

Knowledge, Acceptance, and Affordability of COVID-19 Vaccines: A Cross-sectional Survey

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Abstract

Introduction: To improve public acceptance and decrease vaccine hesitancy in fighting COVID-19, it is important to quantify the general knowledge of the population on COVID-19 vaccine. Thus, the present study focused to evaluate the knowledge, acceptance, and affordability of COVID-19 vaccination.

Materials and Methods: A cross-sectional survey was conducted, using online questionnaire among the general population to evaluate the knowledge, attitude, and practices of people regarding the COVID-19 vaccination program. The participants aged 18 and above were included in the study and were representing different sociodemographic characteristics.

Results: Among a total of 300 complete responses, majority of the study population are females aged between 18 to 40 years (69.6%). About 44% of the study participant belongs to upper-lower socioeconomic status according to Kuppuswamy scale. Nearly 97.3% of the study population were aware on COVID-19 vaccination and the source of COVID vaccine-related information were from television, newspaper, and social media (35.66%). The awareness of available vaccines was significantly associated ($P < 0.01$) with gender and socioeconomic status. Acceptance of vaccination is significantly associated with age and socioeconomic status ($P < 0.01$). Perhaps, 30% still hesitate for vaccinated. Awareness of groups which needs vaccine was significantly associated with socioeconomic group. Availability of vaccine in nearby health-care center is significantly associated with socioeconomic group ($P < 0.01$).

Conclusion: COVID-19 vaccine knowledge could be improved, as there is a room for improvement, people need to understand about the vaccination and overcome the vaccination hesitancy. This can be achieved by addressing the fear factors and creating more vaccine awareness campaigns.

Key words: Acceptance, Awareness, COVID-19 vaccine, Knowledge

INTRODUCTION

Worldwide, the COVID-19 pandemic alert is a major challenge confronted and many efforts have been initiated to prevent and control the infection. In recent years, effective vaccines have been discovered^[1-4] and also showed significant protection against the infection. In addition, with the supportive care, government guidelines

were also been implemented based on the need for the massive vaccination. World's largest vaccination program was initiated by the Indian government for COVID-19 to ensure that 900 million population was vaccinated.^[5] In India, the vaccination campaign starts from January 2021 and used CoviShield (AstraZeneca) and Covaxin (Bharat Biotech). The first vaccine was produced by Bharat Biotech and was approved for restricted emergency use in priority-based vaccination program.^[6] The success of the mass COVID-19 vaccination program depends on the turnover of eligible candidates at the vaccination centers. Unfortunately, a significant proportion of eligible candidates is not turning up to get their dose of vaccine, which indicates hesitancy amongst people to participate in the COVID-19 vaccination program.^[7,8]

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In general, the mass vaccination program was a great success, which purely depends on the eligible candidates in the vaccination center. The COVID-19 vaccination drive faces a threat from vaccine hesitancy.^[8] The knowledge, awareness, concerns on risk, safety, and benefits of the COVID-19 vaccination program of the general population largely affect the rate of acceptance and hesitancy.^[9] Few studies accessed the opinion of the general population using the semi-structured survey on the vaccination program before the introduction and implementation of the vaccine.^[10-12] Apart from the participation of the COVID-19 vaccination program, it is also depending on the socioeconomic and demographic characteristics of the population.^[11] There is a dearth of Indian data in evaluating the knowledge and acceptance of COVID-19 vaccine. The present study focused to evaluate the knowledge, acceptance, and affordability of COVID-19 vaccination.

MATERIALS AND METHODS

This prospective cross-sectional survey was conducted between June 2021 and August 2021 through an online platform among the general population to evaluate the knowledge, attitude, and practices of people regarding the COVID-19 vaccination program. The online-based survey was preferred to ensure timely, comprehensive, and high-yield data acquisition and analysis. This study was approved by the Institutional Ethics Committee, Apollo research and Innovations, Hyderabad.

All the responses were collected through a Google Forms and telephonic interviews. All the participants were well informed pertaining the study objectives, duration of participation, declaration of confidentiality, and the voluntary participation before administration of the questionnaire. Participants providing informed consent were directed to the main questionnaire. This web link was sent by investigators to their personal and social contacts through email or WhatsApp messenger. We deployed a snowball sampling technique, a non-probability sampling method which yields a convenient sample. In cases where participants had limited technical knowledge and/or limited literacy level, investigators conducted the telephonic interview and filled the Google Forms on their behalf.

The participants aged 18 and above were included in the study and were representing different sociodemographic variables such as age, gender, and socioeconomic status. The socioeconomic status was calculated using Kuppaswamy scale (2020).^[13] Descriptive statistics were used. A total of 335 responses was received (include both Google Forms and telephonic interview), perhaps, certain responses were

excluded as they are duplicate and invalid entries, and the final data includes were 300 responses.

A 14-item structured questionnaire was used in the study to obtain the required data. The information related to demographic details such as age, gender, and the socioeconomic status such as education, occupation, and family income was recorded, further the knowledge, acceptance, and availability of the COVID-19 vaccine were also recorded accordingly. The baseline characteristics of the participants were presented as frequency and percentages. The data were analyzed using SPSS version 22.0 (IBM). $P \leq 0.05$ was considered statistically significant for all analyses.

RESULTS

A total of 335 responses, 300 were completed and include in the study. Majority of the study population were aged between 18 and 40 (69.6%) followed by age between 40 and 60 (26%) and greater than 60 years of age (4.34%). Predominantly, majority of the study population was female (64%). According to Kuppaswamy scale (2020), the socioeconomic status was calculated and majority of the study participant belongs to upper-lower socioeconomic status (44%), followed by upper-middle (33.33%), lower-middle (16%), upper (5.33%), and lower class (1.33%) [Table 1].

Awareness of vaccination plays a major role in the vaccination program, about 97.3% of the study population was aware of the COVID-19 vaccine. Majority of the study population got to know the COVID vaccine-related information from television, newspaper, and social media (35.66%) followed by television (31.66%) and 18.3 social media (19%) alone. Among the study population, 51% were aware of all the three vaccines (Covaxin, CoviShield, and Sputnik), followed by 18.3% of the individuals were two vaccines (Covaxin and CoviShield) and 21% were aware about only CoviShield and 9% were about Covaxin. About 92.6% of the study population was aware of one or more doses which were required for vaccine. Majority of the study population were aware about the groups which required COVID vaccination. Individuals has diagnosed

Table 1: Socioeconomic status of the study population

S. No.	Socioeconomic class	Score	n=300
1.	Upper (I)	27.43±1.20	16 (5.33%)
2.	Upper-middle (II)	18.92±1.76	100 (33.33%)
3.	Lower-middle (III)	13.145±1.64	48 (16%)
4.	Upper-lower (IV)	7.9±1.39	132 (44%)
5.	Lower (V)	3.5±0.57	4 (1.33%)

with COVID positive already (54.33%), pregnant women (51.66%), and adult with comorbid conditions (73.3%) required vaccination [Table 2]. Majority of the study population were vaccinated (68.33%), and nearly half of the study population were not concern about anything, perhaps, the other half were concern about the side effects (23%), non-availability of the vaccine (13%),

rumors (13%), and financial reason (1%). Among the study population, 83.3% of the responders were known about the availability of the vaccine in the nearby health-care centers [Table 2].

The source of information on COVID vaccination was obtained from the reliable sources such as the news from

Table 2: Demographic characteristics, knowledge, acceptance, and affordability of COVID-19 vaccine based on SES

Variables	N (%) n=300	Upper (I) n=16	Upper- middle (II) n=100	Lower- middle (III) n=48	Upper- lower (IV) n=132	Lower (V) n=4
Demographic characteristics						
Age						
18–40	209 (69.6%)	4	67	37	99	2
40–60	78 (26%)	10	29	11	28	-
>60	13 (4.34%)	2	4	-	5	2
Gender						
Male	108 (36%)	10	37	17	44	-
Female	192 (64%)	6	63	31	88	4
Knowledge on COVID						
Awareness of COVID-19 vaccine						
Yes	292 (97.34%)	16	99	46	127	4
No	8 (2.66%)	0	1	2	5	-
Source of information						
Television	95 (31.66%)	5	27	13	58	4
Newspaper	41 (13.66%)	4	12	8	17	-
Social media	57 (19%)	3	23	3	29	-
TV and NP and SM	107 (35.66%)	8	38	24	28	-
Vaccine you aware						
CoviShield	65 (21.6%)	1	13	5	46	-
Covaxin	27 (9%)	1	6	5	15	-
CoviShield+Covaxin	55 (18.3%)	2	21	7	21	4
CoviShield+Covaxin+Sputnik	153 (51%)	12	60	31	50	-
Awareness of vaccine dose						
Yes	278 (92.6%)	15	97	45	117	4
No	22 (7.3%)	1	3	3	15	-
Do the following group need vaccine						
COVID positive						
Yes	163 (54.33%)	61	61	31	59	-
No	137 (45.66%)	39	39	17	73	4
Pregnant women						
Yes	155 (51.66%)	53	53	26	63	1
No	145 (48.33%)	47	47	22	70	3
Children						
Yes	145 (48.33%)	53	53	20	60	-
No	155 (51.66%)	97	47	28	72	4
Adults with comorbidity						
Yes	220 (73.33%)	78	78	37	86	4
No	80 (26.66%)	22	22	11	46	-
Acceptance and affordability						
Have you got vaccinated						
Yes	205 (68.33%)	14	79	36	74	2
No	95 (31.66%)	2	21	12	58	2
Concerns about vaccine						
Side effects	69 (23%)	6	19	6	38	-
Financial reason	3 (1%)	-	-	2	1	-
Non-availability	39 (13%)	1	12	1	24	1
Rumors	39 (13%)	1	15	11	12	-
None	150 (50%)	8	54	28	57	3
Vaccine availability in nearby health-care center						
Yes	250 (83.33%)	16	89	43	99	3
No	50 (16.66%)	-	11	5	33	1

national television and all sources (TV, newspaper, and social media) radio ($P < 0.01$) and newspaper ($P < 0.05$) and social media ($P < 0.05$) were found to be significantly associated with the age. The awareness of available vaccines was significantly associated ($P < 0.01$) with the gender and socioeconomic groups [Table 3]. Similarly, the awareness of groups which needs vaccine was significantly associated with socioeconomic group (COVID positive [$P < 0.01$], pregnant women [$P < 0.05$], children [$P < 0.01$], adults with comorbidity [$P < 0.01$]). Acceptance of vaccine is significantly associated with age and socioeconomic status ($P < 0.01$), whereas availability of vaccine in nearby health-care center is significantly associated with socioeconomic group ($P < 0.01$) [Table 3].

DISCUSSION

Worldwide still COVID-19 pandemic is a great threat, vaccine comes as a great hope for controlling COVID virus. Perhaps, vaccine must be acceptable and usable among majority of the population.^[14] Mass vaccination is considered to be an effective public health measure to control the COVID-19 pandemic. However, the halfhearted participation of the general population in this campaign is a matter of concern and has potential to defy the whole purpose. It is important to understand the factors that affect people's decision/opinion to take the vaccine.

In the present study, the demographic distribution of the study showed that there is a higher percentage of females when compared to males, this showed that the females

care more toward the infection and are more interested in sharing their knowledge about COVID vaccine. Majority of the responders belong to the upper-lower socioeconomic status and when comparing to the other SES comparatively the having knowledge on vaccination and awareness, still there is a lack of knowledge on the groups who are eligible for vaccine. Majority of the responders were aware about the vaccine, this showed that the success of the awareness campaigns. Similar study findings were observed in the study conducted in northern part of India^[15] and West Bengal.^[16]

To promote public education, it is first necessary to be aware of the cause.^[17] To eradicate coronavirus infection, it is important that the public is informed about the transmission of disease, prevention, and most importantly vaccine information. This will help in promoting vaccine acceptance among the population and decreasing vaccine hesitancy.^[18] Further, there is ample source of information from which the details of vaccination can be obtained such as the national news television, newspaper, and social media, which also significantly affect the study population knowledge on COVID-19 vaccine. More than 30% of the participants responded that they get to know the vaccine-related information from television, newspaper, and social media. Perhaps, other studies highlighted that the major source of information are social media and the scientific articles published in media.^[19,20] Perhaps, even though many trusts on the reliable sources, there arises a concern on the false information obtained from the social media, which may increase the willingness for vaccination among general population.

Table 3: Knowledge, acceptance, and affordability of COVID-19 vaccine and its association with sociodemographic characteristics of the study population

Variables	Association with sociodemographic correlates		
	Age	Gender	Socioeconomic group
Knowledge on COVID			
Do you know about COVID-19 vaccine	n. s	n. s	n. s
Source of information			
Television	$P < 0.01$	n. s	n. s
Newspaper	$P < 0.05$	n. s	n. s
Social media	$P < 0.05$	n. s	n. s
TV and NP and SM	$P < 0.01$	n. s	$P < 0.01$
Vaccine your aware	n. s	$P < 0.01$	$P < 0.01$
Awareness of 1 or more dose of vaccine	$P < 0.05$	n. s	$P < 0.05$
Group need vaccine			
COVID positive	n. s	n. s	$P < 0.01$
Pregnant women	$P < 0.01$	$P < 0.05$	$P < 0.05$
Children	n. s	n. s	$P < 0.05$
Adults with comorbidity	$P < 0.01$	$P < 0.01$	$P < 0.05$
Acceptance affordability			
Have you got vaccinated	$P < 0.01$	n. s	$P < 0.01$
Concerns about vaccine	n. s	n. s	n. s
Vaccine availability in nearby health-care center	n. s	n. s	$P < 0.01$

n. s: Non-significant

Majority of the responders were aware about either any one of the vaccines (Covaxin/CoviShield/Sputnik) and are associated with gender and socioeconomic status. Nearly half of the study population knows that children under the age of 18 were not vaccinated. This is due to the fact that there is a reduced chance of complications if they are infected. About 70% of the responders in the present study know that adults with comorbid conditions need vaccination. Socioeconomic status is significantly associated with the group of individuals who need vaccination such as COVID positive, pregnant women, children, and adults with comorbid conditions. The main focus for the mass vaccination programs is to protect the high-risk individuals such as elderly people, individuals with comorbid conditions, frontline workers, and individuals in service industries.^[21]

About 68.33% of the study population were vaccinated, rate of acceptance of vaccination is significantly associated with age and socioeconomic status ($P < 0.01$). Despite the willingness for the vaccination there exist a hesitance among a group of responders (31.66%). The fear of the infection against COVID infection and the awareness of COVID vaccination shown in this study were the motivators for the people to take the vaccine.^[18]

A recent study in 2021, highlighted that many peoples depends on the social media for COVID-19 Vaccine related information's and there were group of individuals who were unwilling for vaccination.^[9] Thus, there is a need to communicate the updates on COVID-19 vaccine through authenticated source to the general public, specifically to individuals belonging to the lower socioeconomical State. Further, government might use a social media platform to increase the awareness on COVID vaccine, which will increase the willingness.

In the present study, 83.3% of the individuals responded that the vaccine is available in the nearby health-care centers. Even though, there is an availability of COVID vaccine, safety precautions cannot be replaces, for instance, personal hygiene, face mask/shield, and social distancing play a major role in public health and awareness against COVID.^[22] Indian government authorities should ensure that vaccines are available for those belonging to lower socioeconomic classes at either no cost or at subsidized rates so as to ensure national vaccination coverage for all. As the present study shows that trusted the national news channels, print media, and social media, they should provide the reliable information on the vaccine development and efficacy. Thus, the general public confidently talks about the concerns of the public to understand the need for the vaccination against COVID infection.

The study has few limitations; first, we have used snow ball technique, rather than the stratified random sampling method, hence, it is difficult to generalize the study finding. As a cross sectional, the study finding could not able to predict the future acceptance rate of vaccine, which may vary based on the phrases of pandemic and disease consequence.^[23] Second, the study is a self-reported questionnaire which could lead to more socially desirable responses from participants.

CONCLUSION

The present cross-sectional survey is an attempt to understand the knowledge and acceptance of COVID vaccination based on socioeconomic state. The present study has increased the concern on vaccine acceptance which might affect the mass vaccination program drive. The study finding would shed more light on the public health policymakers and the government authorities in implementing the various strategies to achieve acceptance of mass vaccination. COVID-19 vaccine knowledge could be improved, as there is room for improvement, people need to understand about the vaccination and overcome the vaccination hesitancy. This can be achieved by the addressing the fear factors and creating more vaccine awareness campaigns. As the present study was the cross-sectional survey at the particular point of time, similar studies at different point of time with the representation from different socioeconomic status would provide the clear insight on the knowledge, attitude, and acceptance of the vaccine in the developing country India.

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