

Original Research Article

Evaluation of knowledge, attitude and practice (KAP) of pharmacy students' acceptance of COVID-19 vaccines in South India

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Sent for review: 17 March 2024

Revised accepted: 28 August 2024

Abstract

Purpose: To assess South Indian pharmacy students' knowledge, attitudes and practices (KAP) regarding adherence to COVID-19 immunization guidelines.

Methods: A six-month prospective cross-sectional study was conducted among KMCH College of Pharmacy, Coimbatore pharmacy students. The 39 validated questions on knowledge, attitudes, practices, and concerns about the COVID-19 vaccine were used to grade replies using 3-point and 5-point Likert scales. IBM SPSS Statistics for Windows, Version 23.0, was used to analyze the data.

Results: The survey was completed by a total of 271 pharmacy students. A majority (59 %) of students possessed adequate knowledge ($p = 0.0003$), and 92 % were willing to receive COVID-19 vaccinations. The majority of respondents have implemented COVID-19-appropriate practices. Majority of information sources (52 %) were from healthcare providers.

Conclusion: Pharmacy students in South India have a fair knowledge of COVID-19 vaccination. More effort is required to improve awareness on this subject.

Keywords: COVID-19 vaccination, Survey, Knowledge, Attitude, and Practices (KAP), Public health

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Tropical Journal of Pharmaceutical Research is indexed by Science Citation Index (SciSearch), Scopus, Web of Science, Chemical Abstracts, Embase, Index Copernicus, EBSCO, African Index Medicus, JournalSeek, Journal Citation Reports/Science Edition, Directory of Open Access Journals (DOAJ), African Journal Online, Bioline International, Open-J-Gate and Pharmacy Abstracts

INTRODUCTION

The COVID-19 pandemic, caused by the newly discovered coronavirus known as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), poses a significant global threat, having spread to more than 185 countries [1-3]. People infected with COVID-19 may recover without

special treatment. However, those with certain medical conditions are at higher risk of severe illness [4,5].

The virus spreads through saliva or nasal discharge, so practicing respiratory etiquette and maintaining social distancing is important. On January 30, 2020, the World Health Organization

(WHO) declared the Chinese COVID-19 outbreak a public health emergency of international concern, posing a high risk to countries with vulnerable health systems. The committee stated that the virus could be contained through early detection, isolation, prompt treatment, and the implementation of a robust system to trace contacts [1,6]. COVID-19 vaccine represents a glimmer of hope for normalcy to return. Moreover, government's COVID-19 recovery strategy is vaccination. Many members of society still lack sufficient grounds for wholehearted vaccination support. They doubt the efficacy of vaccines over their safety and query their necessity, referred to as vaccine hesitancy. The perspective of hesitancy is distinct from the action of refusing a vaccine. Even those who are vaccinated may have reservations about certain aspects of vaccination [7-10]. Because the turnover of eligible candidates at vaccination centers influences the effectiveness of several COVID-19 immunization programs, vaccine hesitancy jeopardizes the campaign's success. Knowledge, attitude, practices, and concerns regarding the safety, efficacy, hazards, and benefits of the COVID-19 vaccination program are the primary determinants of acceptance and resistance [11,12].

As of 2020, vaccine manufacturers globally will have concluded phase three trials for three vaccines. This development instills optimism in the global community, signaling the potential for an immediate resolution to the pandemic and the prospect of a return to normalcy. Emergency use sanction has been granted for a few vaccines, so they must be administered to determine the community's knowledge and attitude towards such intervention [13-14]. Vaccine trials have yielded positive results, and three vaccines, Covaxin, Covishield, and Sputnik V, are currently being administered to the people of India. Covovax and Corbevax, two licensed vaccines, demonstrate that COVID-19 vaccines are safe and elicit an outstanding immune response. Vaccines are now available, and the success of a vaccination program will depend on the immunization rates of the general population; consequently, it is essential to prepare and design effective vaccination policies and messages to maximize adoption [7,15].

People's understanding, beliefs, actions, and worries about the safety, effectiveness, risks, and benefits of COVID-19 vaccination program affect how likely they are to accept the vaccines. Understanding the influencing factors of COVID-19 vaccination acceptance and identifying common barriers and facilitators for vaccination decisions are essential to reducing the

vaccination dilemma among students, as vaccination has been maintained as the standard for COVID-19 protection in educational institutions. This study aims to conduct a KAP survey on COVID-19 vaccination among pharmacy students in South India.

METHODS

Six months were devoted to a prospective cross-sectional study on pharmacy students at the KMCH College of Pharmacy in Coimbatore, Tamil Nadu, India. For data collection, institutional approval was sought. Students' responses to the questionnaire were kept confidential and used solely for study purposes. Before administering the questionnaire, participants were apprised of the duration of participation and the declaration of confidentiality.

A pre-validated KAP questionnaire titled "Development and validation of a questionnaire to assess knowledge, attitude, practices, and concerns regarding COVID-19 vaccination among the general population" was found [16]. Socio-demographic profiles such as age, gender, and place of residence were included. The study included all pharmacy students willing to participate in the survey. A sample size calculator with a 95 % confidence level and a 5 % margin of error was used to obtain the sample size of 266 from a population of 862.

The KAP questionnaire comprised six domains: knowledge, attitude, practice, concerns, opinions, and information sources. The survey included 39 questions covering eligibility for the COVID-19 vaccine, sources of information, attitudes (4 questions), practices (3 questions), opinions (10 questions), and concerns (6 questions).

The questionnaire was directed to participants who provided informed assent. Participants received the questionnaire from one of the following sources; URLs in Google Forms, emails or WhatsApp, or they received it directly, based on their preference. Members who have yet to respond were given one or two reminders.

Each correct answer to knowledge queries was worth one point, while incorrect and unknown responses were worth zero points. The queries about the COVID-19 vaccine, factors affecting vaccine program participation, and concerns about the vaccine were rated using 3-point and 5-point Likert scales.

Statistical analysis

Statistical analysis was conducted using Version 23.0 of IBM SPSS Statistics for Windows. (Armonk, New York: IBM Corporation). A t-test on unpaired samples was used to determine whether there was a significant difference between the samples from independent categories. Using Pearson's Correlation, the relationship between the variables was evaluated. The probability value $p < 0.05$ was deemed significant in both statistical methods.

RESULTS

Socio-demographic details of participants

The socio-demographic details of the included participants ($n = 271$) are depicted in Table 1.

Table 1: Socio-demographic details of participants

Variable		Population (%)
Gender	Male	56
	Female	44
Age	Up to 20 years	47
	Above 20 years	53

Table 2: Study participant's knowledge regarding COVID-19 vaccination

Question	Statement	Knowledge score (%)
K1	Legal mandatoriness of vaccine	4
K2	Eligibility of infants	87
K3	Eligibility of children and adolescent	61
K4	Eligibility of adults	94
K5	Eligibility of pregnant and lactating	64
K6	Eligibility of chronic disease patients	63
K7	Eligibility of COVID-19 patient	77
K8	Eligibility of COVID-19 infection recovered	80
K9	Eligibility of person allergic to food and drugs	45
K10	Eligibility of immune-compromised people	33
K11	Duration to attain	39

protective immunity

Study participant's knowledge of COVID-19 vaccination

The extent of participants' knowledge of eligibility to get vaccination among different population groups is listed in Table 2. Overall, only 59 % of students showed adequate knowledge about vaccination eligibility. Total knowledge score has a significant influence on vaccination status ($p = 0.0003$).

Source of Information to decide on getting vaccinated against COVID-19

The decision to get vaccinated against COVID-19 is influenced by the information obtained from various sources, which is presented in Table 3. Healthcare providers are the highest source of information.

Table 3: Source of Information to decide on getting vaccinated against COVID-19

Question	Source of information	Percent (%)
I1	News from National TV/Radio	37
I2	Government agencies	37
I3	Social media	40
I4	Discussion among friends and family	37
I5	Healthcare providers	52

Study participant's attitude and practice regarding COVID-19 vaccination

Table 4 presents attitudes towards vaccination. There is a significant difference between those who are vaccinated and those who are willing to recommend it to friends and family ($p = 0.001$). While most (55 %) prefer getting vaccinated to acquiring immunity naturally, some (45 %) are willing to develop immunity naturally. Study participants' Practice towards vaccination is presented in Table 5.

Table 4: Study participant's attitudes regarding COVID-19 vaccination

Question	Statement	Positive attitude (%)
A1	Willingness to vaccinate	92
A2	Pay for vaccine	77
A3	Recommend to friends and family	91
A4	Acquiring immunity	55

by vaccination

Table 5: Study participant's practices regarding COVID-19 vaccination

Question	Statement	Good practices (%)
P1	1 st dose	55
P2	2 nd dose	40
P3	Need of precautions after COVID-19 vaccination	81

Table 6: Study participant's opinions regarding COVID-19 vaccination

Question	Statement	Positive opinion (%)
O1	Covid-19 vaccine causes no harm	27
O2	Vaccine protects against covid-19	21
O3	Free availability	18
O4	Doctor recommendation	26
O5	Benefits outweigh risks	28
O6	Societal responsibility	15

Table 7: Study participant's concern regarding COVID-19 vaccination

Question	Statement	More concern (%)
C1	Non-availability of vaccine	61
C2	Immediate side effects	64
C3	Faulty or Fake	79
C4	Rapidly developed and approved	28
C5	Unforeseen future effects	53
C6	Promoted for commercial gains	58

Study participant's opinions and concerns regarding COVID-19 vaccination

There is an overall negative opinion and concern about the safety of vaccines and they believe vaccination cannot eradicate COVID-19 presented in Table 6 and Table 7. The availability of vaccines free of cost or role models, political leaders, senior doctors, and scientists' vaccination status do not significantly influence student vaccination. Knowledge and practices regarding the COVID-19 vaccination showed a

high significance depending on age. It was revealed that gender did not affect KAP ($p > 0.05$) as presented in Table 8.

Overall responses on KAP towards COVID-19 vaccination

Figure 1 gives the overall percentage of the KAP on study participants. Only 59 % of students have adequate knowledge. The majority of the students showed a positive attitude towards vaccination. The vaccination status based on the knowledge and attitude score is shown in Table 9.

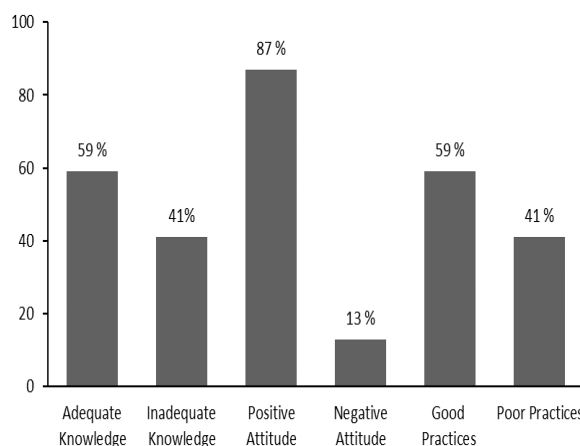


Figure 1: Overall responses on KAP towards COVID-19 vaccination

DISCUSSION

This study was conducted in India on COVID-19 immunization among pharmacy students during the peak of the vaccination campaign. Although more than ninety-five percent (95 %) of the participants in this study have received the COVID-19 vaccine, nearly half of them lack knowledge about vaccination, in contrast to the findings of Mudenda *et al* [17] in which pupils demonstrate a high level of awareness. Students must learn about legal mandates and eligibility criteria. At the time of this survey, only 4 % of pupils knew that the COVID-19 vaccination was not mandated by law.

Table 8: Association of age and gender with knowledge, attitude, practice

Category	Age group			Gender		
	Score (mean ± SD)		P-value	Score (mean ± SD)		P-value
	Up to 20 years	Above 20 years		Male	Female	
Knowledge	6.0±1.7	6.9±1.9	0.0001**	6.2±1.8	6.7±1.8	0.058
Attitude	15.2±2.3	15.4±2.0	0.478	15.1±2.3	15.5±2.0	0.156

Practice	4.5±1.2	4.1±1.3	0.011*	10.9±2.2	11.5±2.1	0.158
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Note: * $P < 0.05$; ** $p < 0.0001$ vs age categories Using Pearson's Correlation

Table 9: Effect of knowledge and attitude on vaccination status

Vaccination status	Knowledge score			Attitude score		
	Mean	SD	P-value	Mean	SD	P-value
Not vaccinated	4.5	2.3	0.0003*	14.2	2.8	0.058
First dose	6.5	1.7		15.2	2.1	
Fully vaccinated	6.6	1.7		15.6	2.1	

Note: * $P < 0.05$ vs vaccinated group; SD = standard deviation

The rise in vaccination rates may be attributable to institutions' immunization requirements. Findings from this study also indicate that the students lacked knowledge regarding the eligibility of vaccination for individuals with food and medication allergies (55 %) and immune deficiency (67 %) among other conditions.

In contrast to the findings of Jain *et al* where students primarily relied on social media as a source of vaccination information, the current study revealed that students primarily rely on healthcare providers as a source of information [18]. In the meantime, the students are concerned about the decision to get vaccinated voluntarily, even though they have already been vaccinated, due to institutional and societal pressure and the desire to return to normal social life. These findings align with an earlier study [18].

Most students are eager to be vaccinated and suggest it to friends and family; nevertheless, there is rising worry regarding vaccination safety and side effects since many feel that pharmaceutical corporations create vaccines for profit. The results were comparable to those of a previous study, which found that post-COVID-19 vaccination hesitation among healthcare workers was attributed to a lack of trust in pharmaceutical companies [19].

The availability of free vaccines did not influence their vaccination decision. This contradicts the findings of Wang *et al*, by claiming that vaccination fees decrease vaccination rates [20]. Other studies confirm that a lack of information about novel vaccines, potential adverse events, and vaccination safety were the primary causes of vaccination reluctance. These findings suggest that healthcare practitioners need to adequately counsel and educate students about COVID-19 vaccination [18-22].

Knowledge and practice scores were statistically distinct across age categories, whereas attitude scores were comparable. An earlier study showed that there was no statistically significant difference in variables between the groups of

students accepting, hesitating, or refusing the vaccine in terms of variables [21]. ANOVA was used to evaluate differences in knowledge and attitude scores between vaccinated and unvaccinated groups. A study by Gao *et al* reported that medical students' knowledge about the COVID-19 vaccine was closely related to their vaccination intention [23]. In addition to these findings, knowledge regarding COVID-19 vaccination is limited. Lack of adequate information is one of the primary causes of vaccination reluctance. It is widely believed that COVID-19 vaccination cannot eradicate the disease, and there is insufficient vaccine data. COVID-19 vaccination and its potential adverse effects are gaining popularity among students. However, this has not prevented them from receiving the vaccine; the adoption of the vaccine is not entirely voluntary and may result from institutions' mandatory vaccination policies.

Limitations of this study

This study only involved one pharmacy school, which may limit its generalizability. There was a limited access rate, and monitoring patients following infection or vaccination was challenging. In addition, since data were collected from pharmacy students, they will likely respond affirmatively based on their medical knowledge because they know what is expected of them.

CONCLUSION

This study suggests the need to increase pharmacy students' knowledge of COVID-19 vaccination. It recommends using government agencies and national news channels for information dissemination. Proper vaccination counseling, elimination of doubt in vaccination development processes, and a reduction in the dissemination of misinformation on social media will increase vaccination rates.

DECLARATIONS

Acknowledgements

None.

Funding

None provided.

Ethical approval

None provided.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Conflict of Interest

No conflict of interest associated with this work.

Contribution of Authors

The authors declare that this work was done by the authors named in this article and all liabilities pertaining to claims relating to the content of this article will be borne by them.

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