



Original Research Article

UNDERSTANDING VACCINE PERCEPTION IN FUTURE HEALTHCARE PROVIDERS: A CROSS-SECTIONAL STUDY OF COVID-19 VACCINE ATTITUDES

Mani Bharti¹, Shruti Pandey², Mamta Yadav³, Sunita Singh⁴, Ekta Arora⁵, Jyoti Prabha⁶

¹Assistant Professor, Department of Pharmacology, Government Institute of Medical Sciences, Greater Noida, Uttar Pradesh, India.

²Associate Professor Department of General Surgery, Government Institute of Medical Sciences, Greater Noida, Uttar Pradesh, India.

³Assistant Professor, Department of Pharmacology, Government Institute of Medical Sciences, Greater Noida, Uttar Pradesh, India.

⁴Professor, Department of Pharmacology, te North DMC Medical College & Hindu Rao Hospital, New Delhi, India.

⁵Associate Professor, Department of Pharmacology, Government Institute of Medical Sciences, Greater Noida, Uttar Pradesh, India.

⁶Specialist, Department of Obstetrics & Gynaecology, Deen Dayal Upadhyay Hospital, Harinagar, New Delhi, India.

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Corresponding Author:

Dr. Mani Bharti,
Assistant Professor, Department of
Pharmacology, Government Institute of
Medical Sciences, Greater Noida, Uttar
Pradesh, India.
Email: manibharti1@gmail.com

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ABSTRACT

Background: The COVID-19 pandemic has highlighted the crucial role of vaccination in controlling infectious diseases. Medical and paramedical students, being future healthcare providers, play a significant role in promoting vaccine acceptance and mitigating vaccine hesitancy. This study aims to evaluate the awareness and attitudes of medical and paramedical students towards the coronavirus vaccine. **Objective:** To assess the knowledge, awareness, and attitudes of medical and paramedical students towards the recently discovered coronavirus vaccine.

Materials and Methods: This was a cross-sectional study conducted on medical and paramedical students at a Tertiary care Hospital, Delhi. A questionnaire containing demographic information, 14 knowledge items, and 6 attitude questions was completed by 124 participants.

Results: Overall, >85% of people were aware of the vaccines, route of administration, possible side effects, and doses of vaccine. However, very few of them knew about the in-depth details. The knowledge score revealed that 90% of participants had sufficient knowledge about the coronavirus vaccine. MBBS students had significantly better knowledge in comparison with nursing students. In terms of attitude, > 64.2% of students showed a positive attitude.

Conclusion: The medical & paramedical students of North DMC Medical College and Hindu Rao Hospital, Delhi showed a satisfactory level of awareness and attitudes towards the COVID vaccine, with an obvious difference in disciplines. Further educational interventions with periodic assessment of such interventions are the need of the hour in the current scenario of this COVID pandemic.

Keywords: Awareness, Attitude, Medical students, Covid vaccine.

INTRODUCTION

COVID-19 (Coronavirus Disease 2019) is an ongoing pandemic caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) that has completely disrupted not only normal human life but has presented many unforeseen and unprecedented challenges to medical and healthcare systems worldwide. As of December 2024, COVID-19 has infected over 770 million people and resulted in more than 6.9 million deaths globally.^[1] COVID-19 is

essentially a disease of the respiratory system with a variety of symptoms, from mild rhinorrhoea to severe respiratory distress.^[2,3] The virus has been found to be more lethal in the elderly and patients with comorbidities such as hypertension, obesity, diabetes, and kidney disease.^[4,5] Multiple non-pharmaceutical interventions, such as lockdowns, social distancing, and the use of face masks, contributed to a relative slowing of SARS-CoV-2 transmission.^[6] However, international health authorities recognized that these measures alone were insufficient to fully control the spread of the disease.

Consequently, the concept of herd immunity, or population immunity, was introduced. Herd immunity provides indirect protection from infectious diseases when a significant portion of a community becomes immune, either through vaccination or natural infection.^[7]

According to the World Health Organization (WHO), vaccination is the most effective method for achieving herd immunity. India commenced its Covid-19 vaccination program on January 16, 2021, and as of now, 86% of the eligible population has been vaccinated with the first and second doses.^[8]

For a considerable period, vaccinations have been suggested as the leading tool for controlling rapidly spreading infectious diseases. However, the spread of rumors and conspiracy theories against vaccination has intensified pressure on healthcare authorities and workers.^[9] COVID-19 vaccine development and supply is an ongoing process.^[10] A new collaboration by several companies and their initiatives was announced in September 2020 aimed at supplying 100 million doses of COVID-19 vaccine to low- and middle-income countries in 2021.^[11] Vaccination of more than 82% of the population is crucial for achieving the necessary herd immunity to control viral transmission and stop the pandemic.^[12] Social reforms and related activities are necessary to spread awareness about the usefulness of the COVID-19 vaccination, even in settings where the resources are minimal. This intends to encourage vaccination and institute trust in the general population regarding the health authorities and policymakers, promising better disease control and reduced mortality. This study determined COVID-19 vaccine knowledge, attitudes, and acceptance among the medical and paramedical students at the tertiary health care center.

Objectives

- To assess the level of awareness about the COVID-19 vaccine among medical and paramedical students.
- To evaluate the attitudes of these students towards receiving and recommending the COVID-19 vaccine.
- To identify factors influencing their attitudes and awareness.
- To provide recommendations for improving vaccine education among healthcare students.

MATERIALS AND METHODS

Study Design: This is a cross-sectional survey-based study conducted in August 2021.

Study Population: The study includes medical and paramedical students from a Tertiary care Hospital, Delhi

Inclusion and Exclusion Criteria

Inclusion Criteria

Students enrolled in medical or paramedical courses. Students are willing to participate in the study.

Exclusion Criteria

Students who have completed their courses.

A cross-sectional online survey was conducted involving the medical and paramedical students Tertiary care Hospital, Delhi. The study was conducted in August 2021 after receiving ethical clearance from the institutional ethics committee.

The study was conducted online as face-to-face interviews were not possible during the pandemic. A questionnaire was sent to the students online. Ethics approval was obtained from the institutional ethics committee. Participants were told in detail about the voluntary nature of the study, and were conjointly briefed about the right to withdraw from the study at any time they felt the need without any implications.

Data Collection

Survey Instrument

A structured questionnaire is developed to assess:

Demographic information (age, gender, course of study, year of study).

Awareness about COVID-19 and the vaccine (knowledge of vaccine types, efficacy, side effects).

Attitudes towards the COVID-19 vaccine (willingness to receive the vaccine, trust in vaccine safety and effectiveness, likelihood of recommending the vaccine to others).

Development, Validation, and Distribution of the Questionnaire

A questionnaire with 20 items (in English) was formulated using reference material, fact sheets, and information leaflets on the COVID-19 vaccine developed by the WHO, national health services, and relevant literature. To make sure that the information provided was valid and appropriate for the study, it was reviewed by three experts working in the related field.

The study contained the following sections:

Section 1: consisted of study information and an informed consent agreement. This comprised questions related to gender, age, residence, and course.

Section 2: included 14 questions, two of which were open-ended, such as Q13. (What are the contraindications for COVID vaccination?) & Q14. (14. Duration of observation period after Covid vaccination) The rest of the 12 questions are about general concerns and knowledge of the COVID-19 vaccine, including the development of the COVID-19 vaccine, route of administration, doses of vaccine, amount of dose, source of knowledge, opinion about the temperature of storage, concerns about potential complications from the vaccine,

Section 3: consisted of 6 questions related to participants' perceptions towards the COVID vaccination and their attitude towards taking the vaccine and motivating their family and friends.

The questionnaire was developed based on a literature review of earlier studies and discussions among the authors after several in-depth interviews and advice from public health and epidemiology experts. The final version of the questionnaire had 20 items, with 14 and 6 items in the knowledge and attitude and practise sections, respectively. The questionnaire was created on the basis of recent

literature available related to similar kinds of studies and various open-ended interviews conducted by the researchers. Each correct survey answer added one point toward the final score of each section. A score of 70% or more in each section of both surveys was determined as the cut-off score for adequate knowledge, attitude, practice, or acceptance.

Administration

Because of the pandemic, the study was conducted online. The final questionnaire link was shared with all students through various digital platforms such as WhatsApp and Gmail.

The online study using Google Forms targeted the medical and paramedical students' population by sending the Google Form link on a list of emails and social media platforms (WhatsApp) with specific questions about demographic status to avoid selection bias. We estimated the number of responses on the Google form represents approximately 124 possible participant responses.

Statistical analysis was performed using Microsoft 365 Excel. All participants gave their informed consent before participating in the study.

RESULTS

Demographic Characteristics

Distribution of respondents by age, gender, and course of study.

A total of 124 respondents were included in the final analysis, of which 64 (51.6%) were male and 60 (48.4%) were female, with a mean (SD) age of 21.6 9.8 years, ranging from 18 to 32 years.

Year of study distribution among respondents.

Among the participants, 110 were MBBS students, 10 interns, and 4 paramedical students. Geographically, most respondents (90.8%) were from the NCR, with some from other states too.

Table 1 provides an overview of the study characteristics and differences between the study populations.

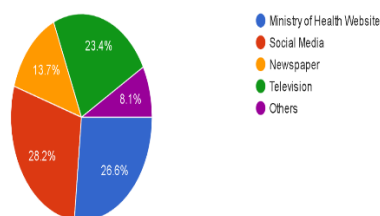
Table 1: Sociodemographic characteristics of the study participants (n=124)

	Categories	Percentage
Age	≥ 20	64 (51.61%)
	<20	60 (48.39%)
Sex	Male	64 (51.61%)
	Female	60 (48.39%)
Education	MBBS 1stYear	43(35%)
	MBBS 2 nd year	55(44.7%)
	MBBS 3 rd year	4(3.3%)
	MBBS final year	7(5.7%)
	Interns	10(8.1%)
	Paramedical	4(3.3%)
Residence	NCR	94.3%
	Other	6.64%

Awareness Levels

The proportion of students aware of different COVID-19 vaccines. & Sources of information about the vaccine.

100% of participants are aware that vaccination is critical for coronavirus prevention, with 28% learning about the vaccine through social media and 26% learning about it through the ministry's website. 27% came from television 13% from newspapers and the rest, 10–12%, from other sources.



Knowledge of vaccine efficacy and side effects.

Participants have good knowledge of the coronavirus vaccine in terms of its development, route of administration, type of vaccine doses, and side effects, as the correct responses were more than 70%.

The details of the questions and their correct responses are mentioned in table 2. In this section, there are two open-ended questions about contraindication and time of observation post vaccination. Most students responded correctly in the question on post vaccination observation time. On the question regarding contraindications, I summarised their responses: - "1) No person below the age of 18 should take the vaccine. Because at the time of study below 18 years vaccination was not started. 2)Pregnant and lactating women should not be administered the COVID-19 vaccine. This is because women who are pregnant, lactating, or expecting pregnancy confirmation have not been part of any vaccine trials. 3)Anyone who has previously experienced an anaphylactic or allergic reaction to a dose of the COVID-19 vaccine (during trials) should not receive the vaccine.4) Anyone who has anaphylaxis or an allergic reaction to vaccines or injectable therapies, whether it is immediate or delayed.5) Those who show active symptoms of COVID-19 can take the vaccine only 4–8 weeks after recovery.

Table-2 shows the knowledge of participants about the COVID vaccine. " When we talk about the attitude and perception of participants.

Table 2: Knowledge of the participants about COVID-19 vaccine (n=124)

Item	Correct response %	Incorrect response %
1.Is there a vaccine for COVID 19?	100%	-
2. If yes, what is the source of knowledge?	-	-
3.Covishield COVID 19 vaccine is developed by:	95(76.6%)	29(23.4%)
4.Covaxin COVID 19 vaccine is developed by:	106(85.5%)	18(14.5%)
5.Covishield and Covaxin are which type of vaccines	94 (75.8%)	30(24.2%)
6.Route of administration of Covishield & Covaxin are:	110(88.7%)	14(11.3%)
7. Sites of administration of Covishield & Covaxin are:	114(92.7%)	9(7.3%)
8. What are the number of doses required for Covishield and Covaxin?	118(95.2%)	6(4.8%)
9. What is the ideal temperature /ideal storage condition for Covishield and Covaxin?	107(86.3%)	17(13.7%)
10. What is the schedule of dosing of Covishield and Covaxin?	103(83.2%)	21(16.8%)
11.Dose of COVID Vaccine (covishield & covaxin) is:	97(78.2%)	27(21.8%)
12. Common side effects of the covid vaccine are:	98(79%)	26(21%)

Attitudes Towards the Vaccine

65.3% of people are willing to receive the vaccine, while 14.5 percent are not ready for vaccination and 20.16% are unsure.67% of participants are willing to motivate their family and friends for vaccination, while 26% of participants are not sure and 11.9% are not willing to motivate others.98.4% of participants

are aware of masking and social distancing after vaccination. Overall, 74.15% of people are in favour of vaccination.

All details of the questionnaire related to the perception and attitude of participants towards the coronavirus vaccine are given in Table 3.

Table 3: Attitudes & perception of participants toward COVID-19 (n=124)

Item	Yes /agree	No /disagree	May be/ neutral
1. Are you willing for vaccination?	81(65.32%)	18(14.51%)	25(20.16%)
2. Are you motivating your family or friends for vaccination?	84(67.74%)	14(11.29%)	26(20.96%)
3.Can a vaccinated person spread the disease?	39(31.45%)	47(37.90%)	38(30.64%)
4.Do we need masking and social distancing after vaccination?	122(98.4%)	1(.8%)	1(.8%)
5. Overall are you in favour of vaccination?	74.19%	2(1.6%)	31(25%)
6. Can vaccination from Covid 19 protect you for a lifetime?	33(26.7%)	43(34.7%)	48(38.7%)

DISCUSSION**Key Findings**

This study provides a comprehensive evaluation of the awareness and attitudes of medical and paramedical students towards the COVID-19 vaccine at North DMC Medical College and Hindu Rao Hospital, New Delhi. The results indicate a generally positive attitude towards vaccination, with significant variations in willingness to receive the vaccine, encourage others, and adherence to post-vaccination protocols.

Willingness to Receive the Vaccine

The study found that 65.3% of participants were willing to receive the COVID-19 vaccine. This relatively high acceptance rate is encouraging, suggesting that a majority of future healthcare providers recognize the importance of vaccination in controlling the pandemic. However, the fact that 14.5% of respondents were not ready for vaccination and 20.16% were unsure highlights the presence of vaccine hesitancy even among healthcare students. This hesitancy could be attributed to concerns about vaccine safety, efficacy, or potential side effects, as

seen in other studies on vaccine acceptance among healthcare professionals and students.

Motivation to Encourage Others

The willingness to motivate family and friends for vaccination was observed in 67% of the participants. This indicates a strong potential for these students to act as advocates for vaccination within their communities. However, 26% of participants were unsure, and 11.9% were unwilling to motivate others. This hesitancy to advocate for vaccination could stem from the same concerns that affect their willingness to get vaccinated, or a lack of confidence in communicating the benefits of vaccination effectively.

Awareness of Post-Vaccination Protocols

An impressive 98.4% of participants were aware of the necessity of masking and social distancing even after vaccination. This high level of awareness is critical as it underscores the understanding that vaccination is a tool to complement, not replace, other public health measures. This knowledge is vital for preventing complacency and ensuring continued efforts to reduce virus transmission.

General Attitude Towards Vaccination

Overall, 74.15% of respondents were in Favor of vaccination, which is a positive indication of the general attitude towards COVID-19 vaccines among future healthcare providers. This favourable attitude is crucial as it can influence their future practice and interactions with patients, potentially increasing vaccine uptake in the broader population.

Comparison with Other Studies

In another similar study, the result is COVID-19 vaccine acceptance (26.7%), with an apparent high hesitancy (52.4%) and refusal (20.9%).^[13]

5.2% were afraid of the negative consequences of falling ill with COVID-19. Fear of vaccine side effects was similarly assessed, with only minor concerns identified. While remaining generally positive about the COVID-19 vaccine.^[14]

On the other hand, a study of 793 undergraduate nursing students from 12 Polish universities revealed that in the spring of 2021, 77.2% of study participants were already vaccinated against COVID-19 and approximately 50% of students in the unvaccinated group declared willingness to get a vaccination.^[15]

A study conducted by Talarek et al. in 2020 among the students of Warsaw Medical University showed that a majority (94.6%) of students expressed their intention to receive a hypothetical COVID-19 vaccine. Additionally, the study reported that older students (4th–6th year) were more often vaccinated against influenza and that a positive attitude towards influenza vaccination was linked to the intention to receive a COVID-19 vaccine.^[16]

When compared to similar studies, these results align with findings from various regions where healthcare students generally show a high level of acceptance towards COVID-19 vaccines but also exhibit areas of hesitancy. This consistency underscores the universal nature of vaccine hesitancy issues and the need for targeted interventions to address them globally.

Implications for Public Health and Education

The study's findings highlight the need for ongoing educational interventions to address vaccine hesitancy among healthcare students. These interventions should focus on:

- **Providing Clear and Accurate Information:** Addressing concerns about vaccine safety, efficacy, and side effects through evidence-based information.
- **Enhancing Communication Skills:** Training students to effectively communicate the benefits of vaccination to patients and the public.
- **Building Trust:** Encouraging transparency and trust in health authorities and the vaccination process.

Periodic assessment of these educational interventions is crucial to ensure they are effective in increasing vaccine acceptance and advocacy among healthcare students. This approach will help in building a well-informed and proactive healthcare workforce ready to tackle current and future public health challenges.

CONCLUSION

This study provides valuable insights into the awareness and attitudes of medical and paramedical students towards the COVID-19 vaccine. The findings underscore the need for targeted educational interventions to improve vaccine knowledge and acceptance among healthcare students, ultimately contributing to better public health outcomes.

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