

Original Research Article

Attitude of healthcare workers towards coronavirus 2019 disease vaccine: a hospital based cross-sectional study

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ABSTRACT

Background: Healthcare workers are among the first group to receive coronavirus 2019 disease (COVID-19) vaccine, and their attitude towards the vaccine is likely to affect vaccine acceptance among general population. We aimed to study the attitude of HCWs towards COVID-19 vaccine and determine the factors associated with it.

Methods: A cross-sectional study was conducted through a written questionnaire prior to first dose of COVID-19 vaccine in the month of January, 2021, at a district hospital in Ludhiana, Punjab. HCWs were categorized as having negative, positive or mixed attitude based on their response to a written questionnaire. Data was analysed using SPSS version 24.0.

Results: More than half of the participants had negative attitude towards COVID-19 vaccine (N=274, 54.5%), while less than a third had positive attitude (N=141, 28.0%) and rest had mixed attitude (N=88, 17.5%). Younger HCWs (<50 years), nurses, females and those living with chronic medical or psychiatric illness showed higher chance of negative attitude towards COVID-19 vaccine, while doctors, paramedical staff, HCWs with higher qualification and urban dwellers had mixed response. On logistic regression analysis, being a female HCW was significantly associated with negative attitude while being a doctor or nurse was significantly associated with mixed attitude towards COVID-19 vaccine. Doubt regarding safety was the commonest response observed among all variables.

Conclusions: In the presence of a high proportion of HCWs having negative attitude, targeted interventions should be planned to address specific concerns of HCWs, so as to increase the overall vaccine acceptance for COVID-19 vaccine.

Keywords: Attitude, Healthcare workers, COVID-19 vaccine

INTRODUCTION

Severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) has rapidly spread globally over the last one and half year, developing into a pandemic affecting more than 163 million people and causing over 3 million deaths.¹ The pandemic has overburdened the healthcare system, weakened the economy worldwide, and created fear amongst the general public.^{2,3} Success of public health measures to combat coronavirus disease 2019 (COVID-

19) relies upon acquired immunity amongst the population (herd immunity) which is estimated to be around 67% for COVID-19.⁴ A safe and effective vaccine is therefore essential to reduce COVID-19 transmission. Massive efforts by various government organisations and pharmaceutical companies are ongoing to produce an effective vaccine.⁵ However the rapid pace at which COVID-19 vaccines are being developed and approved for use is likely to create doubts regarding safety of vaccines. Vaccine hesitancy is defined by the WHO strategic advisory group of experts on immunization

“delay in acceptance or refusal of vaccination despite availability of vaccination services”. It has been identified as one of the global health threats by the WHO in 2019, suggesting that it is not a new phenomenon but a rapidly growing entity, varying across vaccines and places.⁶

Healthcare workers (HCW) are identified as one of the priority groups by the WHO for COVID-19 vaccine.⁷ Being the frontline workers in COVID-19, they are at an increased risk of acquiring infection as well as transmitting to their families and the community.⁸ HCWs also play a vital role in disseminating information related to a newly introduced vaccine among general public, hence influence vaccine acceptance of entire population. This study was designed to evaluate the attitude of HCWs towards COVID-19 vaccine and its predictors.

METHODS

Study design

An observational cross-sectional study was conducted in our institute from January 10, 2021 to January 31, 2021. The study was planned after the approval of two vaccines for emergency use in India, AstraZeneca's Covishield and Bharat Biotech's Covaxin. HCWs of the hospital (doctors, nurses, nursing orderlies, laboratory and OT technicians, pharmacists, physiotherapists, occupational therapists, dieticians), aged 18 years and above who consented to participate, were included in the study. Administrative and medical store staff, as well as security guards working in the hospital were also included in the survey. Those not willing to fill the survey questionnaire were excluded.

Data collection

A written questionnaire was prepared by the investigators and administered to all participants. The questionnaire consisted of demographic variables and opinions towards COVID-19 vaccine (whether worried or comfortable). Demographic characteristics included age, gender, occupation, qualification, residence (urban or rural), living condition (living alone or with family) and chronic physical or mental illness, history of COVID-19 infection and history of vaccine hesitancy in the past. Negative attitude towards COVID-19 vaccine was evaluated using questions addressing worries related to vaccine safety, mistrust of benefits, risk of acquiring infection, preference to natural immunity, preference to personal protective measures (face masking, hand sanitization, social distancing), doubt commercial profiteering or unsure. Positive attitude towards COVID-19 vaccine was assessed based on whether the HCWs were comfortable about getting COVID-19 vaccine, as determined by the responses: immunity for self, benefit to the family is a part of government measure for establishing herd immunity, free of cost vaccine availability or unsure. Participants providing both negative and positive responses were considered as having a mixed attitude.

The questionnaire was circulated at the service place of participants after informing them about the objectives of the survey. The study was approved by institutional ethics committee.

Statistical analysis

Data was analysed using SPSS version 24.0 software. Categorical data was presented as frequencies and proportions. Chi-square test was used to assess differences in proportion between qualitative data. Variables independently associated with negative and mixed attitudes were further adjusted for demographic factors using multivariate logistic regression analysis, $p < 0.05$ was considered as significant.

RESULTS

In this study, out of 622 HCWs, 503 participated and filled the survey questionnaire. Males comprised 58.8% (N=296) and females comprised 41.2% (N=207) of the HCWs. Majority of the HCWs belonged to 18-34 years age group (N=232, 46.1%), followed by 35-49 years (N=210, 41.7%) and >50 years (N=61, 12.1%). Doctors (N=88) and nurses (N=130) comprised 43.2% of the participants. Other HCWs included paramedical staff (N=116, 23%), support staff (nursing orderlies and guards, N=139, 27.6%) and administrative staff (N=30, 5.9%). More than half of the HCWs were graduates and postgraduates (N=294, 58.4%), while the rest had completed matriculation and senior secondary qualifications (N=209, 41.5%). Majority of the HCWs lived in urban areas (N=367, 73.0%) and with families (N=434, 86.2%). Fifty five HCWs (11.0%) had history of COVID-19 infection. History of chronic medical illness and psychiatric illness was found in 29 (5.7%) and 28 (5.5%) HCWs respectively. History of side effects to vaccines was reported by six HCWs (1.1%) and 18 HCWs (3.5%) reported vaccine hesitancy in past (Table 1). Majority of the participants had negative attitude towards COVID-19 vaccine (N=274, 54.5%), 28% (N=141) had positive attitude and 17.5% (N=88) had mixed attitude based on their response to the given questionnaire (Figure 1).

Factors associated with negative attitude towards COVID-19 vaccine

Higher chance of negative attitude was seen in younger age group (<50 years), nurses, female HCWs and those living with chronic medical or psychiatric illness. Apart from the above differences, doctors, paramedical staffs, HCWs with higher qualification (graduates and post graduates) and urban dwellers were more likely to have a mixed response towards COVID-19 vaccine (Table 2). On logistic regression analysis, being a female HCW was significantly associated with negative attitude (OR 2.66, 95% CI 1.45-4.88, $p=0.001$), while being a doctor or nurse was significantly associated with mixed attitude

towards COVID-19 vaccine (OR 5.60, 95% CI 1.11-28.21, $p=0.03$ and OR 6.97, 95%CI 1.68-28.90, $p=0.007$).

Table 1: Demographic characteristics of participants (n=503).

Participant characteristics	N (%)
Age (years)	
18-34	232 (46.1)
35-49	210 (41.7)
>50	61 (12.1)
Sex	
Females	207 (41.2)
Males	296 (58.8)
Occupation	
Doctors	88 (17.4)
Nurses	130 (25.8)
Paramedical staff	116 (23)
Support staff (NOs and guards)	139 (27.6)
Administrative staff	30 (5.9)
Qualification	
Matric	105 (20.8)
Senior secondary	104 (20.6)
Graduate	197 (39.1)
Post graduate	97 (19.2)
Residence	
Urban	367 (73)
Rural	136 (27)
Living conditions	
Alone	69 (13.7)
With family	434 (86.3)
History of COVID-19 infection	55 (11)
Chronic medical illness	29 (5.7)
Chronic psychiatric illness	28 (5.5)
History of side effects to vaccines	6 (1.2)
Vaccine hesitancy (previous history of refusal or delayed acceptance of vaccines)	18 (3.5)

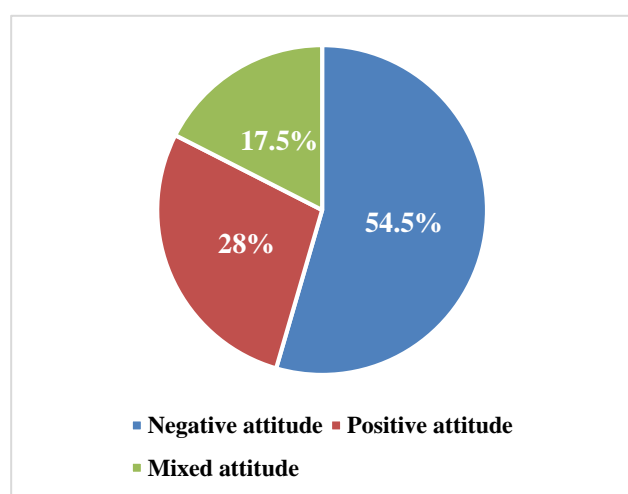


Figure 1: Attitude of HCWs towards COVID-19 vaccine.

More than half of the HCWs had doubt regarding safety of vaccine (N=309/503, 61.4%). Preference to natural immunity (N=226/503, 44.9%), worry about risk of acquiring infection (N=210/503, 41.7%), mistrust of benefits (N=205/503, 41.7%) were the next most common negative responses (Table 3). Benefit of family (N=199/503, 39.5%), immunity for self (N=197/503, 39.1%) and willing to be a part of government measures for herd immunity (N=192/503, 38.1%) were the most common positive responses observed amongst HCWs (Table 4). Doubt regarding vaccine safety was the most common response observed amongst all demographic variables, except in HCWs with chronic medical conditions, who preferred natural immunity over vaccination.

DISCUSSION

In this hospital-based observational study, we found that more than half of the HCWs had negative attitude towards COVID-19 vaccine and being a female HCW was significantly associated with negative attitude. Being a doctor or nurse was significantly associated with mixed attitude towards COVID-19 vaccine, although less than a third of the HCWs showed mixed response. We observed lesser chance of negative attitude in elder HCWs (>50 years), those with lower qualifications and those residing in rural areas.

Similar to the present study, the discrepancy between the demographic variables and occupational categories has been observed in many other studies concerning vaccine acceptability. In a study conducted by Gagneux-Brunon et al to determine vaccine acceptance in HCWs in France, similar results were observed, where female HCWs, nurses and younger age group HCWs were less likely to accept COVID-19 vaccine.⁹ Higher self-perceived risk of COVID-19 infection and fear about COVID-19 were the possible reasons for higher vaccine acceptability in males as well in older HCWs. Similar study in Israel described lower vaccine acceptability in females and nurses.¹⁰ Another study by Nzaji et al observed positive attitude towards COVID-19 vaccine amongst male HCWs and doctors.¹¹ Female HCWs and nurses tend to have a longer contact with patients, and are more prone to acquire and transmit infection. Negative response towards COVID-19 vaccine observed in these groups is hence worrisome, as it affects acceptability of vaccine among HCWs who are most vulnerable to acquire infection.

In the present study, less than a third of the participants had mixed response towards vaccine. Kimberly et al, in a survey of United States adults revealed that 31.6% of the participants were not sure if they would accept vaccine against COVID-19 when it is available.¹² In a study to assess acceptance of COVID-19 vaccine among Indian HCW, 33.8% of HCWs had an intention to receive COVID-19 vaccine but were not sure, again depicting uncertainty towards a new vaccine.¹³ Despite being more qualified than other HCWs and general population, the

uncertainty of response seen in doctors and nurses in the present study depicts a lack of sufficient motivation and

education prior to start of vaccination campaign against COVID-19.

Table 2: Univariate analysis of factors associated with attitude towards COVID-19 vaccine.

Characteristics	Negative attitude (N=274, 54.5%)	Positive attitude (N=141, 28.0%)	Mixed attitude (N =88, 17.5%)	P value	
				Negative vs. positive	Mixed vs. positive
Age (years)					
18-34	140 (51.1)	54 (38.3)	38 (43.2)	0.000	0.002
35-49	111 (40.5)	54 (38.3)	45 (51.1)		
>50	23 (8.4)	33 (23.4)	5 (5.7)		
Sex					
Females	145 (52.9)	32 (22.7)	30 (34.0)	0.000	0.059
Males	129 (47.1)	109 (77.3)	58 (66.0)		
Occupation					
Doctors	47 (17.2)	20 (14.2)	21 (23.9)	0.000	0.000
Nurses	86 (31.4)	29 (20.6)	15 (17.0)		
Paramedical staff	44 (16.1)	35 (24.8)	37 (42.0)		
Support staff (NOs and guards)	80 (29.1)	44 (31.2)	15 (17.0)		
Administrative staff	17 (6.2)	13 (9.2)	0 (0.0)		
Qualification					
Matric	47 (17.2)	50 (35.5)	8 (9.0)	0.000	0.000
Senior secondary	70 (25.5)	19 (13.5)	15 (17.0)		
Graduate	104 (38)	52 (36.9)	41 (46.6)		
Post graduate	53 (19.3)	20 (14.2)	24 (27.3)		
Residence					
Urban	200 (73)	94 (66.7)	73 (83.0)	0.179	0.007
Rural	74 (27)	47 (33.3)	15 (17.0)		
Living conditions					
Alone	44 (16.1)	15 (10.6)	10 (11.4)	0.134	0.864
With family	230 (83.9)	126 (89.4)	78 (88.6)		
History of COVID-19 infection					
Yes	36 (13.1)	10 (7.1)	9 (10.2)	0.063	0.403
No	238 (86.9)	131 (92.9)	79 (89.8)		
Chronic medical illness					
Yes	19 (6.9)	3 (2.1)	7 (8.0)	0.039	0.047
No	255 (93.1)	138 (97.9)	81 (92.0)		
Chronic psychiatric illness					
Yes	24 (8.8)	2 (1.4)	2 (2.2)	0.002	0.639
No	250 (91.2)	139(98.6)	86 (97.8)		
History of side effects to vaccines					
Yes	5 (1.8)	0 (0.0)	1 (1.1)	0.171	0.384
No	269 (98.2)	141(100.0)	87 (98.9)		
Vaccine hesitancy (previous history of refusal or delayed acceptance of vaccines)					
Yes	12 (4.4)	4 (2.8)	2 (2.3)	0.593	1.000
No	262 (95.6)	137 (97.2)	86 (97.7)		

In this study, doubt regarding vaccine safety was the most common association with negative attitude among HCWs. Singhania et al in a study conducted on Indian HCWs found strong association of vaccine non-acceptance with concerns about vaccine effectiveness, adverse effects and low perception of disease severity.¹³ These findings were consistent with observations made by other similar studies, where concerns of vaccine safety were predominant.¹⁴⁻¹⁶

Limitations

The study has several limitations. It is a single-centre hospital based study and lacks sufficient data to generalize the results over a large population of HCWs of the country. The concerns and attitude of HCWs as depicted in the study may not predict acceptance of the vaccine, since the perceptions regarding the vaccine may change once the vaccine becomes available. The survey

questionnaire is prepared by the authors based on literature review of similar studies on COVID-19 vaccine acceptance, and only the most relevant variables have been chosen to allow ease of administration.

Table 3: Reasons provided by participants for negative attitude towards COVID-19 vaccine (n=274).

Reasons for negative attitude	N (%)
Doubt safety of vaccine	309 (61.4)
Mistrust of benefits	205 (40.7)
Worry about risk of acquiring infection	210 (41.7)
Prefer natural immunity	226 (44.9)
Prefer personal protective measures	187 (37.1)
Concerns about commercial profiteering	108 (21.4)
Unsure	77 (15.3)
Any other reason	8 (1.5)

Table 4: Reasons provided by participants for positive attitude towards COVID-19 vaccine (n=141).

Reasons for positive attitude	N (%)
Immunity for self	197 (39.1)
Benefit of family	199 (39.5)
Want to be part of government measures for herd immunity	192 (38.1)
Free of cost	129 (25.6)
Any other reason	8 (1.5)

CONCLUSION

HCWs form the backbone of any nation's healthcare system. Attitude and vaccine acceptance of HCWs, in context with need for mass vaccination to combat the ongoing COVID-19 pandemic, plays a major role in vaccination behaviour of general population. Considering the factors associated with negative attitude of HCWs, there is an urgent need to develop targeted educational and motivational campaigns, so as to prevent mass rejection of a new vaccine. The present study addresses specific concerns related to COVID-19 vaccine, rather than the overall acceptability of vaccine in HCWs, as observed in various studies described above.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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