

Review Article

Covid-19 vaccine hesitancy among health care workers: A systematic review

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ABSTRACT:

Aim: The study aims to assess COVID-19 vaccine hesitancy among healthcare workers. **Materials and methods:** A systematic review of selected cross-sectional studies was performed. The data were hand-searched using electronic databases, and 200 articles were screened. The intervention and outcomes were assessed in the study included for systematic review. The articles' bias assessment was done using the Newcastle Ottawa scale. **Results:** Five cross-sectional studies included in our systematic review were statistically significant. The studies reported low rates of COVID-19 vaccine acceptance. **Conclusion:** The overall COVID-19 vaccine hesitancy among HCWS was found to be high.

Keywords: COVID-19 vaccine, Vaccine hesitancy, Healthcare workers.

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INTRODUCTION

The COVID-19 pandemic is a worldwide public health, social and economic threat. Since there is no clinically proven treatment for COVID-19 infection, herd immunity can only be gained by high vaccination coverage worldwide¹. The Severe Acute Respiratory Virus - Coronavirus - 2 (SARS- COV-2) vaccine is considered critical to alleviating the Coronavirus disease (COVID-19) pandemic.

Vaccination remains the most successful way of controlling the disease, which unfortunately is challenged by delay or vaccine refusal. According to the Strategic Advisory Group of Experts on Immunization (SAGE), vaccine hesitancy is the term used to describe: "delay in the acceptance or refusal of vaccination despite the availability of vaccination services"².

Complacency, convenience and confidence are the factors that contribute to vaccine hesitancy.

Complacency denotes the low perception of the disease risk; hence, vaccination was deemed unnecessary. Confidence refers to the trust in vaccination safety effectiveness, besides the competence of the healthcare systems. Convenience entails the availability, affordability and delivery of vaccines in a comfortable context.^{2,3}

Healthcare workers are more at risk of getting COVID-19 than the general population. They are more likely to contract and subsequently transmit the disease. HCWs are the primary focus for vaccination promotion and advocacy. The CDC and World Health Organization (WHO) had prioritized HCWs to receive the COVID-19 vaccine.⁴

The complex motives behind vaccine hesitancy can be analyzed using the epidemiologic triad of environmental, agent and host factors^{5,6}. Environmental factors include public health policies, social factors and media messages^{6,7}. The agent

(vaccine and disease) factors involve the perception of vaccine safety and effectiveness, besides the perceived susceptibility to the disease⁷. Finally, host factors are dependent on knowledge, previous experience, educational and income levels⁷.

The low vaccination acceptance rates among HCWS can decrease the vaccination compliance of individuals who coincidentally engage with vaccine-hesitant HCWs professionally or personally. This is of concern because HCWs are the most reliable social resource to encourage vaccination among the general population⁸. This systematic review aims to assess the COVID-19 vaccine hesitancy among healthcare workers.

MATERIALS AND METHODS

In this study, a systematic review was carried out to evaluate the association of COVID 19 vaccine hesitancy among healthcare workers. This review was done following the PRISMA guidelines. PRISMA consists of a four-phase flow diagram and a 27-item checklist. It is used to improve transparency in systematic reviews. The flow diagram describes the identification, screening, eligibility and inclusion criteria of the reports that fall under the scope of a review.

RESULTS

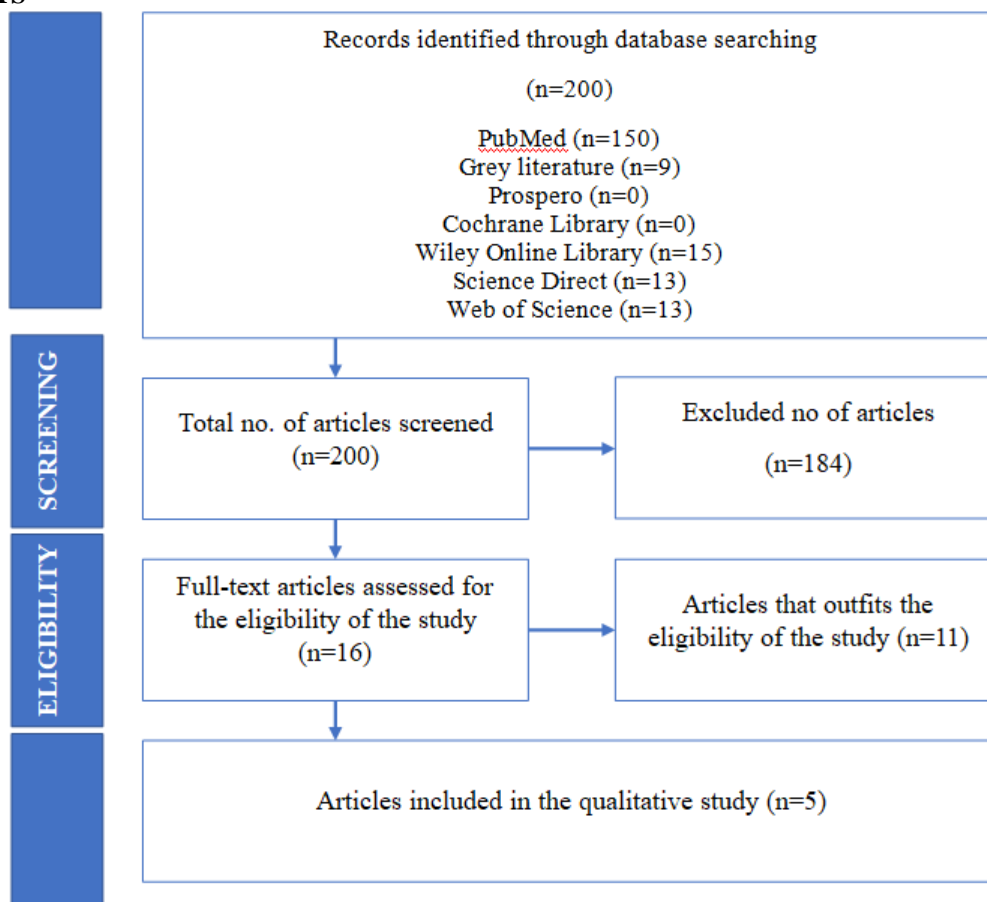


FIGURE 1: PRISMA flow diagram

The articles related to COVID 19 vaccine hesitancy among healthcare workers were hand-searched using electronic databases such as PubMed, Grey literature, Prospero, Cochrane library, Wiley Online Library, Science Direct and Web of Science. The articles were retrieved from each database based on MESH Representation.

The keywords “COVID 19 vaccine”, “Vaccine hesitancy”, and “ Health Care workers” were entered into the search engines. All relevant data were retrieved and scrutinized to procure relevant information.

INCLUSION CRITERIA

Peer-reviewed published articles, original articles, articles with full text, only cross-sectional studies, survey studies, only articles with the correlation of COVID 19 vaccine hesitancy among healthcare workers, the articles published by authors in the English language were included.

EXCLUSION CRITERIA

Articles other than the English language, unpublished manuscripts (preprints), articles that did not aim to evaluate COVID 19 vaccine hesitancy among healthcare workers, case-control, in vitro and animal studies were excluded.

Figure 1 shows that a total of 200 records were identified, and following the screening process, a total of 5 articles were included in this review.

TABLE 1: INTERVENTION OF THE STUDIES BASED ON COVID-19 VACCINE HESITANCY AMONG HEALTHCARE WORKERS

AUTHOR NAME	YEAR	COUNTRY	STUDY DESIGN	ORIGIN OF SUBJECTS
Beeson Maraqa et al. ⁹	2021	Palestine	Cross-sectional study	Among the participants, 373(32.3%) were physicians, 483(41.7%) were nurses, and 302(26.1%) were other health professionals. In addition, 62.9% of females and 52.5% were between 30-49 years.
Stephanie M. Toth-Manikowski et al ¹⁰	2022	Chicago	Cross-sectional study	Respondents were physicians, advanced practice providers, nurses, allied health care workers between 18 - >65 years.
Narmada Ashok et al. ¹¹	2021	Tamil Nadu	Cross-sectional study	Among the participants, 80% were doctors, and among them, 58% were paediatricians, and 21.6% were consultants from other specialities. The majority of them were male(50.8%), the age group was 18-25 years(30.2%) and most were married (69.3%).
Rihanna Mohammed et al. ¹²	2021	Addis Ababa(Ethiopia)	Cross-sectional study	Mostly(350,57.0%) the participants were less than 30 years old (mean age of 30.57+ 6.87 years), 58.1% were unmarried and orthodox christians(383,62.6%).
Sukran Kose et al. ¹³	2020	Izmir(Turkey)	Cross-sectional study	Among the participants, 53(4.7%) were physicians, 306(26.9%) were nurses, and 80(7.0%) were other health professionals. 72.5% were females, and 27.5 % were male. The age group include 15 - 45+ years.

Table 1 shows the intervention of the studies based on COVID-19 vaccine hesitancy among healthcare workers. The study design is a cross-sectional study. The majority of the participants were physicians. However, the study also includes nurses and other health professionals.

TABLE 2: OUTCOME OF THE STUDIES BASED ON COVID-19 VACCINE HESITANCY AMONG HEALTHCARE WORKERS

AUTHOR NAME	SAMPLE SIZE	CHARACTERISTICS	OUTCOME	P-VALUE
Beeson Maraqa et al. ⁹	1159	The study included 1159 HCWs, 62.9% females, and 52.5% between 30-49 years. Intentions to get vaccinated was only 37.8%, 31.5% undecided, and 30.7 % decided to decline.	Greater levels of intention were reported among males, younger ages, physicians, HCWS at non-governmental settings, those who previously received the influenza vaccine, and those who had higher COVID-19 related knowledge.	<0.05
Stephanie M. Toth-Manikowski et al ¹⁰	1974	A total of 1974 health care workers participated in the study, of which 289(15%) anticipated declining vaccination.	Vaccinated HCWs were more likely to be swayed to vaccinate based on external stimuli such as the media or personal healthcare providers.	<0.05
Narmada Ashok et al. ¹¹	264	Among 264 respondents, 40.2% of HCWs had the intention to get the vaccination immediately. However, 32.2% HCWs wanted to decide after seeing the adverse effects of	Infected people in the immediate social network, COVID19 knowledge, the safety of vaccines, those who did not get a flu vaccine last year were found to have a statistically significant association with vaccine acceptance.	<0.005

		vaccination. Nearly one-quarter (23.9%) did not intend to get the vaccine soon, and 3.8% did not intend to get the vaccine anytime.		
Rihanna Mohammed et al ¹²	614	A total of 614 HCWs responded to the study, with a mean age of 30.57+ 6.87 years. Approximately two-thirds (60.3%) of HCWs were hesitant to use the COVID 19 vaccine. In addition, participants under the age of 30 were approximately five times more likely to be hesitant to be vaccinated than those over 40.	Lack of belief in COVID19 vaccine benefits, lack of trust in the government and science to produce safe and effective vaccines and concern about vaccine safety were also predictors of COVID19 vaccine hesitancy.	<0.05
Sukran Kose et al ¹³	1138	A total of 1138 health care workers participated in the study. 68.6% of the health care professionals stated that they could be vaccinated. Men, students, the younger age group and those who had a previous flu shot were all willing to get the COVID-19 vaccine.	Profession, previous flu vaccination status, age groups, and the desire to get COVID 19 vaccine were related.	<0.05

Table 2 shows the outcome of the studies based on COVID-19 vaccine hesitancy among healthcare workers. The studies reported low rates of COVID-19 vaccine acceptance. In addition, lack of trust in the government and science to produce safe and effective vaccines were predictors of COVID-19 vaccine hesitancy.

Table 3: BIAS ASSESSMENT

Author Name	Selection				Comparability	Outcome / exposure	
	Sample representation	Sample size	Non-respondents	Risk factor		Assessment of outcome	Statistical test
Beeson Maraqa et al., ⁹ 2021	*	*	*	*	*	*	*
Stephanie M. Toth-Manikowski et al ¹⁰ , 2022	*	*	*	*	*	*	*
Narmada Ashok et al ¹¹ ., 2021	-	-	-	*	*	*	*
Rihanna Mohammed et al., ¹² 2021	*	*	*	*	*	*	*
Sukran Kose et al ¹³ ., 2020	-	*	*	*	*	*	*

*denotes low-risk bias, - denotes a high-risk bias

Table 3 shows bias assessment. This assessment was done using the Newcastle- Ottawa scale, adapted for quality assessment of cross-sectional studies. The articles were assessed as low risk and high-risk bias based on this scale.

DISCUSSION

The COVID-19 pandemic became a significant threat to the world ever since WHO declared it a pandemic on the 11th of march 2020¹⁴. Since then, efforts have

been made to prevent the pandemic from spreading and causing severe illness and death tolls. Vaccine development was part of this endeavor. Nevertheless,

vaccine hesitancy remains a major public health problem.

Healthcare providers play a critical role in controlling and preventing COVID-19 as frontline workers in treating patients, providing preventive measures, and setting themselves as role models to the community. COVID-19 vaccine hesitancy is a common phenomenon globally, with variability in the cited reasons behind the refusal of vaccine acceptance.¹⁵

The study conducted by Beeson Maraqa et al. in the year 2021 had discussed the correlation of COVID-19 vaccine hesitancy among healthcare workers. It was a cross-sectional study conducted in Palestine. Intentions to get vaccinated were only 37.8%, 31.5% undecided, and 30.7% planned to decline. Greater levels of intention were reported among males, younger ages, physicians, HCWs at non-governmental settings, those who previously received the influenza vaccine, and those who had higher COVID-19 related knowledge was found to be statistically significant ($P < 0.05$). This study concluded that vaccine acceptance was much lower among HCWs. This would greatly diminish the role of vaccination in reducing the burden of the COVID-19 pandemic throughout the country.⁹

Stephanie M. Toth - Manikowski et al. in the year 2022, had discussed that approximately 3 out of every 20 HCWs reported being vaccine-hesitant, and it was found to be statistically significant ($P < 0.05$). HCWs were positively influenced by close friends and colleagues who believed that COVID-19 vaccination is important, supporting communication across departments and roles to improve vaccination rates. Certain populations such as Black or African Americans, non-physicians or those concerned about adverse side effects had a lower likelihood of receiving the vaccination against COVID-19 and should be targeted to improve communication regarding COVID-19 vaccination.¹⁰

Narmada Ashok et al., in the year 2021, had discussed that only 40.2% of HCWs wanted to vaccinate immediately. On the other hand, 32.2% wanted to decide after seeing the adverse effects of vaccination. Nearly one-quarter (23.9%) did not intend to get the vaccine soon, and 3.8% did not intend to get the vaccine anytime. Infected members in the immediate social network, COVID-19 knowledge, the safety of vaccines and those who did not get an influenza vaccine last year was found to be statistically significant ($P < 0.005$).¹¹

Rihanna Mohammed et al., in the year 2021, had discussed that approximately two-thirds of HCWs (60.3%) were hesitant to use the COVID-19 vaccine. Respondents under the age of 30 were approximately five times more likely to be hesitant to be vaccinated than those over 40 years. Lack of belief in COVID-19 vaccine benefits, lack of trust in the government and science to produce safe and effective vaccines and concern about vaccine safety was found to be statistically significant ($P < 0.05$).¹²

Sukran Kose et al., in the year 2020, had discussed that 68.6% of the healthcare professionals stated that they could be vaccinated. Men, students, the younger age group and those who had a previous flu shot were all willing to get the COVID-19 vaccine, and it was found to be statistically significant ($P < 0.05$).¹³

The overall analysis of the study showed a high rate of COVID-19 vaccine hesitancy among HCWs. The participants mentioned the long and short-term side effects and efficacy of the vaccine and the possibility of getting COVID-19 infection from the vaccine itself associated with the speed at which the vaccines are produced were main concerns of the hesitancy of vaccine. On the other side, lack of awareness about the vaccines inadequate training and communication about the COVID-19 vaccine safety and efficacy by the concerned bodies were reported as factors contributing to vaccine hesitancy.^{16,17,18}

To increase vaccine uptake and acceptance, the Ministry of Health and other concerned bodies should build strategies such as organizing intercultural health advocating sessions for HCWs and the community, which would enhance the knowledge and skill of health advocators in terms of vaccine information and interpersonal communication. In addition, HCWs should be involved in providing agreed vaccination information and making informed decisions, involving HCWs in an empathic way and designing different vaccine-related information communication platforms.^{19,20}

CONCLUSION

The overall COVID-19 vaccine hesitancy among HCWs was found to be high. Younger age, HCWs other than medical doctors or nurses, belief regarding acquired immunity, negative perception on the safety of COVID-19 vaccine, lack of trust in Ministry of Health and Science to produce safe and effective vaccines, and concern about risks of COVID-19 vaccine were identified as significant factors contributing to increased hesitancy against COVID-19 vaccine.

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