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# Awareness, attitude, and practices of the population regarding the COVID-19 vaccine in Rural and Urban areas around Hyderabad

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**ABSTRACT**

**Background:** Corona virus disease (COVID-19) is an infectious disease caused by a newly discovered Corona virus (SARS-CoV-2). Most people infected have mild to moderate symptoms like fever, dry cough, tiredness, headache, sore throat, loss of smell or taste, diarrhoea, and conjunctivitis that recover without hospitalization. The older population or those with co-morbidities like chronic respiratory illness; hypertension etc may develop severe symptoms like difficulty in breathing, chest pain or tightness, and loss of speech or movement, which require hospitalization. **Objective:** [1] To describe the socio-demographic profile of the study participants. [2] To assess the awareness & determine the acceptance of the COVID-19 vaccine in the study population. **Results:** A total of 170 participants took part in the study. More than half of the study participants were males (55.3%), and the mean age of the study population was 37.6±13.3 years. Nearly 1/4$^{th}$ of the participants had a previous history of COVID-19 infection among them (23.3%), and a similar history among family members was present among 11.6% of the participants. The majority of the participants (89.8%) were aware that COVID-19 is a contagious illness. The majority of them (80.8%) knew that the vaccines are given in two doses. Nearly 3/4$^{th}$ of them (71.2%) were aware of the registration process for getting the vaccination done, but only half (52.2%) knew about the COWIN application. Nearly 2/3$^{rd}$ were aware (62.5%) that they can still get infected with COVID-19 post-vaccination. The majority of the aspects showed a favourable attitude of the study participants, with a Median score between 4-5 for the positively framed questions and 1-2 for the negatively framed questions. **Conclusion:** The knowledge regarding the COVID-19 pandemic, required appropriate social behaviour and awareness regarding the vaccination was good. However, the people were more open to getting vaccinated if available at a government organization and free of cost. The major fear deterring vaccination was the loss of income due to post-vaccination side effects. Responses involving vaccination showing a negative association with literacy indicate the greater need to concentrate awareness and myth-dispelling programs among the rural and lower literacy strata of society.

**Keywords:** COVID-19; vaccine; acceptance; Hyderabad, India

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## Introduction

Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus (SARS-CoV-2). Most people infected with COVID-19 experience mild to moderate symptoms, such as fever, dry cough, tiredness, headache, sore throat, loss of smell or taste, diarrhoea, and conjunctivitis, which typically recover without the need for hospitalization. The older population or those with co-morbidities like chronic respiratory illness, hypertension, etc, may develop severe symptoms like difficulty in breathing, chest pain or tightness, loss of speech or movement, which require hospitalization.

The disease spreads through direct, indirect, or close contact between people. It could be spread by respiratory droplets of an infected person while coughing, sneezing, or talking; through contact with an infected person's secretions, like saliva or respiratory secretions; through fomites when a person touches these and then touches their face; through aerosol-generating procedures in health care settings, and could also spread through close contact with the infected, even before the development of symptoms. WHO recommends a set of measures to prevent the spread of infection, such as identification of those with symptoms and immediate isolation of the patient and contact, wearing a face mask in public places, following hand hygiene frequently, respiratory hygiene like coughing into a flexed elbow, physical distancing, ensuring good environmental ventilation, and disinfection. On March 11, 2020, the WHO declared the Coronavirus outbreak a Global Pandemic. According to WHO reports, as of the beginning of February 2021, a total of 100 million reported cases and over 2.3 million deaths had occurred globally since the start of the pandemic[1,2]. As of February 6, 2021, India had 1.48 lakh (1.37%) active cases and 1.55 lakh (1.43%) deaths reported [3]. In the days that followed, many researchers around the world were involved in preparing the COVID-19 vaccine, conducting various clinical trials across the population, with a breakthrough in finally obtaining approval for its administration.

Even though countries have taken strong measures to contain the spread of the virus through health education, diagnosis, and treatment, vaccines will provide long-lasting immunity and help better control the spread of the virus. Over 274 vaccines are in different stages of trial globally. In India, the COVID-19 vaccine was first offered to health care workers on January 16, 2021. It will be offered to front-line workers, then to the population aged 50 years and above, and those under 50 with co-morbidities, and finally to the rest of the population. Recently, the Government of India started giving COVID-19 vaccines to children in the age group of 15-18 years from January 3, 2022.Co-WIN, a digital platform, will be used to track beneficiaries who have registered for vaccination.

Vaccine hesitancy is a concern, as it leads to a delay or total refusal of a vaccine. Available information suggests that vaccine hesitancy was prevalent in the initial phase of the vaccination drive. Several factors contribute to this, including a lack of adequate information provided to the public about the vaccine, fear of potential side effects, cultural beliefs, and political considerations. Since the COVID-19 vaccine was introduced, there has been considerable negative publicity from the media and the general public. Hence, it is necessary to understand the level of awareness and acceptance among the general population, particularly in rural areas. Effective BCC strategies are necessary to combat vaccine hesitancy and achieve better coverage in the Phase II vaccination drive.

## Objectives

1. To describe the socio-demographic profile of the study participants.

2. To assess the awareness about the COVID-19 vaccine in the study population.

3. To determine the acceptance of the COVID-19 vaccine among the study population.

A cross-sectional study was conducted between March 1 and April 30, 2021, in urban and rural areas surrounding Hyderabad city in Telangana state, India. The study participants were adults (over 18 years of age) residing in the vicinity of Hyderabad. A sample size of 384 was calculated, considering a power of 80%, a confidence level of 95%, an absolute precision of 5%, and assuming a vaccine hesitancy proportion of 50% among the general population. The participants were selected using a convenience sampling technique. After obtaining written informed consent, participants were provided with a semi-structured questionnaire containing 21 closed-ended questions to assess their knowledge and practices related to COVID-19 vaccination, as well as 9 Likert scale statements to evaluate their attitudes. The questionnaire was initially constructed in the English language and subsequently translated into Telugu. Before the study commenced, the questionnaire was pre-tested and validated. The subjects who participated in the pre-testing were not included in the final study.

**Inclusion Criteria:** Adults (>18 years) of age

**Exclusion Criteria:**

- Children
- Pregnant and lactating women

The collected data were entered and analysed using Statistical Package for the Social Sciences (SPSS) version 25.0 (IBM Corp., 2017). IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp. The descriptive results are expressed in terms of means, medians, and percentages. The association between variables was tested using the Chi-square test and the Mann-Whitney U test. The study protocol was submitted for ethical clearance to the Institutional Ethics Committee (IEC) of All India Institute of Medical Sciences (AIIMS), Bibinagar, Hyderabad. The study participants were provided with a detailed Participant Information Sheet (PIS). Before data collection, written informed consent was obtained from the study participants. After the data collection, the collected data were kept confidential (the questionnaire did not use any participant identifiers). The collected information was used only for research purposes.

**Institute Ethics Committee:** Ethics committee approved the project on 24/02/2022 with reference AIIMS/ BBN/ IEC/ Feb/2021/ 04/ 24.02.2021.

## Results

A total of 170 participants took part in the study. Table 1 describes the socio-demographic characteristics of the participants. More than half of the study participants were males (55.3%), and the mean age of the study population was 37.6±13.3 years. More than two-thirds of them resided in urban areas (67.1%), were graduates (35.9%), and postgraduates (28.8%). The majority of them were employed 94 (55.3%) and lived in a nuclear family 113 (66.5%). Nearly one-quarter of the participants (23.3%) had a previous history of COVID-19 infection, and a similar history was present among family members in 11.6% of the participants.

**Table-1:** Socio-demographic characteristics of the study participants

| Characteristics | | No. | % |
|---|---|---|---|
| **Gender (N=170)** | Male | 94 | 55.3 |
| | Female | 76 | 44.7 |
| **Place of residence (N=165)** | Urban | 114 | 67.1 |
| | Rural | 51 | 32.9 |
| **Education status (N=170)** | Postgraduate | 49 | 28.8 |
| | Graduate | 61 | 35.9 |
| | Intermediate/ 12$^{th}$ standard | 13 | 7.6 |
| | Secondary School | 25 | 14.7 |
| | Primary school | 10 | 5.7 |
| | Illiterate | 12 | 7.1 |
| **Employment status (N=150)** | Employed | 94 | 55.3 |
| | Unemployed | 56 | 44.7 |
| **Type of family (N=165)** | Nuclear | 113 | 66.5 |
| | Joint | 52 | 33.5 |
| **Marital status (N=159)** | Married | 112 | 65.9 |
| | Unmarried | 47 | 43.1 |
| **Previous history of COVID-19 infection in self (N=163)** | Yes | 38 | 23.2 |
| | No | 125 | 43.1 |
| **Previous history of COVID-19 infection among family members (N=164)** | Yes | 19 | 11.6 |
| | No | 145 | 88.6 |

Table 2 describes the participants' knowledge of COVID-19. The majority of the participants (89.8%) were aware that COVID-19 is a contagious illness. Almost universally (98.8%), they were aware of the availability of the COVID-19 vaccine in India. The majority of them (80.6%) knew that the vaccines are given in two doses. Nearly three-quarters of them (71.2%) were aware of the registration process for receiving the vaccination, but only half (52.2%) knew about the COWIN application. Nearly two-thirds (62.5%) were aware that they can still contract COVID-19 after vaccination.

**Table-2:** Knowledge regarding various aspects of COVID-19 infection among the study participants

| Characteristics | | No. | % |
|---|---|---|---|
| COVID-19 is a contagious disease (n=157) | Yes | 141 | 89.8 |
| | No | 14 | 8.9 |
| | I don't know | 2 | 1.3 |
| Vaccine is available for COVID-19 prevention (n=167) | Yes | 160 | 95.8 |
| | No | 5 | 3.0 |
| | I don't know | 2 | 1.2 |
| Vaccine against COVID-19 is being given in India (n=167) | Yes | 164 | 98.2 |
| | No | 3 | 1.8 |
| Number of doses of vaccine being given (n=170) | 01 | 5 | 2.9 |
| | 02 | 137 | 80.6 |
| | >2 | 3 | 1.8 |
| | I don't know | 19 | 14.7 |
| Route of administration (n=169) | Intramuscular injection | 166 | 98.2 |
| | Oral | 1 | 0.6 |
| | I don't know | 2 | 1.2 |
| Sub-populations exempt from receiving COVID-19 vaccine (n=099) | Children < 18 years of age | 48 | 48.5 |
| | Adults > 50 years of age | 20 | 20.2 |
| | Pregnant/lactating mothers | 28 | 28.3 |
| | Those with previous h/o COVID-19 infection | 2 | 2.0 |
| | I don't know | 1 | 1.0 |
| Knowledge regarding the registration process for vaccination (n=170) | Aware | 121 | 71.2 |
| | Unaware | 49 | 28.8 |
| Knowledge regarding COWIN application (n=169) | Aware | 88 | 52.1 |
| | Unaware | 81 | 47.9 |
| One can still get infected with COVID-19 post vaccination (n=128) | Yes | 80 | 62.5 |
| | No | 25 | 19.5 |
| | I don't know | 23 | 18.0 |

**Table-3:** Practice aspects regarding COVID-19 prevention among study participants

| Component | | No. | % |
|---|---|---|---|
| Willingness to get vaccinated (n=150) | Yes | 126 | 84.0 |
| | No | 24 | 16.0 |
| Willingness to encourage others get vaccinated (n=154) | Yes | 147 | 95.5 |
| | No | 7 | 4.5 |
| Preferred health facility to get vaccinated (n=157) | Government | 116 | 73.9 |
| | Private | 41 | 26.1 |
| Willingness to pay for vaccination (n=155) | Yes | 81 | 52.3 |
| | No | 76 | 47.7 |
| Willingness to receive more information regarding vaccination (n=150) | Yes | 130 | 86.7 |
| | No | 20 | 13.3 |

Table 3 describes the practice aspects of the study participants. More than three-quarters of the respondents (84%) were willing to get vaccinated, and almost all of them (95.5%) were willing to encourage others to do the same. The majority of them (73.9%) preferred a government facility for vaccination. More than half of them (52.3%) were willing to pay for the vaccination, with prices ranging from 100 rupees to 500 rupees.

**Table-4:** Attitude regarding various aspects of COVID-19 prevention among study participants (n=170)

| Component | Median (IQR) |
|---|---|
| It is necessary to wear mask in public places | 5 (4-5) |
| It is necessary to follow social distancing | 5 (4-5) |
| It is necessary to follow SMS even after vaccination | 5 (4-5) |
| Everyone should be vaccinated | 4 (3-5) |
| Only healthcare and front-line workers need to be vaccinated | 2.5 (1-4)* |
| Only children <18 yrs should be vaccinated | 3 (2-4)* |
| If one member in a family received vaccination it's enough | 2 (1-4)* |
| I fear if I get vaccinated, I might fall sick | 3 (2-4)* |
| I fear due to the side effects I might have to get hospitalized and lose my earnings | 2 (1-4)* |
| *Negatively framed questions | |

Table 4 describes the study participants' attitudes regarding COVID-19 preventive measures. The majority of aspects showed a favourable attitude among the study participants, with a Median score between 4 and 5 for the positively framed questions and 1 and 2 for the negatively framed questions.

**Table-5:** Association between education status and attitude towards COVID-19 prevention among study participants (n=170)

| Component | Literate Median (IQR) | Illiterate Median (IQR) | P-value |
|---|---|---|---|
| It is necessary to wear mask in public places | 4 (4-5) | 4 (4-5) | 0.972 |
| It is necessary to follow social distancing | 4 (4-5) | 4 (4-5) | 0.762 |
| It is necessary to follow SMS even after vaccination | 4 (4-5) | 4 (4-5) | 0.272 |
| Everyone should be vaccinated | 4.5 (3.75-5) | 4 (3-5) | 0.715 |
| Only healthcare and front-line workers need to be vaccinated | 3.5 (2.5-4) | 2 (1-3.5) | 0.104 |
| Only children < 18 yrs should be vaccinated | 4 (3.75-4.25) | 2 (1-3) | **<0.0001** |
| If one member in a family received vaccination it's enough | 4 (2-4.25) | 2 (1-3) | **0.020** |
| I fear if I get vaccinated, I might fall sick | 2.5 (2-3.25) | 3 (2-4) | 0.573 |
| I fear due to the side effects I might have to get hospitalized and lose my earnings | 3.5 (1.75-4.25) | 2 (1-3.5) | 0.090 |

Table 5 describes the association between literacy and COVID-19 prevention attitude. Regarding general preventive measures, such as wearing masks and social distancing, there was no statistically significant difference between the two groups. However, the difference was statistically significant between the groups regarding vaccination of children < 18 years of age and vaccination of only one family member ($p<0.05$).

## Discussion

Battling a health emergency on the scale of the COVID-19 pandemic requires a coordinated effort between the government and healthcare service providers. It entails making policy decisions, implementing them, providing ongoing

healthcare, containing the spread of the disease, and monitoring disease epidemiology[1]. Among these parameters, spreading awareness and implementing safe practices among the public regarding the pandemic and vaccination are of utmost importance.

Our study, conducted from February to April 2021, aimed to investigate the knowledge, practices, and acceptance of the COVID-19 vaccine within our community. Vaccines serve as indispensable tools for protection against the disease in a pandemic setting[2]. The Indian Government had allocated a substantial amount of budget for the development and procurement of vaccines against the coronavirus[3]. Vaccination against the coronavirus came as a much-awaited respite during the pandemic and was carried out in three phases. The second phase of the vaccine targeting people over 45 years began in April 2021,[4] and the third phase, targeting the population above 18 years, was planned to begin in May 2021.[5]

More than 90% of the study population had correct knowledge regarding the disease and the vaccination. The subjects demonstrated a good understanding of social distancing, sanitisation, and the importance of wearing protective face masks. 95-98% of the study population knew about the vaccination drive initiated by the GoI. This, in turn, reflects the efficacy and success of the various awareness drives conducted by the GoI through electronic and social media.

Our study results regarding the knowledge of eligibility for vaccination or beneficiaries during the study period showed that nearly 23% of the study population was not aware of who was eligible for vaccination. 84% of our study population was willing to get vaccinated. For the successful implementation of any vaccination program, studies have shown the need to recognize and address vaccine hesitancy in the community, which is dependent on the three 'C's model of complacency, convenience, and confidence[6]. The CoWIN digital platform was a GoI initiative that could be downloaded on any Android device to register for vaccination at the nearest health care facility. This was integrated into the already in–use "ArogyaSetu" app in March 2021 and is easily accessible[7]. Around 72% of the study population was aware that they needed to get registered for vaccination. However, knowledge of using the CoWIN app for online registration was seen in just over 50% of the population. However, by May 1, 2021, it was noted that 126.33 million Indians had been vaccinated (including both those who received two doses and a single dose[8]. The CoWIN platform has been instrumental in facilitating the enrollment of around 45 million beneficiaries since its launch in August 2021, accounting for 80% of beneficiary registrations[9].

To further increase vaccination coverage, the GoI permitted vaccinations to be carried out in designated private healthcare facilities from March 2021. The doses would be given upon payment of a government-capped sum. It was observed that within our study population, nearly two-thirds preferred to get vaccinated at a government facility, and only half were willing to pay for the vaccination. During the later phases of vaccination, community health activists (ASHA-Accredited Social Health Activists) were actively involved in door-to-door delivery and encouraging vaccination.

The fear surrounding the COVID-19 vaccination has an impact on the attitudes and practices of the general population regarding the vaccine. In a study conducted by El-Elimat et al. in Jordan, half of the study population, and in a study by Pogue et al. in the USA, 63% of the study population, feared the side effects of the vaccine and were concerned about its safety[10]. In our study population, it was found that subjects feared they might fall ill, be hospitalised, and lose their earnings after vaccination. This attitude was more prevalent in the illiterate group. Also of concern was the attitude that it was enough if only one family member, usually the breadwinner, got vaccinated. This response also correlated with the degree of literacy, which may reflect the still prevalent social customs and gender bias in Indian families[11]. Easy access to vast amounts of unauthenticated information on social media platforms has resulted in an "infodemic " during the COVID-19 pandemic. With more than 65% of the Indian population residing in rural areas, an apparent discrepancy in vaccinations has been noted due to various myths surrounding the vaccine [12].

**Limitation of the study:** The major limitation of our study was its inability to achieve the target sample size of 384 participants due to the then-prevailing COVID-19 restrictions and poor online response. However, being a community-based study that included responses from both urban/rural, literate/illiterate study subjects, which encompassed a nearly equal sex ratio, we believe these results can be extrapolated to the broader population.

## Conclusion

The knowledge regarding the COVID-19 pandemic required appropriate social behaviour and awareness regarding vaccination, which was good. However, the people were more open to getting vaccinated if it was available at a government organization and free of charge. The primary fear deterring vaccination was loss of income due to post-vaccination side effects. Responses involving vaccination, showing a negative association with literacy, indicate a greater need to concentrate awareness and myth-busting programs among the rural and lower literacy strata of society.

**Author Statement:** We would like to state that IEC approval was taken prior to the study. The reference number is AIIMS/BBN/IEC/Feb/2021/04/24.02.2021.

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