

Understanding COVID-19 Vaccine Hesitancy in Health Care Workers: A Systematic Review

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Abstract: COVID-19 is an infectious and highly transmittable respiratory disease caused by severe acute respiratory syndrome (SARS-CoV-2). The ongoing COVID-19 pandemic has had a global impact since it first emerged as a major health concern in late 2019. In 2020, the World Health Organization declared COVID-19 as a worldwide pandemic and as a threat to public health. Since then many measures, including the distribution of vaccines, have been taken to reduce the transmission and to prevent future infections and/or deaths. Health care workers have served valiantly on the front lines of the pandemic and are often the first to be offered COVID-19 vaccines. However, many have hesitated to be COVID-19 vaccinated prompting research efforts focused on understanding COVID-19 vaccine hesitancy in health care workers. Therefore, a search was conducted utilizing PubMed (including MEDLINE), CINAHL, and Web of Science databases utilizing some of the guidelines from the Preferred Reporting Items in Systematic Reviews (PRISMA). From the aforementioned academic databases, 23 articles were retrieved, analyzed, and categorized using the following criteria: (1) health care workers level of acceptance of the COVID-19 vaccine, (2) determinants of health care workers COVID-19 vaccine hesitancy, (3) public misinformation regarding the COVID-19 vaccine, (4) strategies for addressing COVID-19 vaccine hesitancy, and (5) if researchers deemed the conclusions and attitudes presented in the articles to be valid. The findings of the systematic literature review indicated the acceptance of the COVID-19 vaccine is likely higher in male health care workers than female health care workers, as well as potentially being more accepted by older health care workers when compared to younger health care workers. Additionally, this research indicated that political affiliation of health care workers may have played a factor in vaccine hesitancy or acceptance of the COVID-19 vaccine. Future research should be conducted on the COVID-19 vaccine hesitancy of health care workers as strategies are addressed to overcome the barriers associated with vaccine hesitancy.

Keywords— COVID-19, vaccine hesitancy, health care workers.

INTRODUCTION

In 2019, the acute respiratory syndrome coronavirus 2 emerged and quickly spread. By 2020, the virus, known as COVID-19, caused a significant number of deaths and was identified as a pandemic and a global threat. Several vaccines against the virus were developed to curb the outbreak. However, a number of health care workers expressed COVID-19 vaccine hesitancy despite the fact that they likely faced a significantly higher risk of infection (Khalis, Hatim, Elmouden, Diakite, Marfak, Ait El Haj ... & Nejjari, 2021). Initial studies globally and widely varied in terms of the acceptability rate associated with health care workers and COVID-19 vaccinations, ranging from approximately 28%-84% willing to participate in the vaccination. Although a relatively high acceptance rate was noted in many countries, concern still emerged for those who were COVID-19 vaccine hesitant (Khalis et al, 2021; Verger, Scronias, Dauby, Adedzi, Gobert, Bergeat, Gagneur & Dube, 2021; Agyekum, Afrifa-Anane, Kyei-Arthur & Addo, 2021). As the pandemic lingered, a growing number of healthcare organizations across the United States (U.S) began mandating COVID vaccinations for all employees. Since then, numerous campaigns have been rolled out to build public confidence in the vaccination. However, studies indicate these efforts have

mostly been unsuccessful in significantly alleviating COVID-19 vaccination hesitancy arising from concerns raised by health care workers (Toth-Manikowski, Swirsky, Gandhi & Piscitello, 2022).

Vaccine Hesitancy

The reluctance or refusal to vaccinate despite the availability of vaccines is known as vaccine hesitancy. Despite the attempts to provide vaccines to control the spread of disease, vaccine hesitancy still raises concerns and likely creates a barrier to the management of public health (Saied, Saied, Kabbash & Abdo, 2021).

COVID-19 is thought to have disproportionately affected health care workers across the globe since they have frequent contact with COVID-19 positive patients. Therefore, it is believed by many to be particularly important to promote vaccine participation of health care workers (Okuyan, Bektay, Demirci, Ay & Sancar, 2021; Singh, Kumari, Singh, Kandpal & Kaushik, 2021).

While research pertaining to the factors that may influence vaccine acceptability among health care workers is ongoing, studies show that health care workers may be generally less likely to accept COVID-19 vaccination compared to non-

health care workers (Janssen, Kluge, Marx, Hermes, Salzberger & Karagiannidis, 2021; Ahmed, Almoosa, Mohamed, Rapal, Minguez, Abu Khurma, Alnems, Al Mutair & Gray, 2021). The purpose of this systematic literature review is to assess the outlook of health care workers and their hesitance to accept the COVID-19 vaccines through the identification of some of the possible factors related to vaccine hesitancy and a discussion of strategies that may assist in reducing vaccine hesitancy.

Based on a review of available literature, a range of factors associated with vaccination hesitancy of health care workers was identified. It was observed that misinformation plays a particularly weighty role in vaccination hesitancy of COVID-19, even though other factors such as religion, political affiliation, job role and vaccine history also are impactful (Khalis et al, 2021). Based on the findings of this review, it is recommended that healthcare organizations adopt multi-faceted strategies aimed at building trust in COVID-19 vaccinations among health care workers (Lockyer, Islam, Rahman, Dickerson, Pickett, Sheldon, & Bradford, 2021).

Methods

An EBSCOhost search was initially utilized to determine the availability of literature related to COVID-19 vaccine hesitancy among health care workers. The study and literature review search loosely followed the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA). PubMed (including MEDLINE), CINAHL, and Web of Science databases were utilized to conduct a literature search of information pertaining to the research topic. MEDLINE was grouped with PubMed since PubMed searches yield results from MEDLINE data. This was done to remove duplicate articles. A Boolean search was then utilized to produce a wide range of articles related to the research topic. During the search, various arrangements and combinations of the following keywords were used: COVID-19 and vaccine hesitancy among health care workers. From the three databases a total of 237 articles were found.

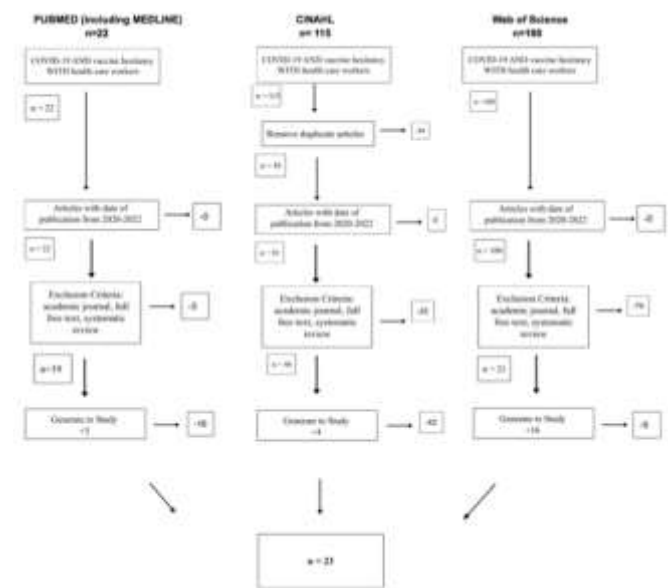
Exclusion Criteria

After searching on PubMed (including MEDLINE), CINAHL, and Web of Science, 237 articles were identified as possible candidates for the literature review. Duplicate articles were removed from the CINAHL database (n = -34). The next step included applying a filter to all three databases to remove any articles from the search that were not published between 2020-2022 (n = - 0). Any articles that did not have full-free text available, were not from an academic journal or a systematic review were then excluded (n = -117). Results were then analyzed and those articles that did not meet the pre-determined criteria were also removed (n = - 63). After these steps were applied, only 23 articles between the three databases remained as candidates for the literature review.

The goal of this study was to determine possible factors that may lead towards the vaccine hesitancy of health care workers and to examine potential methods to reduce

hesitancy. All data observed in this literature review had to link to the original research inquiry. With all exclusions applied, only 23 studies were determined by the researchers to be germane to the study (see Figure 1).

Figure 1: Literature Review Process



DISCUSSION

To determine the factors that might lead to COVID-19 vaccine hesitancy among health care workers, a comprehensive literature review was completed utilizing PubMed (including MEDLINE), CINAHL, and Web of Science databases. By gathering articles from these three databases, PRISMA guidelines were followed for a systematic literature review on the results collected to select relevant academic articles. From the results, 23 articles were selected to be analyzed for the systematic literature review.

Following the completion of the systematic literature review, the information from the articles were sorted into five common themes that emerged and had a direct correlation to the research question at hand. These five common themes include: (a) acceptance of the COVID-19 vaccine, (b) determinants of COVID-19 vaccine hesitancy, (c) misinformation regarding the COVID-19 vaccine, (d) addressing the issue of COVID-19 vaccine hesitancy, and (e) researchers’ conclusions and attitudes validity. Theme frequency can be observed in Table 1.

Table 1: Frequency of Theme Occurrences in Literature

Benefits	Occurrences	Instances of Attributes (n)	Percentage *(%)
Explored acceptance of COVID-19 vaccine	1, 2, 4, 6, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, 20, 21, 22, 23	n=19	82%
Determinants of COVID-19 vaccine hesitancy	1, 2, 3, 4, 6, 8, 10, 11, 12, 14, 15, 17, 18, 19, 20, 22	n=16	70%
Understanding misinformation regarding COVID-19 vaccine	2, 4, 6, 8, 10, 11, 12, 14, 15, 17, 18, 19, 20, 22, 23	n=15	65%
Relevant data presented to address and solve issue of COVID-19 vaccine hesitancy	2, 4, 9, 12, 14, 15, 17	n=7	30%
If the conclusions and attitudes of the raters perception valid based upon data and analysis presented in the article	1, 2, 3, 4, 6, 8, 9, 10, 11, 12, 15, 16, 17, 18, 19, 20, 21, 23	n=18	78%

*Percentages have been rounded to the nearest whole number

As Table 1 demonstrate, 82% of the articles included in the systematic literature review had evidence that explored the acceptance of the COVID-19 vaccine for health care workers [1, 2, 4, 6, 8, 9, 10, 11, 12, 13, 14, 15, 17, 18, 19, 20, 21, 22, 23]. About 70% of the articles reviewed listed determinants of vaccine hesitancy [1, 2, 3, 4, 6, 8, 10, 11, 12, 14, 15, 17, 18, 19, 20, 22]. Furthermore, 65% of the articles reviewed in this systematic literature review provided an understanding of the misinformation regarding COVID-19 vaccine hesitancy [2, 4, 6, 8, 10, 11, 12, 14, 15, 17, 18, 19, 20, 22, 23]. About 30% of the articles provided relevant data that could address the issue of COVID-19 vaccine hesitancy among health care workers [2, 4, 9, 12, 14, 15, 17]. Lastly, 78% of the articles reviewed had conclusions and data presented that the researchers perceived as valid for the purposes of this study [1, 2, 3, 4, 6, 8, 9, 10, 11, 12, 15, 16, 17, 18, 19, 20, 21, 23].

DISCUSSION

Vaccine hesitancy among health care workers remains an important challenge in the fight against the pandemic. Following the outbreak of the pandemic, unprecedented cooperation between various stakeholders saw vaccines developed rapidly (Ayukekbong, 2021). In some areas and due to their high risk of infection, health care workers have been prioritized to receive vaccinations first. Some studies indicate physicians, nurses, and technicians have been more likely to participate in COVID-19 vaccinations given the perception that they may have a deeper understanding of the

medical issues involving the pandemic and the vaccine (Khalis et al, 2021). Furthermore, this current literature review revealed acceptance of the COVID-19 vaccine may be higher among older health care workers. This might be explained by the fact that the virus often has a more severe impact with increasing age. It should also be noted that older people are more likely to be hospitalized when ill (Saied et al, 2021).

This literature review also showed that male health care workers may be more likely to accept the vaccine compared to their female counterparts. This pattern could be partly explained by the theory of planned behavior which suggests that men have relatively good health-seeking behavior. It was also observed in this review that health care professionals who had taken vaccines before are more likely to accept the COVID-19 vaccine (Hajur et al, 2021).

FACTORS ASSOCIATED WITH COVID-19 VACCINE HESITANCY

The most prevalent factor associated with health care workers declining COVID-vaccines was due to fear of possible adverse effects of the vaccination (Khalis et al, 2021; Hajur, Tariku, Bekele, Abdu, Dule, Mohammedhussein & Tsegaye, 2021; Toth-Manikowski et. al, 2022; Berry, Johnson, Myles, Herndon, Montoya, Fashaw & Gifford, 2021). Adverse effect was closely followed by misinformation on vaccine quality as a reason for vaccine hesitancy of health care workers (Kabamba, Kabamba, Ngoie, Banza, Mbidi, Luhata, Lora, Cikomola & Mukamba, 2020; Belingheri, Roncalli, Riva, Paladino & Teruzzi, 2021). Furthermore, some studies identified political affiliation and religion as key factors influencing acceptability of the COVID-19 vaccines (Khalis et al, 2021; Shehata, Elshoram & Abu-Elenin; 2021).

Lack of trust in the government and/or medical institutions are seemingly pivotal toward the aforementioned feelings for COVID-19 vaccine hesitancy in health care workers. As some studies suggest, this lack of trust highlights the need for improved communication with and among health care workers. It is important to note that although frontline health care workers have often been prioritized in the administration of vaccines, commitment to COVID-19 vaccinations among this group is likely to lag behind without trustworthy communication (Al-Metwali, Al-Jumaili, Al-Alag, & Sorofman, 2021; Navarre, Roy, Ledochowski, Fabre, Esparcieux, Issartel, ... & Saison, 2021; Lockyer et al, 2021; Kuter, Browne, Momplaisir, Feemser, Shen, Green-McKenzie ... & Offit, 2021).

Overall, the main barriers to vaccine uptake among health care workers as reported in the reviewed articles are concerns over the effectiveness of the vaccines and adverse events (Ayukekbong, 2021, Hajure et al, 2021; Toth-Manikowski et al, 2022; Berry et al, 2021). Important to these conversations is that these barriers are more evident in the general population compared to health care workers. Over the last

year, some countries have suspended certain COVID-19 vaccines after deaths were reported among people who had taken the vaccine. Expectedly, such news is likely to increase vaccine hesitancy among health care workers despite this group likely possessing more knowledge of vaccines than the general population. As noted in some of the reviewed articles, it is important that awareness campaigns target barriers identified in research (Khalis et al, 2021).

The results of this review have several implications for healthcare practice. As the results show, vaccine hesitancy remains worryingly prevalent among health care workers (Ayukekbong, 2021; Wang, Wong, Ho, Cheung, Chan, Yeoh & Wong; 2020). Going forward, there is a need for healthcare organizations to improve how they communicate to their staff. One of the factors commonly quoted in the reviewed studies as causing hesitancy is misinformation. Since the pandemic began, misinformation about the efficacy of vaccines has dominated social media platforms. Healthcare organizations can address this challenge by providing the right information to their staff. Having a diverse panel provide vaccine information is particularly important as experiences have shown that people accept vaccines more when the message is delivered by someone they can relate to. By using a diverse panel, healthcare organizations can ensure that their staff shares accurate information (Lockyer et al, 2021).

As discussed above, the causes of vaccine hesitancy among healthcare workers vary greatly. As such, it is important that multifaceted strategies are adopted to enhance the likelihood of healthcare workers accepting vaccines. Such strategies should focus on highlighting the benefits of taking the vaccine and debunking misconceptions. It is also imperative to note that peers significantly influence personal behaviors as one is more likely to take the vaccine if their colleague is vaccinated first (Lockyer et al, 2021; Xu, Zhang, Chen, Yu, Li & Wang, (2021).

LIMITATIONS

This study provides a systematic review on COVID-19 vaccine hesitancy among health care workers and its associated factors. There are some limitations to this work that should be considered while interpreting the results of this study. One obvious limitation is the possibility of sampling bias and the subjective nature of the reviewers. It should be noted that the quality of studies included in the review was determined based on the authors' interests and this may have given room for personal bias. Also, there are chances that the data collected from the articles was misinterpreted and presented in this study through the researcher/rater reviews. Appropriate efforts were taken to minimize these limitations.

As the search strategy for the topic included the use of Boolean search and language imitations, there is a possibility that potential articles with additional information might have been missed. The review does not include articles from other databases such as COCHRANE, EMBASE, etc. Furthermore, the review articles for the study were analyzed

by the researchers in the timeframe of eight weeks and the researchers had limited fundamental knowledge about the subject that was assessed. Another notable issue is the possibility for a change in behavior. Since people change behavior from time to time, the validity of the review's findings may be subject to unexplained factors. As such, it is important that follow-up reviews are made to account for factors such as unpredictable variants of the virus (Saied et al, 2021; Khalis et al, 2021; Janssens et al, 2021).

Despite the limitations of this study, the results record possible factors associated with COVID-19 vaccine hesitancy of health care workers and provide a launching point for deeper conversations and study.

FUTURE RESEARCH

Future researchers should continue to utilize the findings of this study to develop strategies that can help overcome the barriers associated with vaccine hesitancy among health care workers. Having a successful strategy for vaccine acceptance can help public health interventions for population health management and improve the quality of care for all.

CONCLUSION

Vaccine hesitancy among health care workers remains prevalent and is likely to continue to produce a negative impact on efforts to bring the pandemic under control. As this review of literature shows, although the causes of vaccine hesitancy vary, misinformation appears to have a particularly huge role. As multiple studies have shown, misinformation about vaccines remains the greatest barrier. In order to enhance uptake of COVID-19 vaccinations among this group, it is important that healthcare organizations invest in providing accurate information. At the national level, there is a need for a multi-faceted campaign aimed at demystifying misconceptions about vaccines. Healthcare organizations must also improve their communication strategies in order to improve vaccine acceptability among health care workers. Healthcare organizations can address this by adopting multifaceted communication strategies with a strong focus on trustworthiness (Lockyer et al, 2021).

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