

Survey on Analysis of Knowledge, Attitudes, and Beliefs Regarding COVID-19 Vaccination in the Selected Region of North Maharashtra: A Cross-Sectional Study

Gaurav Shriram Patil, Dinesh Dattatraya Borhade, Bhupesh Digambar Patil, Sopan Namdev Nangare, Ganesh Bansi Patil

Department of Pharmaceutics, HR Patel Institute of Pharmaceutical Education and Research, Shirpur, Maharashtra, India

Abstract

Background: Since the beginning of the COVID-19 pandemic, several vaccines have been approved for use and are being distributed globally in various regions. Still, general public knowledge, attitudes, and belief toward COVID-19 vaccination are poorly understood. As a result, the present study aimed to investigate community knowledge, attitudes, and beliefs towards COVID-19 vaccination in North Maharashtra. **Materials and Methods:** An exploratory and anonymous general population-based Google survey was conducted among 358 participants (64%: 229) male and (36%: 129) female. A descriptive, cross-sectional survey using the Snowball sampling technique was used as a tool for experimentation whereas statistical data analysis was performed using descriptive statistics to determine the variables predicting knowledge, attitudes, and beliefs towards COVID-19 vaccination. **Results:** As a result, 91.9% of participants were fully informed about the COVID-19 vaccine's development. Around 69.6% of participants experienced that a booster dose of the COVID-19 vaccine may not be proven harmful to the human being. In addition, 79.6% of study individuals were confident that the situation of COVID-19 would be under control after adequate vaccination. As well, 88.5% of participants considered that vaccines strengthen the immune system of an individual. **Conclusion:** In summary, the findings reflect a better knowledge and more encouraging attitude of participants regarding COVID-19 vaccination in the selected region of North Maharashtra.

Keywords: COVID-19, North Maharashtra, pandemic, snowball sampling, vaccine

INTRODUCTION

The whole globe witnessed the catastrophe caused by the novel coronavirus severe acute respiratory syndrome coronavirus (SARS-CoV-2). An abandoned virus that was initiated in Wuhan (China) dominated the world with disbelief and panic.^[1] The sudden outbreak of the COVID-19 virus has caused extensive worries about potential economic and health-care interruptions.^[2] Primarily, it is linked to the novel coronavirus strain SARS-CoV-2, which has become a principal public health concern throughout the globe.^[3] According to publicly available information, the World Health Organization declared the COVID-19 outbreak a pandemic on March 11, 2020.^[4]

In India, the first-ever COVID-19 was reported in Kerala in the 1st week of February 2020. Since then, it has rapidly blowout across the state resulting in 9,997,272 confirmed cases and

150,114 deaths as of January 5, 2021.^[5] As a result, a pandemic has proven to be a serious threat to both community health and the global economy. Isolation and social distancing are proven as effective therapies for slowing the spread of the disease, but they do hardly guarantee that the disease will be eradicated. Hence, as of today, the COVID-19 vaccine is regarded as the most predictable solution.

As per the literature report, one of the most significant concerns to world health is vaccination hesitancy. Herein, elevated vaccination coverage is demanded to knock down

Address for correspondence: Dr. Ganesh Bansi Patil,
A/p Shirpur, Dhule - 425 405, Maharashtra, India.
E-mail: ganu16@gmail.com

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the epidemic curve.^[6] Vaccination reluctance affects not only the individual who is scared to take the vaccine but also the whole public, rendering it more difficult to achieve the threshold that provides herd immunity.^[7] One of the biggest issues that individuals have when refusing the vaccine is that it slows down the immunization process.^[8] Importantly, the previous study has shown that vaccine reluctance is a frequent incidence over the world, with a variety of reasons for refusal of vaccine acceptance.^[9] Moreover, several studies have found that the causes of vaccine rejection or hesitancy include safety concerns based on misinformation, religious motives, and personal opinions.^[10]

As of January 16, 2021, India had begun the COVID-19 vaccination program. This program is divided into several phases starting from Phase I which consists of the vaccination of health-care workers who were frontline warriors against the COVID-19 battle. Following that, on March 1, 2021, Phase II was launched, which included the vaccination of elderly groups over the ages of 60, as well as persons over the age of 45 with preexisting morbidities.^[11] Furthermore, individuals over the age of 45 were vaccinated in Phase III, followed by those between the ages of 18 and 45. Since the commencement of vaccination on January 16, 2021, no suitable studies have been conducted in India to determine the state-by-state population's approach regarding the COVID-19 vaccination. There has been no earlier available work in India that examines the awareness and attitude of citizens of North Maharashtra to be vaccinated against COVID-19 when a vaccine became available. As an outcome, the present study aims to assess the knowledge, attitudes, and beliefs of the citizens of North Maharashtra regarding the COVID-19 vaccination and analyze the various sample characteristics associated with vaccine refusal. To the best of our knowledge, this is the first prospective study on the assessment of the knowledge, attitudes, and, beliefs regarding COVID-19 vaccination in the region of North Maharashtra. We conducted an exploratory and anonymous broad population-based Google survey among 358 individuals. A descriptive, cross-sectional survey using the Snowball sampling technique was chosen as a tool for testing whereas statistical data analysis was accomplished using descriptive statistics.

MATERIALS AND METHODS

The cross-sectional study was performed using the Snowball sample technique. Herein, the data for the survey were collected through a well-structured questionnaire and the channel of data collection was Google Forms.^[12] In brief, the study was conducted among the citizens of the North Maharashtra region who were above 18 years of age.

Principally, the study was accomplished in two stages; the first stage was a pilot study in which 15 participants were asked to complete the survey questionnaire.^[13] Afterward, the survey questionnaire was cross-checked for modification. Stage II (main study) consists of the implementation of a

snowball sampling strategy, wherein the Google Form survey link was forwarded over different social media podiums including WhatsApp, Facebook, and LinkedIn, only to the primary contacts just above the age of 18 years and residing in North Maharashtra. After completing the survey, the primary respondents were requested to share the Google Form with their contacts. The survey was accompanied in October 2021. The survey questions were divided into several sections to get information mainly on (a) demographic characteristics of the population, (b) participant knowledge about vaccination, (c) participant attitudes toward vaccination, and (d) participant beliefs about vaccination.^[14,15] Finally, the data were statistically analyzed using descriptive statistics. In this, Microsoft Office Excel 2007 was used as a calculation tool. Finally, the responses to multiple-choice questions were represented using frequency and percentage for every response received.

Ethical consideration

The protocol for the overall study was approved by the Institutional Ethical Committee, K. V. T. R Ayurved College, Boradi (Out No. 700/2021/22), Tal-Shirpur, Dist-Dhule. A voluntary online consent was taken from the study participants by sharing a consent form embedded in the survey form itself which was shared on the timeline/inbox/WhatsApp of the participants, which enclosed the outline of the research, purpose, and brief instructions regarding the survey. Consent was confirmed when a box was checked to designate that the consent was granted. Moreover, participation in the study was voluntary for the individuals, and he or they will be free to discontinue participation at any time. Participants in the study were made aware of the purpose, risk, and benefit of the study and the confidentiality of information provided. All the methods used obey the principles and ethical values of the Declaration of Helsinki.

RESULTS

Table 1 depicts the demographic summary of a number of the respondent which consists of categories such as gender, age, education, marital status, and district of residence. Based on the collected data, a total of 358 participants willingly participated in the study by selecting "yes" on the question regarding informed consent. Among those, 358 individuals, the majority of participants were male (males = 229; 64%) and a small portion of participants were female (females = 129; 36%), respectively. Out of 358 participants, 88.8% of respondents were between the age group of 18 and 29, whereas, 8.9% and 2.3% of the study participants belonged to the 30–49 and above 50 years of age, respectively. Only 16.2% of participants were married, whereas the majority of study participants are unmarried. Of all respondents, 63.7% of participants were undergraduate, 27.4% of participants were postgraduate, and only a small number of participants were educated up to 10th/12th. A good number of study participants belonged to the Dhule (60.3%), whereas a small portion of participants were from Jalgaon (23.5%)

Table 1: Demographic details of the study participants

Demographic details	Number of participants	Percentage of participants	Demographic details	Number of Participants	Percentage of participants
Gender			Marital status		
Male	229	64	Married	58	16.2
Female	129	36	Unmarried	300	83.8
Age (years)			District of residence		
18-29	318	88.8	Dhule	216	60.3
30-49	32	8.9	Jalgaon	84	23.5
Above 50	8	2.2	Nandurbar	58	16.2
Education			Yearly household income		
No formal education	2	0.6	No income	82	22.9
School education 10 th /12 th	30	8.4	Up to 50,000 thousand	149	41.6
Degree/diploma	228	63.7	50,000 thousand -1 lakh	48	13.4
Post-graduate/PhD	98	27.4	1-5 lakh	43	12
			Above 5 lakh	36	10.1

Table 2: Knowledge of participants on COVID-19 vaccination

About the knowledge of vaccination	Number of participants	Percentage
Do you know about the development of the COVID-19 vaccine?		
Yes	329	91.9
No	29	8.1
Do you know that India has two of its indigenous-based COVID-19 vaccine?		
Yes	335	93.6
No	23	6.4
Is it dangerous to use a booster dose of COVID-19 vaccines?		
Yes	109	30.4
No	249	69.6
Do COVID-19 vaccines have any side effects?		
Yes	80	22.3
No	278	77.7
Does COVID-19 vaccination rise allergic reactions?		
Yes	83	23.2
No	275	76.8
Is it possible to decrease the incidence of COVID-19 without vaccination?		
Yes	148	58.7
No	210	41.3
Do you know, that India has developed the world's first indigenous DNA-based COVID-19 vaccine?		
Yes	280	78.2
No	78	21.8

and Nandurbar (16.2%), respectively. Table 2 signifies the data of knowledge of participants regarding COVID-19 vaccination. The careful observation of data represented in Table 2 indicates that participants are well-versed with the knowledge of COVID-19 vaccination. The statistics in Table 2 indicate that a huge number of participants are well

known about the development of vaccines. Furthermore, the majority of participants around 93.6% knew that India has two of its indigenous-based COVID-19 vaccines. In the line of a booster dose, a good number of people think that usage of a booster dose will not be proven dangerous to human beings; whereas, around 30.4% still think that it could be proven risky. A good number of participants think that COVID-19 vaccines do not have any side effects, while 22.3% assumed that the vaccines might have certain side effects. On asking about the allergic reactions, the majority of study participants think that vaccines do not cause any increase in allergic reactions. While some small portion of participants assumed that the vaccines tend to increase the incidence of allergic reactions. Out of 358 participants in the study, around 58.7% of participants were thinking that it is impossible to decrease the incidence of pandemics without vaccination.

Figure 1 shows the summary of participants' attitudes regarding COVID-19 vaccination. The overall results of the attitude of participants regarding COVID-19 vaccination in North Maharashtra show a more positive attitude. The majority of participants think that the situation will be going to be under control after the vaccination. Whereas, a large number of study participants also presumed that India will win the battle against the pandemic. A remarkable number of participants agreed with the question that the Government Of India was handling the situation of the COVID-19 pandemic very well. Furthermore, a favorable number of participants show a positive attitude toward the effectiveness of wearing a face mask after the vaccination. Furthermore, a large number of participants were shows an optimistic attitude regarding taking vaccination shots without any hesitation if it is available on their premises of residence. Figure 2 demonstrated the summary of responses of beliefs of participants regarding COVID-19 vaccination. Among 358 individuals, the vast majority of study participants believed that vaccines strengthen the immune system. Only a small number of participants were unaware of the same. Interestingly, the majority of participants think that vaccine is ardently needed to prevent the COVID-19

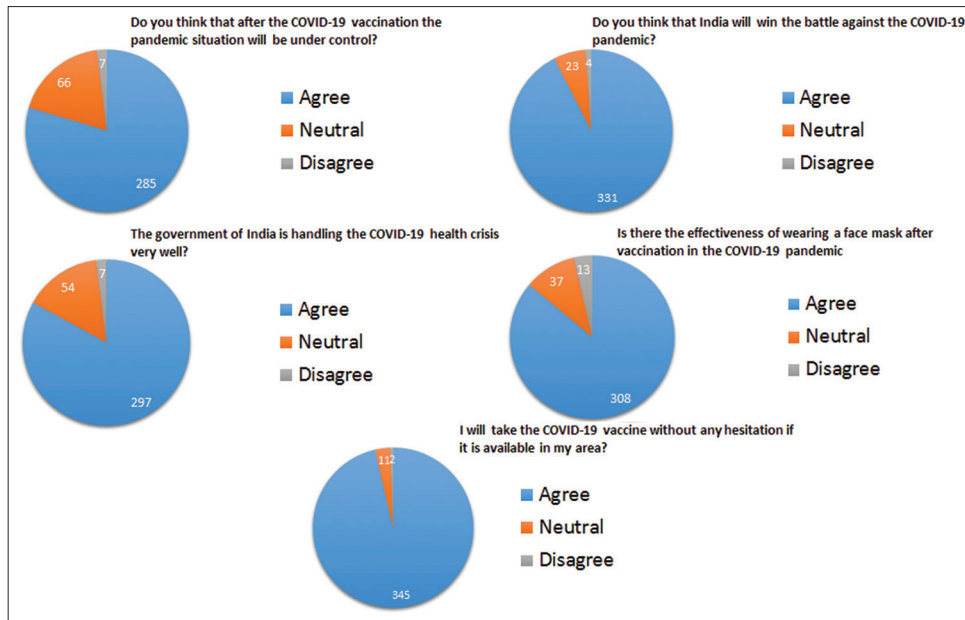


Figure 1: Summary of study participant's attitude regarding COVID-19 vaccination

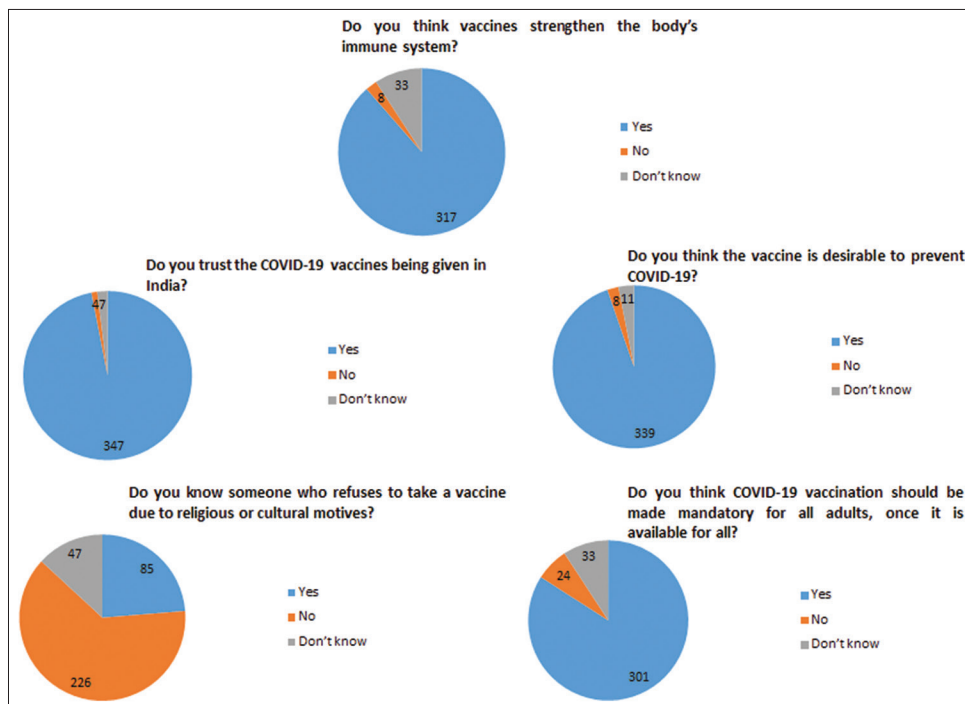


Figure 2: Summary of study participant's beliefs regarding COVID-19 vaccination

pandemic. Whereas, only a small proportion of participants believed that there is no need for a vaccine to prevent the COVID-19 pandemic. A good number of participants around 96.9% believe in the vaccines given in India. While only a very small portion of participants did not trust the vaccines given in India. In the vein of religious concerns and cultural motives which become the hurdle in the vaccination drives, 23.7% of participants knew somebody who refuses to take the vaccine due to religious concerns and cultural motives.

Out of 100% involvement of study participants, 84.1% of participants thought that vaccination must be compulsory for all adults if it is accessible for everyone. While only a small fraction of participants showed the opinion that there should not any compulsion for vaccination.

DISCUSSION

In summary, the native population's knowledge, attitudes, and beliefs about COVID-19 vaccination in a region of North

Maharashtra are crucial for understanding the epidemiological dynamics of disease control. Herein, vaccine reluctance remains a substantial barricade to complete population vaccination in the selected region. In this vein, the present research study provides the showcase of COVID-19 vaccination knowledge plus predictors of vaccination reluctance in the selected region of North Maharashtra. A transitory look into the demographic particulars of the partakers in the present investigations shows that 88.8% of them fit the age of 18–29 years as depicted in Table 1. There is a requirement to focus on the age group above 30 regarding COVID-19 vaccination awareness. Herein, 91.9% of study participants demonstrate awareness about vaccine development which indicated the attentiveness to vaccination among the individuals. Fascinatingly, 77.7% of participants consider that there is no report for side effects of COVID-19 vaccines, whereas 22.3% experience that there might be some risky effects of COVID-19 vaccines. Furthermore, 69.6% of participants believe in no side effects of a booster dose of COVID-19 vaccines. While the rest of the study persons (around 30.4%) expresses their opinion related to the side effects of a booster dose.

Taken as a whole, the study population of a selected region of North Maharashtra assured a superior understanding of the COVID-19 vaccination, its development, uses, side effects, etc. In this, the data collected and reported in Table 2 briefly focuses on the knowledge of the COVID-19 vaccine and indicates that individuals were well aware of the knowledge of the COVID-19 vaccination. The information in Figure 1 depicts the participants' outlook and attitudes about vaccination. Notably, 79.6% of participants showed trust that COVID-19 will be under control. In addition, 92.5% of participants demonstrated the belief that India will achieve success in the battle against COVID-19. Moreover, 86% of study participants believed that wearing a face mask after the subsequent vaccination is effective. The study data demonstrated that 96.4% of individuals were ready to get vaccinated without hesitation if it is available in their area of residence. The present survey provides details about the attitude of participants toward the immune system changes by vaccination. As a result, 88.5% of participants believed that a vaccine would boost the immune system, whereas 70.51% of the study population believed the same in the United Arab Emirates (UAE). The participants with the intention that a vaccine is needed to prevent COVID-19 was around 94.7%, whereas in UAE, only 43.1% of participants were shows the response the same. In this study, it was found that 96.9% of participants responded “yes” as a reaction after asking related to trust for the COVID-19 vaccine provided by the government. In the case of the UAE, more than 60% of participants said they trusted the vaccine provided by their government.^[16] When compared to the UAE population (11.27%), 23.7% of participants in India knew someone who refused to take vaccination owing to religious concerns. Surprisingly, it specifies that a minor portion of the study group was unwilling to receive the vaccine. It may due

to religious myths and preconceptions. The vast majority of participants, approximately 84.1% believe the vaccine should be made mandatory for all people in India once it is available. Literature assured that residents in the UAE are also conscious that taking the availed vaccine is currently a useful strategy for combating the virus.^[17] We also found that the 0.6% of vaccine reluctance rate among the participants was lower as compared to studies reported in Australia at 12%, Brazil at 12%, Malaysia at 15%, and Saudi Arabia at 16%.^[18]

Concisely, the present study demonstrates the need related to robust public health education and vaccination systems. Mainly, the development of the COVID-19 vaccine within a short period raises a few questions in people's minds. In addition, there is no proper data available related to clinical trials and marketed survey reports of the same. The availability of this data in the public domain will help to resolve the diverse thoughts related to COVID-19 vaccination. As recently, the Indian government announces the vaccination of individuals belongs aged between 15 and 18 who have yet to receive the vaccine. In this case, the present study will facilitate vividness of the knowledge, approach, and belief among those participants.

Limitations and bias

There are numerous drawbacks to the study. For example, the first drawback is the use of convenience sampling as the method of sample recruitment, which has an inherited bias of under or over-presenting the target group. Another one is the sample recruitment method. Where participants were recruited through diverse social media platforms to local colleges, academic institutions, and other residential areas which shows the large percentage of college graduates. This could also test the impact of education on vaccine reluctance. Similarly, the studied population does not characterize the whole region; however, the participants were from all major cities in the region, which represent extensive geographic areas. Hence, the study can be deliberated as a representative sample. Furthermore, the sample size was substantial enough to achieve 100% statistical power in accurately detecting the prevalence of COVID vaccine hesitancy.

CONCLUSION

Since the COVID-19 epidemic emergence in March 2020, it resulted in significant human loss whereas it showed a significant impact on their livelihood. Numerous attempts have been undertaken in this area to battle the pandemic. Furthermore, several attempts have been made across the world to develop sustainable solutions to overcome the pandemic. Despite numerous efforts, delivering the impact of the COVID-19 vaccines to individuals in developing countries remains a challenge. In this present study, we aimed to evaluate the knowledge, attitudes, and beliefs regarding COVID-19 vaccination in the region of North Maharashtra through a cross-sectional study. Interestingly, a considerable percentage of study participants from the

resided region of North Maharashtra were familiar with vaccine development and its impacts. In addition, participants demonstrate a remarkable awareness of the indigenous vaccine. Furthermore, the majority of the individuals in the particular region are well-versed in the prevention and control measures of COVID-19. Despite this, few participants of the study demonstrated a willingness to refuse the vaccination. In conclusion, the present study assured the superior knowledge and a more encouraging attitude of participants concerning COVID-19 vaccination in the chosen area of North Maharashtra.

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Conflicts of interest

There are no conflicts of interest.

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