

# Assessment of knowledge, attitude and practice towards covid-19 vaccine among healthcare workers in a tertiary care center

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## Abstract

**Background:** In the current scenario of vaccine scepticism amidst India's massive vaccination drive, assessment of knowledge and attitude of healthcare workers towards the vaccine and their appropriate training is vital to build trust in the vaccine and increase acceptance.

**Objectives:** To study and assess Knowledge, Attitude and Practice towards Covid-19 Vaccine among healthcare workers in a tertiary care center.

**Materials & Methodology:** The study was Pre & Post Questionnaire Survey. After informed consent, the responders were provided an online questionnaire for the collection of information on knowledge, attitude and practices about COVID-19 vaccines. Responses were collected both before and after the sensitisation programme.

**Results:** The study included 366 participants with mean age of 23.25 years (SD=9.08). Our study found that there was significant change in the knowledge, attitude and willingness of the HCWs after the sensitising program. After the sensitisation, 83.7% were ready to accept that the vaccine is a good idea (compared to 65.6%). 83.7% were ready to accept that the vaccine is a good idea (compared to 65.6% pre-sensitisation). Concerns about the side effects reduced among HCWs from 53.3% to 48.3%. Willingness to take the vaccine increased from 37.7% to 69.78% after the sensitisation Also more healthcare workers were willing to recommend the vaccine to others (70.6% compared to 40.2%).

**Conclusion:** We found that the sensitizing program showed significant change in the knowledge, attitude, and willingness among the HCWs. This provides further opportunities for development of similar educational and awareness programmes for HCWs and for the general population.

**Keywords:** COVID-19 vaccine, health care workers, sensitisation program

## Introduction

There are widespread public concerns about aspects of the vaccine development process. There are two types of COVID-19 vaccines-protein-based or gene-based. Protein-based vaccines deliver the immune system-stimulating antigen to the body. This category includes

whole-inactivated (killed) vaccines, like the Polio and flu shots, subunit vaccines and virus-like particles, like in the Hepatitis B and Human Papillomavirus vaccines. Gene-based vaccines deliver the genetic instructions for the host's cells to make the antigen, which more closely mimics a natural infection. In the case of coronaviruses, the antigen of interest is the surface spike protein which the virus uses to bind and fuse with human cells. The viral-vector technique transports genetic information in a less-harmful virus-often a common cold-causing adenovirus that is sometimes engineered so it can't replicate in the host. DNA and mRNA vaccine designs deliver naked nucleic acids or, more recently, encapsulate them in a carrier nanoparticle. Within each of these versatile platforms, the same production and purification methods and manufacturing facilities can be used to make vaccines for different diseases <sup>[1]</sup>.

As American Nursing Foundation survey Oct-2020 on vaccine hesitancy among health care workers states, nearly 63% were somewhat or very confident in taking vaccine, 34% voluntarily receive vaccine, 57% are comfortably discussing about vaccine with patients <sup>[2, 3]</sup>. COVID-19 vaccine third phase trials by the numbers (as of November 30, 2020): Pfizer-BioNTech-43,448 enrolled (21,720 vaccine, 21728 placebo), Moderna-30,000 enrolled in 89 clinical sites. The clinical trial for the Pfizer-BioNTech COVID-19 vaccine demonstrated very high efficacy of the 2-dose regimen against symptomatic, laboratory-confirmed COVID-19. The overall efficacy was 95% (95% CI: 90.3%, 97.6%) with high certainty of evidence, and 8 cases in the vaccine group and 162 cases in the placebo group <sup>[4, 5, 6]</sup>. There are some attitude and behavior changes related to acceptance of COVID-19 vaccine <sup>[7, 8, 9]</sup>. Despite the unprecedented speed, mRNA vaccines are clinically unproven. No commercially available vaccines use the platform and until now, it has not been tested in large-scale human trials. With COVID-19, that's all set to change.

As there are no studies related to this in India, we conducted a pre-and post-educational survey about the vaccine in our Indian context and population.

### **Objectives of the study**

1. To assess the knowledge, attitude & practices about COVID-19 vaccine among healthcare providers.
2. To promote confidence among healthcare workers in their decision to get vaccinated, and to recommend to their colleagues & patients.

### **Materials and Method**

Approval for this study was obtained from Ethics committee. This was a sectional study in which data was collected for 1month. The respondents were provided with google, an online method for the collection of information. Participation in the survey implied consent. The assessment was done at first point of contact that is Pre-Test before the commencement of sensitisation training programme which was delivered by the researchers. The curriculum of the sensitization programme training included how this vaccines are prepared, trials, efficacy, doses, contraindications. The training lasted for 1-2 hours followed by the post test.

This questionnaire was shared online and the questions were multiple choice types with 1 best response and few yes or no questions. At the end feedback/suggestions will be taken from the respondents. Sample size included all the healthcare providers who has undergone training program on sensitization training program. It included Doctors, nurses, lab technicians, Radiology technicians, Data operators, Ward boys, Housekeeping, Security guards under the ambit of Shri Atal Bihari Vajpayee Medical College Research Institute and its associated government hospitals forming the sample of about 1500 subjects. All those who consented were included and others were excluded. Confidentiality was maintained throughout the study.

## Methodology

After the approval from Institutional Ethics Committee, the responders were provided with a Google questionnaire form, an online method for the collection of information. This included informed consent, questionnaire on socio-demographic details, and knowledge, attitude & practices about COVID-19 vaccine.

Inputs and opinions from the respondents were taken before & after the sensitisation programme and assessed using descriptive statistics.

## Data analysis

All data collected was kept confidential. It was coded and entered for analysis by using the Statistical Package for Social Science (SPSS) for Windows Version 17.0 (SPSS inc.Chicago,USA) <sup>[10]</sup>. Descriptive statistics such as means, frequencies, percentages were used to analyze the data. Chi-square and Fisher's exact tests was used to test for significance between categorical variables.

## Assessment tools

A semi-structured questionnaire was prepared by the researchers to understand the various socio-demographic characteristics of the responders.

Knowledge, attitude and practices (KAP) questionnaire was developed by taking the facts from WHO, CDC and ICMR guidelines. This questionnaire contained questions to assess knowledge about the current COVID-19 vaccine preparation, route of administration, doses, etc.

The questionnaire also assessed whether he/she is worried about getting infected, wary of complications, etc. and about behaviors like vaccine promotion among colleagues, family and the society at large.

## Results

### Pre and post-test KAP study

N=384. Among them 366 respondents were pre-training and 18 were post training sensitization.

**Table 1:** Socio demographic profile of study subjects (n=366)

Variables	Characteristics	Number (Percentage)
Gender	Male	203 (55.5)
	Female	163 (44.5)
Religion	Hindu	326 (89.0)
	Muslim	27 (7.7)
	Christian	12 (3.1)
	Others	01 (0.2)
Marital Status	Married	111 (30.3)
	Single	255 (69.7)
Education Level	High school	94 (25.7)
	Not gone to school	47 (12.8)
	Primary School and below	02 (0.5)
	Secondary school	26 (7.1)
	University and above	197 (53.9)
Occupation	Doctor	34 (9.3)
	Group- D	48 (13.1)

	Interns	11(3.0)
	Nurse	23(6.3)
	Others	31 (8.4)
	Paramedical staff	03 (0.8)
	Postgraduate	10 (2.7)
	Undergraduate	203 (55.4)
	Technician	02 (0.5)
Annual Income	<50000	206 (56.3)
	500001-120000	75 (20.4)
	120001- 170000	22 (6.0)
	>1700001-250000	11 (3.0)
	>250000	52 (14.2)
Area of Residence	Rural	62 (16.9)
	Urban	304 (83.1)

Mean age  $\pm$  SD = 23.25 $\pm$ 9.08

**Table 2:** Covid-19 experience among study subjects (n=366)

Variables	Characteristics	Number (Percentage)
Covid infected	Yes	152 (41.5)
	No	214 (58.5)
Chronic conditions	Yes	24 (6.6)
	No	323 (88.3)
	Non-respondents	19 (5.1)
Overall health rate	Fair	62 (16.9)
	Good	192 (52.4)
	Very Good	89 (24.3)
	Poor	01 (0.3)
	Very Poor	01 (0.3)
	Non-respondents	21 (5.8)
Working place	Suspected Patients	16 (4.4)
	Handled covid samples	12 (3.3)
	In covid hospital not in direct contact	53 (14.5)
	Covid wards/OPD/ICU	73 (19.9)
	None of the above	17 (4.6)
	Non-respondents	195 (53.3)

- Among 152, 28 were mild, 11 were moderate, 112 were not known and 1 subject had severe infections.
- Among 214, 262 responded were all the above, 7 were maintained distance, 3 were proper sanitization and 13 were worn mask regularly.

**Table 3:** Attitude on Covid-19 Vaccine among subjects (n=366)

Attitude questions	Average score (%)	
	Pre-test	Post test
Vaccination is a good idea because I feel less worried about catching COVID-19 infection & its complications.	65.5	83.7
Concerned about the efficacy of the COVID-19 vaccine.	58.2	69.5
Concerned about the side effects of the COVID-19 vaccine.	53.3	48.3

**Table 4:** Knowledge on Covid-19 Vaccine among subjects (n=366)

Questions		Number (Percentage)	
		Pre-test	Post-test
Covid-19 vaccine approved at present in India	Correct response	123 (33.6)	320 (87.4)
	Wrong response	243 (66.4)	66 (23.49)
Route of Vaccine	Correct response	206 (56.3)	300 (81.96)
	Wrong response	160 (43.7)	66 (18.03)
Covid Vaccines approved for use	Correct response	285 (77.9)	330 (90.16)
	Wrong response	81 (22.1)	36(9.83)
Interval between doses	Correct response	215 (58.7)	275 (75.13)
	Wrong response	151 (41.3)	91 (24.86)
Number of doses	Correct response	228 (65.3)	260 (71.03)
	Wrong response	138 (37.7)	106 (28.96)

(Correct response will be scored as 1 and wrong response will be scored as 0)

**Table 5:** Willingness for Covid-19 vaccine among subjects (n=366)

Questions	Average score (%)	
	Pre-test	Post test
Willingness to get Covid-19 Vaccine	37.7	69.78
I am willing to take Covid-19 vaccine	40.2	73.50
Not willing to take Covid-19 vaccine	36.5	25.19
You recommend the public to take the Covid-19 vaccine	40.2	70.6
Recommend your family to take covid-19 vaccine	43.5	79.8
If you already had covid-19 infection, will you take the vaccine	56.1	60.9

## Discussion

Knowledge about the availability and efficacy of the COVID-19 vaccine are vital to successfully control the pandemic. Policymakers and health authorities must ensure acceptance and trust from both the community and healthcare workers because hesitation and delay may result in vaccination refusal. Our study provided an overview of the knowledge attitude and willingness of the COVID-19 vaccine among Indian healthcare workers. We then evaluated the changes in these outcomes after a sensitising program.

Our study found that the 65.5% of HCWs were ready to accept that vaccination is good idea to prevent COVID-19. 58.2% & 53.3% of participants were more concern about efficacy & side effects in taking vaccination. Also 40.2% of the HCWs were willing to get Covid 19 vaccine and only 40.2% were willing to recommend the vaccine to the public. However, there was significant change in the knowledge, attitude, and willingness of the HCWs after the sensitising program. After the sensitisation, 83.7% were ready to accept that the vaccine is a good idea (compared to 65.6%). Concerns about the side effects reduced from among 53.3% to 48.3%. Willingness to take the vaccine increased from 37.7% to 69.78% after the sensitisation Also more healthcare workers were willing to recommend the vaccine to others (70.6% compared to 40.2%). Similarly, the knowledge about the vaccine details were increased in HCWs after the sensitisation program. More percentage of correct answers were seen in all questions related to the available vaccines, routes and dosing. Hence our study reports that the concerns about Covid 19 vaccine is present in significant proportion of HCWs and a sensitising program can help reduce the concerns by increasing the knowledge and hence the willingness towards the vaccine. The confidence in HCWs about the vaccine will trickle down to the public and help in controlling the pandemic.

Our study identified the role of sensitising programs in generating awareness and distributing knowledge about the covid 19 vaccine among Health care workers. Therefore, the government and public health experts must take the necessary measures according to the local

culture to achieve higher vaccination acceptance and encourage positive intention toward COVID-19 vaccination. An educational framework must also be produced for the general population conveying the risks of vaccine delay or avoidance as it can then reduce governmental efforts to control the pandemic. Ultimately, a transparent educational and social campaign portraying social benefits of vaccination is critical to alleviate the detrimental pandemic effects.

The literature concerning the healthcare worker's acceptability of COVID-19 vaccination is currently limited; however, most of the examined studies have shown controversial results.

Studies in Greece <sup>[11]</sup> and the Democratic Republic of the Congo <sup>[12]</sup> revealed a minor proportion of healthcare workers willing to be vaccinated against COVID-19. Nurses' unwillingness to receive COVID-19 vaccination was also reported in surveys in China <sup>[13]</sup>. In contrast, a high percentage of healthcare workers in France <sup>[14]</sup> and nurses in Hong Kong <sup>[15]</sup> were willing to be vaccinated. A study by Faconti *et al.* found that only a small proportion of the participants would accept a vaccine against COVID-19, while 70% could be qualified as "vaccine hesitant". The main reasons for not receiving the COVID-19 vaccine were concerns about the vaccine's expedited development and fear of side effects <sup>[16]</sup>.

Some limitations should be considered in interpreting the findings. Our sample was limited to only healthcare workers therefore, our findings cannot be extrapolated to general population. Moreover, data collection was done using a convenient online survey, limiting our study representativeness. However, an online survey is an alternative approach for data collection in social distancing periods due to the COVID-19 pandemic. Sampling bias may arise because of snowball sampling. Another limitation concerns the possibility of bias due to misreporting of self-reported intentions about a hypothetical vaccine. Self-report data could potentially lead to misreporting and information bias, and potential under- or overestimations of reported associations. Also, the cross-sectional design used could not infer a causal relationship. Due to the nature of the questionnaire for assessing individuals' intention to be vaccinated, we choose the answers' option of "yes," "no" and "not sure" for participants' convenience; however, the Likert scale could be a better measurement of participants' attitudes. Last, given the hypothetical nature, our results may differ from actual acceptance behaviors. Further studies are needed to compare the behaviors of vaccination during or after the COVID-19 pandemic.

### **Implications of the study**

This study provides insightful information on educational awareness about COVID-19 infection and vaccination that can be implemented via an applicable framework of governmental public health efforts. Health literacy and awareness greatly influence intention to act upon health recommendations, which is crucial to avoid such negative consequences of the pandemic, such as waste disposal of protective gear and restrictive hygienic practices aimed to reduce the COVID-19 public health burden. Therefore, building health literacy through a social and educational framework is needed to prepare individuals for difficult situations such as pandemics to be socially responsible and to assure successful vaccination campaigns among the general population.

### **Conclusion**

Our study assessed knowledge, attitude, and willingness in HCWs about covid 19 vaccine and the effect of sensitizing intervention in these parameters. We found that the sensitizing program showed significant change in the knowledge, attitude and willingness among the HCWs. This provides further opportunities for development of similar educational and awareness programs for HCWs and for the general population.

**Funding Source:** Self-funded.

**Conflict of interest:** Nil.

### References

1. Abbasi J, COVID-19 and mRNA Vaccines-First Large Test for a New Approach, JAMA. 2020 Sept;324(12):1125-1127.
2. American Nurses Foundation, Pulse on the Nation's Nurses COVID-19 Survey Series: COVID-19 Vaccine, 4th Survey, 2020 Oct. (<https://www.nursingworld.org/practice-policy/work-environment/health-safety/disaster-preparedness/coronavirus/what-you-need-to-know/covid-19-vaccine-survey>)
3. Lindley, *et al.*, COVID-19 Vaccination Intent, Perceptions, and Reasons for Not Vaccinating Among Groups Prioritized for Early Vaccination-United States, September and December 2020: Morbidity and Mortality Weekly Report, CDC. 2021;70(6):217-222 (<https://www.cdc.gov/mmwr/volumes/70/wr/mm7006e3.htm>)
4. C4591001 Clinical Trial Group; Safety and Efficacy of the BNT162b2 mRNA Covid-19 Vaccine; New England Journal of Medicine, 2020 Dec;383:2603-2615. ([https://www.nejm.org/doi/full/10.1056/NEJMoa2034577?query=featured\\_home](https://www.nejm.org/doi/full/10.1056/NEJMoa2034577?query=featured_home))
5. mRNA-1273 Study Group; An mRNA Vaccine against SARS-CoV-2: Preliminary Report; New England Journal of Medicine. 2020 Nov;383:1920-1931. (<https://www.nejm.org/doi/full/10.1056/NEJMoa2022483>)
6. [www.clinicaltrials.gov](http://www.clinicaltrials.gov)
7. Tyson A, Johnson C, Funk C. U.S. Public Now Divided Over Whether to Get COVID-19 Vaccine; Pew Research Center, 2020 Sep. (<https://www.pewresearch.org/science/2020/09/17/u-s-public-now-divided-over-whether-to-get-covid-19-vaccine>)
8. Tyson A, Funk C. Growing Share of Americans Say They Plan to Get a COVID-19 Vaccine-or Already Have; Pew Research Center, 2021 March. (<https://www.pewresearch.org/science/2021/03/05/growing-share-of-americans-say-they-plan-to-get-a-covid-19-vaccine-or-already-have>)
9. Jackson C, Newall M. American's re-emergence picks up speed. Ipsos, 2021 May. (<https://www.ipsos.com/en-us/news-polls/axios-ipsos-coronavirus-index>)
10. SPSS Inc. Released. SPSS Statistics for Windows, Version 17.0 Chicago: SPSS Inc., 2008. (<https://www.ibm.com/products/spss-statistics/support>)
11. Papagiannis D, Malli F, Raptis DG, Papathanasiou IV, Fradelos EC, Daniil Z, *et al.* Assessment of knowledge, attitudes and practices towards new coronavirus (SARS-CoV-2) of health care professionals in Greece before the outbreak period. Intern J Environ Res Public Health. 2020;17:49-25. Doi: 10.3390/ijerph17144925.
12. Nzaji MK, Ngombe LK, Mwamba GN, Ndala DBB, Miema JM, Lungoyo CL, *et al.* Acceptability of vaccination against COVID-19 among healthcare workers in the democratic republic of the congo. Prag. Observ. Res. 2020;11:103. Doi: 10.2147/POR.S27109.
13. Wang K, Wong ELY, Ho KF, Cheung AWL, Chan EYY, Yeoh EK, *et al.* Intention of nurses to accept coronavirus disease 2019 vaccination and change of intention to accept seasonal influenza vaccination during the coronavirus disease 2019 pandemic: a cross-sectional survey. Vaccine, 2020;38:7049-56. Doi: 10.1016/j.vaccine.2020.09.021.
14. Gagneux-Brunon A, Detoc M, Bruel S, Tardy B, Rozaire O, Frappe P, *et al.* Intention to get vaccinations against COVID-19 in French healthcare workers during the first pandemic wave: a cross-sectional survey. J Hosp Infec. 2021;108:168-73. Doi: 10.1016/j.jhin.2020.11.020.

15. Kwok KO, Li KK, Wei WI, Tang A, Wong SYS, Lee SS. Influenza vaccine uptake, COVID-19 vaccination intention and vaccine hesitancy among nurses: a survey. *Intern J Nurs. Stud.* 2020;114:103-854. Doi: 10.1016/j.ijnurstu.2020.103854.
16. Fakonti G, Kyprianidou M, Toumbis G, Giannakou K. Attitudes and Acceptance of COVID-19 Vaccination Among Nurses and Midwives in Cyprus: A Cross-Sectional Survey. *Front. Public Health.* 2021;9:656-138. Doi: 10.3389/fpubh.2021.656138.