

## Attitude towards COVID-19 Vaccination in Indian Population

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### ABSTRACT

COVID-19 pandemic caused not only widespread anxiety and panic but also hesitancy towards its vaccine. Public attitude towards vaccination plays an inevitable role in controlling the pandemic. So it is crucial to ascertain vaccine acceptance and overcome vaccine hesitancy in order to reduce the viral load and achieve herd immunity. Therefore, it is essential to study the public attitudes towards COVID-19 vaccine. This study aimed to investigate the attitudes of people in India towards COVID-19 vaccine by developing a self report questionnaire. Data was collected from Indian adults (N=419). The findings of the study show that people in different age groups and gender had significantly varied attitudes towards the COVID-19 vaccine. This study can be helpful for policy makers and healthcare authorities involved in COVID-19 vaccination drive, in working on reducing vaccine hesitancy and increasing vaccine acceptance, by targeting specific sections of the population and moulding their opinions and attitudes.

**Keywords:** COVID-19, attitudes, vaccination

COVID-19, caused by SARS-CoV-2 virus, which first emerged in the Wuhan region of China in November 2019, soon spread all over the world in the next few months. The World Health Organisation declared it as a Public Health Emergency of International Concern on 30<sup>th</sup> January 2020 and then on 11<sup>th</sup> March 2020 it was declared as pandemic (WHO, 2020). To control the spread of virus, countries went to unprecedented lockdowns and public was asked to follow various social distancing measures (CDCa, 2020; Think Global Health, 2021). Despite these efforts, this pandemic has resulted in infections around 100 million mark and over 2 million deaths. A vaccine development takes years to be ready for public immunization and involves various stages of testing and trials during the process (The History Of Vaccines, n.d.). The fastest ever vaccine developed before COVID-19 vaccines was of Mumps which took four years to develop and ready to be used by 1967 (CDCb, 2020). Currently around more than 102 vaccines are in clinical development and around 185 in preclinical development (WHO, 2021). Many countries now have approved vaccines for emergency use in their country like India has approved two vaccines one made by Bharat Biotech and other being Oxford-AstraZeneca (Sheriff M, 2021). On 8<sup>th</sup> January 2021 a ninety-year aged woman became the first person to be vaccinated against the

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## Attitude towards COVID-19 Vaccination in Indian Population

COVID-19 (BBC News, 2020). On 16<sup>th</sup> January 2021 India started vaccination with healthcare workers on the top priority (The Hindu. 2021).

While vaccine development was an arduous process, the efforts of the scientific community bore fruits and now vaccines have been approved and mass immunization is being carried out in the world including India, but immunizing such a huge population is still a challenge. Vaccination is the process of administration of a vaccine to develop immunity against a specific disease. Another challenge is the overall attitude of people towards COVID-19 vaccine and the mass immunization drive. Negative attitude and mistrust towards the vaccine is a major concern for the government and may add hindrance in achieving immunity.

An attitude is "a relatively enduring organization of beliefs, feelings, and behavioural tendencies towards socially significant objects, groups, events or symbols" (Hogg & Vaughan, 2005, p. 150). According to APA dictionary "attitude is a relatively enduring and general evaluation of an object, person, group, issue, or concept on a dimension ranging from negative to positive." Attitude definitions vary widely and myriads of definitions exist in literature. These variations exist due to epistemological issue of generality versus specificity, theoretical conception of construct and generalisation of the construct (Shaw & Wright, 1967, p.3). Attitudes can be either positive or negative (Eagly & Chaiken, 1993) but sometimes can also be ambivalent or uncertain (Priester & Petty, 2001). Attitude had been conceptualised as a structure consisting of three components, i.e. affective component, behavioural component and cognitive component (Ostrom, 1969; Breckler, 1984). Affective component deals with emotions or feelings related to the aspects of the social world like object, person or issue. Behavioral component deals with how our attitudes are formed from our actions and behaviour and how these attitudes affect our behaviour. Cognitive component refers to one's thoughts, beliefs and knowledge about the object (Rosenberg & Hovland, 1960).

Attitudes are formed and acquired in various ways. People learn attitudes due to direct and indirect interaction with others or the attitude object. Such processes include classical conditioning, operant conditioning, evaluative conditioning and observational learning (Crano & Gardikiotis, 2015). Study by Olson et al. (2001) has shown that attitudes may also be inherited via genetic transmission from parents. Mass media i.e., magazines, news channels, movies etc. exposure also helps in acquiring attitudes (Ryffel et al., 2014). One also acquires attitudes based on social comparison with others views to determine whether our views are correct or not (Festinger, 1954). During COVID-19 pandemic mass media as well social media usage increased and played an important role in spreading information and formation of attitudes (Dhanashree et al., 2020).

Attitude towards inoculation has long been studied for various vaccines like MMR (Measles, Mumps, Rubella), Polio etc. and across many countries and cultures (E.g. Khan et. al., 2015; Joseph et. al., 2011; Seale et. al., 2009). During the 2009 influenza pandemic (swine flu) public attitudes towards the vaccine have been studied (Carlsen, & Glenton, 2016; Seale et al., 2009). In French people the unfavourable attitude towards vaccination rose from 8.5% to 38.2% in 2010 and particularly 50% people showed unfavourable attitude towards H1N1 vaccine (Peretti-Watel et al., 2013). Similarly, a review by Yaqub et. al. (2014) of attitude of people and healthcare professionals towards various vaccinations revealed an increasingly hesitant attitude after the Influenza pandemic of 2009 for which reasons included perceived low risk of contracting disease, information deficit, safety and efficacy concern, mistrust etc.

## Attitude towards COVID-19 Vaccination in Indian Population

Attitude towards COVID-19 vaccine has also been studied in various countries and while the majority of the population is willing to get vaccinated, the efficacy of the vaccine, its adverse effects remains a concern (Pogue et al., 2020; Neumann-Böhme et al., 2020). A study by Paul, Steptoe and Fancourt (2020) in the United Kingdom also determined that 16% percent of participants displayed high levels of mistrust and this mistrust was higher in ethnic minorities, people of lower socioeconomic status and education. To the best of knowledge, attitude towards COVID-19 vaccination hasn't been so far studied in India. So the present paper is an attempt to study the attributes of Indian population towards COVID-19 vaccination.

### **METHODOLOGY**

#### *Participants & Procedure*

The study was conducted both in online as well as offline mode. A self report questionnaire using Google-Form was used for data collection in online mode while Pencil paper method was used for offline mode. Convenience sampling was used to reach out the participants. The samples were collected in the months of January and February of 2021. A total of 435 participants were contacted. Informed consent was taken prior to the study and 12 contacted people declined to participate in the study. Finally, 423 filled questionnaires were obtained. 1 sample was excluded due to missing values in their response and 3 samples were discarded as they were not meeting the inclusion criteria. In the end we had 419 valid questionnaires which were used for the present study and analysis.

#### *Inclusion Criteria*

Along with the willingness of the participants to be part of the study, minimum age of 18 or minimum education of Intermediate level, resident of India, ability to comprehend instructions and not having mental health illness were the inclusion criteria for the study. Participants beyond these were excluded from the study for not meeting the eligibility criteria.

#### *Measures*

Items for the questionnaire were constructed from research findings of various studies done during the current pandemic along with interviews and reports by news outlets about the possible concerns and fears about the COVID-19. The existing literature about attitudes towards vaccination for other diseases in the past was also used for preparing the questionnaire. A total of 31 items were prepared for the questionnaire. Five items were discarded due to being redundant and inability to tap targeted attitudes after discussing with the Subject Matter Expert (SME). The questionnaire now consisted of 26 items and was subsequently rated by SMEs on cognitive, behavioural and affective dimensions of attitudes. They also assessed whether the items were eliciting positive, negative or neutral attitudes. After incorporation of minor suggestions, a final questionnaire was prepared which consisted of 26 items. The scale also consisted of demographic details, i.e. name (which was optional), gender, age, education, profession and type of profession, i.e. permanent or temporary. One item was concerned about the participant's medical history about COVID-19. Scoring of the items was on a 5 point Likert scale where 1 indicated strong disagreement and 5 indicated strong agreement with the statement. The questionnaire has 9 questions under affective domain, 12 under cognitive domain and 5 items under behavioural domain. 17 items were negatively scored.

## Attitude towards COVID-19 Vaccination in Indian Population

### *Data Analysis*

Participants's responses obtained on the self report questionnaire were scored as per the prepared scoring guidelines prepared by the researcher. All the analyses carried out in the study were using IBM SPSS version 26. Significance level was set to .05 (two tailed). After various descriptive statistical analyses, Mann-Whitney U test and Welch ANOVA were run to determine differences in attitudes based on classification in the demographic variables.

## **RESULT**

### *Descriptive Analysis*

The demographic details of the participants are presented in Table 1, along with mean and standard deviation scores on the questionnaire of Attitudes towards COVID-19 vaccine.

**Table 1 Demographic Detail of the Participants**

	N	Percentage	Attitude towards COVID-19 Vaccine	
			Mean	SD
Age Group				
18-30	227	54.2	86.98	11.738
31-50	147	35.1	91.59	13.255
Above 50	45	10.7	94.07	15.339
Gender				
Female	252	60.1	87.87	11.654
Male	167	39.9	91.60	14.449
Education				
Intermediate	49	11.7	87.14	10.414
Graduate	133	31.7	87.22	13.373
Post Graduate	206	49.2	91.68	12.720
Doctorate	31	7.4	86.61	14.113
Profession				
Student	153	96.5	86.52	11.154
Home-maker	25	6.0	87.20	14.816
Business	17	4.1	88.82	12.421
Government Sector	139	33.2	92.60	14.496
Private Sector	85	20.3	89.91	11.785
Medical History				
Never Infected	365	87.1	89.27	12.920
Presently COVID-19 Infected	2	.5	96.00	1.414
Recovered from COVID-19 infection	52	12.4	89.71	13.496

Assessment of the normality of data on the Attitude scale towards COVID-19 was obtained using the Shapiro-Wilk Test of Normality. As  $p > 0.05$  we retain the null hypothesis of population normality and conclude that the data is normally distributed (Table 2). Moreover, the obtained skewness and kurtosis values are -.026 and -.387, which indicate the distribution of data approaches normal distribution. Along with normality of the data, normality among the groups was also assessed, as given in the same table.

## Attitude towards COVID-19 Vaccination in Indian Population

The reliability of the attitude questionnaire was established using Cronbach's Alpha which was found to be 0.811. The content validity was established by a group of six subject matter experts after the initial phase of development of items of the questionnaire.

**Table 2 Normality Test**

		<b>Shapiro-Wilk Test</b>		
		<b>W</b>	<b>df</b>	<b>p</b>
Attitude towards COVID-19 vaccine	Total	.994	419	.081
	16-30	.993	227	.420
	31-50	.987	147	.192
	51 above	.955	45	.079
	Female	.995	252	.536
	Male	.983	167	.044

Establishing norms for interpretation of score on the scale of Attitude towards COVID-19 vaccine was done using percentile score, as given in the Table 3. Higher the total score on the questionnaire indicates more favourable attitudes towards COVID-19 vaccine.

**Table 3 Norms based on Percentile**

<b>Percentile</b>	<b>Score on Attitude towards COVID-19 Vaccine</b>	<b>Interpretation of Attitude towards COVID-19 vaccine</b>
0-20	≤78	Strong Negative Attitude
21-40	79-85	Negative Attitude
41-60	86-92	Neutral Attitude
61-80	93-102	Positive Attitude
81-100	Above 102	Strong Positive Attitude

### Welch Test

All the assumptions were checked before running one way ANOVA. Assumption of homogeneity of variance was done using Levene's test. Here we got  $F(2,416)=5.594$ ,  $p=0.004$ , as  $p<0.05$  the null hypothesis of equal variance is rejected. As the assumption of homogeneity of variance has been violated Welch test was run to ascertain differences among the age groups on attitude towards COVID-19 vaccine.

As, *Welsh's*  $F(2,113.56)=8.55$ ,  $p<0.05$ ,  $\omega_2=0.034$  it can be concluded that at least one of the pair of age groups differ significantly on attitude towards COVID-19 vaccine. Games-Howell post hoc procedure is used to test the differences between all unique pairwise comparisons since the homogeneity of variance assumption was not met. As from the analysis, there is a significant difference observed between the attitude toward COVID-19 vaccine between the age group of 16-30 and age group of 31-50 ( $p<0.05$ ) and age group of 16-30 and age group of 50 above.

**Table 4 Games Howell Post Hoc Test**

<b>Comparison</b>	<b>Mean Difference</b>	<b>Std. Error</b>	<b>Sig. (p)</b>	<b>Effect Size</b>
16-30 vs 31-50	4.603	1.342	.002	.367
31-50 vs 50 above	2.482	2.535	.593	.173
16-30 vs 50 above	7.084	2.416	.013	.519

### Mann-Whitney U Test

For independent t- test, assumption of homogeneity of variance  $F(1,417)=12.950$ ,  $p<0.05$  and normal distribution of data in the male category ( $p<0.05$ ) were also violated therefore Mann-Whitney U test was run to ascertain difference in attitudes towards COVID-19 vaccine among groups. The Mann-Whitney test thus indicated that males had a more favourable attitude towards COVID-19 vaccine than females ( $U=17381.5$ ,  $p=0.003$ ).

## DISCUSSION

COVID-19 affects the various aspects of everyone's life at global level. Its impact is also seen in India as well. Due to Covid- 19 everyone faces Physical as well as psychological distress. To reduce the effect of Covid-19 virus India also started to vaccinate their population, but people are confused about the safety of vaccination that's why the study was done to assess the attitudes towards COVID-19 vaccine in Indian population. As said before, higher the scores more favourable is the attitude towards upcoming vaccines and vice versa. Higher scores on the scale indicate that people have less fear, worry and apprehension about the side effects of the vaccine and more faith and belief in efficacy of the vaccine. Results of the present investigation indicate that people in the age group of above 50 have a more favourable attitude followed by the age group of 31-50 and then the 18-30 age group. This trend may likely be due to the fact that people of old age are more vulnerable and higher on risk to SARS-CoV-2 virus (Henri, 2020). The aforesaid thing is easily visible, that's why the government is prioritising old age people for vaccination. Some of the reasons older people are greatly impacted by COVID-19 include the physiological and psychological changes associated with ageing, decreased immune function and multimorbidity which expose older adults to be more susceptible to the infection itself and make them more likely to suffer severely from COVID-19 disease and more serious complications (Henri, 2020). Previous research also supports the findings of the current investigation. A research conducted by Malik et al. (2020), found that older adults (over 55 years) are more inclined to take vaccines than younger adults. Interestingly, some other studies indicated that younger people had a more positive attitude regarding COVID 19 vaccination. Kreps et al. (2021), found that older subjects were significantly less likely to report willingness to vaccinate than younger subjects. In another research, conducted by Elimat et al. (2021), found that the older age groups (>35 years) were less likely to show acceptance for COVID-19 vaccines compared to younger age groups.

Findings from the present study indicate that males have significantly more positive attitudes towards vaccination than females. The findings are in line with previous researches. It was found that women subjects were significantly less likely to report willingness to vaccinate than men (Kreps et al., 2021). In another research conducted by Elhadi et al.(2021), no statistical association was found between acceptance of COVID 19 vaccination and gender, monthly income etc. Elimat, Samen, Almomani, Sawalha, Alal (2021), also stated that males were more likely to accept COVID 19 vaccines compared to females. Malik et al. (2020), also found males are more willing to take vaccines as compared to females in the US.

### Limitations

The study would have benefited if data about co-morbidity of each participant would have been taken. Previous research has shown that comorbid patients are more prone to infection from the virus and constitute a large part of COVID-19 deaths (Sanyaolu et al., 2020; Elezkurtaj et al., 2021). The study has relatively less data from the participants 50 years of age. The participants in the study hailed from a limited geographical area.

## CONCLUSION

In the present scenario, vaccines seem to be the best weapon that can help humanity in overcoming the COVID-19 pandemic. As vaccination for COVID-19 is voluntary, it is essential that we know the attitudes of the general public about the vaccine. More people will volunteer for vaccination; more quickly we will be able to achieve our goal of eradicating/controlling the spread of disease. Knowing the attitudes towards vaccines ahead of time can help the government in making policies and persuading the people to take vaccines, if there is a prevalent negative and unfavourable attitude towards COVID-19 vaccination.

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## Attitude towards COVID-19 Vaccination in Indian Population

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### **Conflict of Interest**

The author(s) declared no conflict of interest.

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