methods: Semi-structured interviews guided by the health belief model were conducted with 8 outpatient nurses, and a focus group guided by the health belief model was conducted with 5 outpatient nurses, for a total of 13 nurses (N=13). The data were triangulated through interviews, a focus group, and a literature review. In addition, an independent external secondary analyst confirmed the findings.

Results: Three key themes appeared: (1) sources of information (trusted sources of information), (2) experience (belief about personal risk and personal responsibility), and (3) logistics (COVID-19 testing requirements, booster frequency, and mandate versus choice).

Conclusion and Implications for Translation: We advise public health professionals to adopt a grassroots approach to vaccine hesitancy interventions, engaging and training doctors and nurses. We also recommend consistency in prevention approaches, as that produces trust. We also recommend further research into the booster requirement, as requiring an unknown number of boosters appears to lower trust among nurses.

Keywords: • COVID-19 • COVID-19 Vaccine • Vaccine Perceptions • Nurses • Vaccine Hesitancy • Public Health • Qualitative • Healthcare

1. Introduction

1.1. Background of the Study

The COVID-19 pandemic has spread across the world infecting millions and resulting in hundreds of thousands of deaths.¹ The pandemic's impact has been profound, impacting healthcare systems, economies, and day-to-day life.¹ According to Healthy People 2030, health and well-being are essential for any thriving society, and the full potential thereof can have valuable benefits. Therefore, promoting health nationwide is a shared responsibility (health promotion, disease prevention, and treatment).²

Healthcare workers, as important sources of health information, influence communities through their work with diverse and high-risk groups, patient advice, and by modeling health-promoting behaviors.³ Healthcare workers are also considered among the high-risk groups because they tend to have higher disease exposure.³ Considering the possibility of future pandemics, it is crucial to develop better prevention and vaccine acceptance strategies.

Studies have shown that registered professional nurses consistently display higher vaccination hesitancy versus other healthcare groups, specifically doctors.^{4,5} Some of the main reasons for vaccination hesitancy are: "concerns about safety and efficacy, mistrust of government and institutions, waiting for more data, and feeling that personal rights are being infringed upon."⁶ Other factors that appear to contribute to vaccine hesitancy among nurses are pregnancy and breastfeeding,⁷ a preference for natural immunity,⁸ COVID-19 vaccine side effects⁹ and booster hesitancy,^{9,10} and diverse beliefs concerning COVID-19 and the vaccine.¹¹

1.2. Objectives of the Study

Little is known about the vaccine acceptance disparities that exist among healthcare workers, or why nurses appear to consistently display higher rates of vaccine hesitancy, versus other healthcare groups, especially doctors.

This phenomenological study has qualitatively examined the outpatient nurses' perceived susceptibility and severity of COVID-19, and their

perceived barriers and benefits toward personally receiving or rejecting the COVID-19 vaccine. These findings may inform future research among healthcare professionals and suggest health education strategies to reduce vaccination hesitancy among healthcare workers, particularly nurses.

2. Methods

2.1. Study Design

This qualitative phenomenological descriptive study utilized semi-structured interviews and a semi-structured focus group, both guided by the health belief model (HBM),¹² with outpatient surgery RNs. In addition, an independent secondary analyst confirmed the findings of the study. In the interviews, the nurses discussed their (1) perceived susceptibility to and (2) perceived severity of COVID-19, and their (3) perceived benefits and (4) perceived barriers to receiving the COVID-19 vaccine. These four HBM constructs were used to examine more deeply the nurses' experiences, what might have influenced their views of COVID-19, and their decision to accept or reject receiving the COVID-19 vaccine.

2.1.1 Data collection and analysis

Data collection occurred from March to July 22, spanning a 5-month period. Snowball sampling was used for recruiting the nurses. The interviews and focus group was conducted via Zoom (Loma Linda University). The nurses were asked questions under a semi-structured topic list. The interview guide consisted of two main questions, the first being "What do you know about COVID-19?" and the second being "What do you think of the COVID-19 vaccine? In terms of safety, efficacy, and achievement." The first main question: "What do you know about COVID-19?" was followed by three follow-up questions. Nurses detailed their sources of information, discussed whether they considered themselves at risk for COVID-19 infection, and shared their views on the seriousness of the disease. This section of the interview guide was concluded by two probing questions in which the nurses were prompted to share any experiences they might have had with COVID-19 infection, and whether they were ever charged with the care of COVID-19 patients or family members.

Then the second main question: “What do you think of the COVID-19 vaccine in terms of safety, efficacy, and achievement?” was followed by five follow-up questions. Nurses detailed their sources of information and what makes a source of information trusted or untrusted in their view. The nurses were also asked to detail their perceived benefits of accepting and receiving the COVID-19 vaccine, their perceived barriers to accepting and receiving the COVID-19 vaccine, and whether the type of COVID-19 vaccine offered them had any influence on their decision to get vaccinated or not. Finally, the nurses were prompted by the two final probing questions to share their views concerning vaccine requirements and mandates, and whether they took the COVID-19 vaccine immediately after it was released or waited before deciding. The focus group questions followed a similar pattern to the interview questions, to further probe and confirm the findings of the interview.

The inductive coding method¹³ was utilized within a thematic framework. In addition, an independent external analyst confirmed the findings.

2.2. Ethical Approval

This study obtained the Loma Linda University School of Public Health Institutional Review Board (IRB) approval. Participation in this study was voluntary and confidential. All the nurses who participated in this study signed an informed consent form prior to being interviewed or to participate in the focus group.

3. Results

3.1. Sociodemographic Characteristics

All the nurses who participated in our study were female. The race/ethnicity of the nurses who were interviewed included White (3), Asian (3), and Hispanic (2). The interviewed nurses’ ages ranged between 30 and 59 years, and their nursing experience ranged between 2 years and 26 years. The race/ethnicity of the nurses who participated in the focus group included undisclosed (1), White (1), and Asian (3). The ages of the nurses who participated in the focus group ranged between 30 years and 69 years, and their nursing experience ranged between 7 years and 46 years (Table 1).

All participating nurses were employed at the same medical institution and were RNs. The participants were recruited in person using snowball sampling. The nurses were selected because they were outpatient nurses. Outpatient surgery nurses often see, care for, and guide a larger number of patients than inpatient nurses.¹⁴

3.2. Qualitative Analysis Results

A total of 13 outpatient nurses shared their perceptions of COVID-19 and the COVID-19 vaccine. Three main themes emerged that contribute to vaccine acceptance or vaccine hesitancy: (1) sources of information, (2) experience, and (3) logistics.

Theme 1: Sources of Information

The first theme, sources of information, is defined in our study as trusted sources of information, and that includes “own research,” “personal connections,” and “personal relationships.” So, the nurses basically trusted their own research, respondents stated that they would read up on journals or look at the Centers for Disease Control and Prevention (CDC) website or the Mayo Clinic website for information. As some nurses stated:

“WebMD, or Mayo, Mayo Clinic”

Table 1: Demographics of the study respondents

Total Nurses (N=13)	Gender	Race/Ethnicity	Age Range	Nursing Experience
Interviews				
Nurse 1	Female	Hispanic	40–49	22 years
Nurse 2	Female	Asian	30–39	2 years
Nurse 3	Female	White	30–39	9 years
Nurse 4	Female	Hispanic	40–49	25 years
Nurse 5	Female	White	40–49	13 years
Nurse 6	Female	Asian	30–39	13 years
Nurse 7	Female	White	50–59	26 years
Nurse 8	Female	Asian	50–59	20 years
Focus Group				
Nurse 1	Female	Undeclared	60–69	46 years
Nurse 2	Female	Asian	30–39	7 years
Nurse 3	Female	White	40–49	9 years
Nurse 4	Female	Asian	60–69	40 years
Nurse 5	Female	Asian	40–49	22 years

“Read up on journals and journal articles”

The respondents also mentioned their personal connections as being trusted sources of information, so the doctors and co-workers who the nurses know and trust. As some of the nurses stated:

“The ICU intensivist was a great wealth of information”

“doctors that I have known for a very long time that I work with”

The nurses also described their personal relationships as being a trusted source of information, such as their family members and friends whom they trust and view as privy to accurate information. As some nurses put it:

“My source is my brother, my brother works for a pharmaceutical company”

“My husband, who’s also a nurse, was in the ICU working with COVID throughout the whole pandemic”

Theme 2: Logistics

The second theme logistics is defined in our study as prevention strategies, that include “COVID-19 testing requirement,” “booster frequency,” and “mandate or choice.” The nurses in our study mentioned the COVID-19 testing requirement. In the beginning, the nurses who were vaccinated did not have to test for COVID-19, recently their workplace changed it. So, the nurses now must be vaccinated and boosted in order not to test for COVID-19. Whereas the patients don’t have to test if they are not boosted. In short, if the patients are vaccinated, they don’t have to test for COVID-19, but the nurses must be vaccinated and boosted in order not to have to test for COVID-19. As one nurse put it:

“So I don’t know why we as employees have to test twice a week when patients themselves don’t even need to test to have surgery now.”

The nurses mentioned this inconsistency in the testing requirement. In addition, the nurses, whether they were boosted or not, expressed some form of booster hesitancy. The reason for this hesitancy appears to be the frequency of the booster, they were not sure how many booster shots might be required of them. As another nurse put it:

“oh boy, here we need how many boosters?” That would be my biggest barrier.”

Lastly, all the nurses were in favor of choice and personal autonomy when it comes to the COVID-19 vaccine. As some of the nurses stated:

“Voluntary is good”

“I definitely think that there should be a choice in vaccinations”

Theme 3: Experience,

The third theme, experience, is defined in our study as a belief about personal risk and personal responsibility. Belief about personal risk includes “COVID-19 symptom exposure” and “personal health conditions,” and belief about personal responsibility includes “having at-risk family members” and “mental health/getting back to normal.”

Our study suggests that the nurse’s belief about personal risk is influenced by the COVID-19 symptoms that they are exposed to. One nurse shared how her son got infected with COVID-19, and she took care of him. He had mild symptoms and recovered. This nurse did not display the same motivation from this experience to get vaccinated, compared to another nurse who shared how her husband got COVID-19 and suffered from very severe symptoms and had to be hospitalized. As some of the nurses stated:

“Well, I had, I had COVID...my whole immediate family ended up getting it...I mean it wasn’t bad at all,”

“I’m scared that I might get you know, severe symptoms, I decided to be vaccinated.”

Health conditions, such as pregnancy and breastfeeding, also appear to influence the nurses’ perceptions of personal risk. As some nurses stated:

“Once I got pregnant, I decided not to get boosted,”

“I think I was breastfeeding, and that was my hesitation.”

Our study also suggests that the nurses’ belief in personal responsibility is influenced by their desire to protect their families and loved ones and their patients. As some nurses put it:

“Protecting my family, protecting my children who don’t have the immune system to help them. I also think responsibility as a nurse,”

“Protecting my patient, myself, and my family”

Some of the nurses also expressed that if herd immunity could be established through the COVID-19 vaccine, and everyone can go back to normal, then it is worth it because they believed that people are suffering more from mental health versus the actual disease. As some nurses put it:

“Our mental health has been suffering more,”

“I think the benefits have been very mental... you feel better to go out and see people and to go back into the world.”

4. Discussion

Three distinct themes emerged that gave valuable insights into the nurses’ perceptions of COVID-19 and the COVID-19 vaccine. The three emergent themes were: Sources of information, defined in our study as trusted sources of information; logistics, defined in our study as prevention strategies; and experience defined in our study as a belief about personal risk and personal responsibility.

In the Shaw et al.⁴ study, which had a qualitative component, the nurses stated that they trusted their own research, followed by trusted co-workers and family members.⁴ Despite our study being solely qualitative, the nurses in our sample exhibited a similar pattern of trust, as seen in the Shaw et al.⁴ study, relying on their own research and information obtained from trusted co-workers (physicians and anesthesiologists) and family members whom they considered knowledgeable.

When it comes to experience, it appears that the outpatient nurses’ belief about personal risk was a driving force for their COVID-19 vaccine acceptance or rejection. The nurses who were assigned to a COVID-19 unit during the pandemic, and the nurses who feared being assigned to a COVID-19 unit during the pandemic, were more motivated to get vaccinated because they had seen that the symptoms of the disease were milder in those who were vaccinated. However, those outpatient nurses who

had gotten infected with COVID-19 (mild symptoms) and recovered, or who took care of infected family members who displayed mild symptoms, did not display the same motivation to get vaccinated.

So far, studies have shown contradictory results when it comes to the effect of caring for COVID-19-infected individuals and COVID-19 vaccination intention. The Peterson et al.⁶ research review could not find any clear relationship between COVID-19 patient care and vaccination intention.⁶ The Dubov et al.¹¹ study also found that “frequency of contact with COVID-19 patients and having someone close affected by COVID-19” did not predict either healthcare workers’ vaccination or hesitancy. There was a contradiction between two other studies cited in this paper. The Dror et al.⁵ study found that hospital healthcare staff who were involved in the care of COVID-19 patients, and individuals who consider themselves at risk for the disease, were more likely to accept the COVID-19 vaccine compared to nurses and health workers not caring for COVID-19-positive patients.⁵ The Shaw et al.⁴ study found that direct care for patients with COVID-19 is associated with lower vaccination intent.⁴

However, our study might have found an explanation for the conflicting findings of the previous studies. Our study suggests that it is the symptoms that the nurses are exposed to (e.g. coming into contact with or caring for individuals with milder symptoms versus individuals with more severe symptoms, or if the nurses themselves got infected and recovered with mild symptoms) that might influence the nurses’ perception of the severity of COVID-19 and hence their decision to get vaccinated, versus the act of caring for COVID-19 infected individuals or coming into contact with COVID-19 patients of itself. Therefore, our study appears to have shed some light on why such a contradiction might exist in previous studies. However, further qualitative research is needed to confirm the findings of our study when it comes to the care of COVID-19-infected individuals and vaccination intention.

In the case of the nurses who were not exposed to severe COVID-19 symptoms and who do not

have immune-compromised family members, it appears that the driving force for their decision to get vaccinated was their desire to get back to normal for the sake of their mental health and the mental health of the community. The nurses' perception that if herd immunity can be established, then they could go back to normal, appears to have influenced these nurses' decision to get vaccinated.

However, further qualitative research is needed to take a deeper and closer look into the nurses' perceptions of herd immunity versus natural immunity.¹⁵ One study conducted by Rabi et al.,⁸ found that nurses had a natural immunity preference which contributed to their hesitation in taking the COVID-19 vaccine.⁸ Our study does not contradict the Rabi et al.⁸ study because it did not look into the nurses' preferences when it comes to natural immunity versus herd immunity.

In addition, the nurses who were pregnant or breastfeeding at the time of the COVID-19 pandemic or who were pregnant or breastfeeding during the time of this study expressed vaccine hesitancy and delayed receiving the vaccine or booster shot. This finding is in accordance with the Townsel et al.⁷ study which found that pregnant healthcare workers were six times more likely to opt to delay the COVID-19 vaccine and twice as likely to decline when compared to other female healthcare workers of reproductive age.⁷

All the nurses in the current investigation were also motivated by a belief in personal responsibility to their families and community to get vaccinated. The nurses were motivated by a desire to protect their patients and family members who might be immune-compromised, elderly, or children. This finding is in accordance with the Oliver et al.¹⁶ study which surveyed 1,933 New York City healthcare workers in two integrated healthcare systems, of which 81% were already vaccinated. The Oliver study found that 86% of COVID-19 vaccinated healthcare workers agreed with the statement that "*the vaccine is important to protect family members.*"¹⁶

The nurses all had a negative view of vaccine mandates and were more in favor of choice and personal autonomy. This is in accordance with the

Peterson et al.⁶ finding after conducting their review of various published articles, and this attitude appears to extend to the influenza vaccine as well.⁶

Our study also appears to have uncovered perceived prevention strategy inconsistencies as being a source of frustration to the nurses, and at the forefront of those inconsistencies is the booster requirement. The fact that the nurses did not know how many booster shots might be required of them, in the long run, appears to contribute to the outpatient nurses' frustration and hesitation concerning the COVID-19 vaccine. All the nurses expressed some form of hesitation about the booster shot, even when they had taken boosters. The reason stated was that they were unsure or did not know how many booster shots might be required of them. This finding is in accordance with an article that discussed booster hesitancy among healthcare workers, which found that booster hesitancy was high in nurses and healthcare workers in general, especially towards a 3rd or 4th booster shot.⁹

4.1. Strengths and Limitations of the study

Some possible limitations of our study are researcher bias, reactivity, and respondent bias.¹⁷ Triangulation limits these biases, and we triangulated our study through interviews, a focus group, and a literature review. Another limitation is the small sample size.

Some of the strengths of this type of research: unique perspectives, a deeper understanding, and rich data.¹⁸

5. Conclusion and Implications for Translation

In conclusion, our findings suggest that public health professionals should employ a grassroots approach to vaccine education and address vaccine hesitancy by involving and training doctors and nurses in intervention efforts. Moreover, we emphasize the importance of maintaining consistency in prevention approaches to build trust among healthcare workers. Furthermore, we recommend additional research on the booster requirement, as the uncertainty surrounding the number of required booster shots seems to impact trust among healthcare workers, particularly nurses, negatively.

The key messages of our study indicate that nurses' perceived susceptibility to, and severity of COVID-19, are influenced by their research, personal connections, and symptom exposure. Their perceived barriers to receiving the COVID-19 vaccine include health conditions, the booster requirement, and a preference for choice. Meanwhile, the perceived benefits of vaccination involve protecting family members, patients and contributing to mental health and herd immunity. These findings can help inform tailored intervention strategies to address vaccine hesitancy among nurses and other healthcare workers.

Compliance with Ethical Standards

Conflicts of Interest: The authors declare no conflicts of interest. **Financial Disclosure:** Nothing to declare. **Funding/Support:** Loma Linda School of Public Health student research funding. **Ethics Approval:** The study was approved by the Loma Linda School of Public Health Institutional Review Board. **Acknowledgments:** I would like to acknowledge and thank my independent secondary analyst Marci Anderson DrPH(c). **Disclaimer:** None.

Key Messages

- ▶ The nurses' perceived susceptibility to, and severity of COVID-19, appears to be influenced by: their own research, personal connections (trusted co-workers), personal relationships (trusted family members), and symptom exposure, which might explain some of the contradicting findings in other research papers.
- ▶ The nurses' perceived barriers to receiving the COVID-19 vaccine appear to be: health Conditions (mainly breastfeeding and pregnancy), the booster requirement (frequency and testing), and a preference for choice.
- ▶ The nurses' perceived benefits to receiving the COVID-19 vaccine appear to be: to protect their family members, protect their patients, and mental health and get back to normal driven by herd immunity perception.

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