

Original articles

# A comparative study of attitudes towards COVID-19 vaccination in the rural and urban population of Uttarakhand, India

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### Background

The public is hesitant about getting vaccinated for COVID-19, and a few people are still avoiding it. The aim of this study was to evaluate the attitude towards COVID-19 vaccination among rural and urban populations of the Dehradun district in Uttarakhand, India.

### Materials and methods

A cross-sectional survey was conducted from April to June 2021 in selected urban and rural areas of the Dehradun district, yielding 770 responses (385 from both rural and urban areas). The attitudes towards COVID-19 vaccination were collected via questionnaire and analysed using descriptive and inferential statistics.

### Results

There were no rural-urban differences in the mean score of attitude towards COVID-19 vaccination ( $49.22 \pm 12.89$  vs  $50.01 \pm 11.88$ ;  $P=0.379$ ). The majority of participants had a neutral to positive attitude, and very few had a negative attitude towards COVID-19 vaccination, equally in the rural and urban population. A significant positive association was found between attitude scores with COVID-19 vaccination and mortality among participant's relatives and friends in rural areas, while participant occupation and number of family members in the urban area were associated with a more positive attitude.

### Conclusion

These results suggest mainly neutral attitude among the rural and urban populations towards COVID-19 vaccination. Therefore, it is important to design and implement innovative and efficient communication strategies to influence the neutral and offset the negative attitudes regarding vaccination drive to facilitate immunisation outreach and coverage.

## INTRODUCTION

The novel Coronavirus disease (COVID-19), was declared as a Public Health Emergency of International Concern (PHEIC) by the World Health Organization (WHO) in January 2020.<sup>1,2</sup> The virus SARS-CoV-2 is genetically related to the previous generation of coronaviruses causing the SARS epidemic in 2003.<sup>3</sup>

The challenges created by COVID-19 have affected the wellbeing of all individuals in all communities irrespective of rich-poor, literate-illiterate, rural-urban directly or indirectly.<sup>4</sup> Preventive measures such as physical distancing, avoiding social gatherings, enforcing masks as mandatory, hand sanitising, and many others have become a daily routine from the beginning of national-wide lockdown. However, the impact of the second wave has brought the impor-

tance of vaccination to the fore.<sup>5</sup>

Since the emergence of a new epidemic, the whole human community anticipated effective pharmaceutical management either as medication or vaccine. Globally, more than 15 vaccines have been approved, and many have yet to prove their efficacy in trials. The Government of India has approved three of these vaccines [Covaxin, Covishield, and Sputnik V], considering promoting vaccination for the general population.<sup>6</sup> Despite the Government efforts, the hesitancy towards vaccines by the general public is concerning.<sup>7</sup>

In general, vaccine preparation requires many years, while the fast-tracking of the vaccines against COVID-19 raised concerns among the public regarding vaccine safety and efficacy. Amidst the fear of the COVID-19 pandemic and numerous reports of side effects from newly developed vaccines, there is heightened apprehension and dilemma

among the public to accept or reject the vaccination drive in the nation.<sup>6</sup>

The theory of planned behavior suggests that every person with particular behavior in taking the COVID-19 vaccine would be influenced by major factors such as an individual's attitude towards a vaccine and perceived behavioral control regarding taking the vaccine.<sup>5</sup> Vaccines have been the most effective and reliable public health intervention for decades, saving millions of people from deadly infectious diseases.<sup>8</sup> Vaccination is one of the most effective ways to help reduce and eliminate viral infection and its spread.<sup>9</sup>

Since the beginning of the Universal Immunization Program (UIP), India has continued expanding and improvising vaccination programs to its community people. Although the government is working to develop and implement the new vaccines against COVID-19, at the same time public should have acceptance, which may require lots of awareness through educational activities.<sup>6</sup> Even the best vaccine against any infection may go unfruitful if it is less used or unused.<sup>9</sup>

Therefore, the aim of this study was to conduct a survey to compare and identify the main drivers of attitudes towards COVID-19 vaccination in urban and rural populations of Uttarakhand, India.

## MATERIALS AND METHODS

### STUDY DESIGN AND SETTING

A comparative, cross-sectional survey was conducted to assess the attitude towards COVID-19 vaccination in Uttarakhand, India, focusing on the urban and rural populations. This study was conducted in the Dehradun district, located in the northern part of India. The total land area is 53,483 km<sup>2</sup> with a population of 10.1 million; the urban and rural area for the study setting was selected from Dehradun district with a total population of 1.8 million.<sup>10</sup> In urban areas, Rishikesh and Raiwala were selected, and in the rural area, Gangabhogpur and Raipur were chosen as study settings. The study participants above 18 years, permanent residence in their respective districts, and willing to participate were included in the study.

### SAMPLE SIZE CALCULATION

The sample size for the study was determined by using (Raosoft, Inc, 2004, <http://www.raosoft.com/sample-size.html>), keeping the margin of error at 5%, at 95% confidence level, 50% response rate, and more than 20,000 population. The estimated sample size was 377; for rural and urban areas, the total sample size was 754.

### SAMPLING TECHNIQUE

The rural and urban areas of Dehradun were conveniently selected. A quota sampling technique was adopted to select 754 participants in which 50% of the sample (377) were conveniently selected from urban areas and the remaining 50% (377) from rural area districts of Uttarakhand, India.

## ETHICAL CONSIDERATIONS

Ethical approval was obtained from the institutional ethics committee with letter no. No. 119/IEC/IM/NF/2021 dated 09 April 2021. The participants were well informed about the purpose of the survey. Informed written consent was obtained from each participant before they responded to the survey questionnaire. Confidentiality of information and anonymity of the participants was maintained.

## VALIDITY AND RELIABILITY OF THE TOOLS

The questionnaire was developed after an extensive literature review on previous vaccination programs. The content validity of the survey questionnaire was done by seven experts from different fields and pretested among 30 participants, each in urban and rural areas similar to the study setting. The reliability of the tool was established by Cronbach's alpha, which was found to be 0.87.

## DATA COLLECTION TOOLS AND TECHNIQUES

The survey consisted of two sections: *Section A*: focused on socio-demographic characteristics of the participants, including age, gender, occupation, monthly income, education, family type, religion, marital status, residence, presence of comorbidities, previous COVID-19 status, history of hospitalisation due to COVID-19, history of COVID-19 positive status in the family, mortality due to COVID-19 in family or friends and COVID-19 vaccination status.

*Section B*: it comprises a questionnaire containing 15 items with positive and negative statements. Each item was rated on a 5-point Likert scale ranging from strongly agree (5), agree (4), uncertain (3), disagree (2), and strongly disagree (1); however, for negative statements, reverse scoring was done to assess the participant's attitude towards COVID-19 vaccination. The total score ranges from 15-75: Negative attitude (15-35), neutral attitude (36-55), and positive attitude (56-75). The total score was determined by summing up the scores per question. The higher scores indicated a positive attitude towards COVID-19 vaccination. The questionnaire was prepared in English and translated into the local language (Hindi) while conducting an interview. The average time to complete the survey was 5-10 minutes.

## DATA COLLECTION PROCEDURE

We conducted house to house surveys of people 18 years or above age residing in selected urban and rural areas by trained fully immunised researchers with COVID-19. The researchers followed proper COVID-19 prevention guidelines while collecting data between April to June 2021. At this time, the second phase of Covid-19 vaccination for all the residents above 45 years of age was eligible for the vaccine for Covid-19.

The participants were informed about the objectives of the study, and written consent was obtained before administering a self-structured questionnaire. Family with more members were invited to participate and interviewed separately, considering the inclusion & exclusion criteria. The process was performed until the targeted sample size was

reached in both rural and urban settings.

## STATISTICAL ANALYSIS

The collected data was organised in Excel sheets (Microsoft Corporation, Redmond, WA, USA), and all statistical analyses were performed by using Statistical Package for Social Sciences (SPSS) version-30 (IBM Corp., Armonk, NY, USA).

Descriptive statistics were calculated for socio-demographic characteristics and were presented using frequency and percentage. Attitude scores were also expressed in frequency and percentage. The inferential test, t-test, ANOVA test and linear regression were employed to assess the association of attitude scores with the socio-demographic characteristics of the rural and urban population. The significance was set at  $P < 0.05$ .

## RESULTS

After excluding 20 improperly filled surveys, the final sample size consisted of 770, with an equal number of 385 responses from rural and urban areas. The mean age of the rural population was  $41.2 \pm 15.5$  and urban  $39.59 \pm 14.12$ , without significant difference ( $P = 0.137$ ). More than half of the participants were female; 55.6% had a rural origin, and 51.6% were in urban areas. Comorbidities were reported by 22.1% in rural and 26.8% in the urban population (Table 1).

Many participants had a neutral to positive attitude, and very few had a negative attitude towards COVID-19 vaccination (Table 2); COVID-19 vaccination and mortality among friends and relatives were significantly associated with their attitude towards COVID-19 vaccination in rural areas. However, participant occupation and number of family members were significantly associated with their attitude towards COVID-19 vaccination in urban areas. It was also noted that the presence of comorbidity and hospitalisation history was not associated with participants' attitudes from both groups, whether rural or urban (Tables 3 and 4).

Almost one-third (33.5%) of participants strongly agreed regarding the safety and efficacy of COVID-19 vaccination. Furthermore, more than half (55.2%) of the participants strongly agreed that the pharmaceutical companies' rules and regulations in manufacturing the COVID-19 vaccination as per the government norms. However, only about a third (35.7%) of participants agreed to advise their relatives and friends to take the COVID-19 vaccination. Furthermore, less than a third (27%) reported neutral behaviour towards the effectiveness of COVID-19 vaccination in preventing virus mutation, while a majority (79.6%) of participants demonstrated a neutral attitude towards the side effects of COVID-19 vaccination on their pre-existing disease conditions (Table 5).

## DISCUSSION

In this comparative, cross-sectional study, most participants (69.1%) had a neutral attitude towards COVID-19 vaccination in the rural population compared to (61.8%) in the urban population. The present study findings suggest that the rural and urban population shows some hesitancy to-

wards the COVID-19 vaccination drive. However, it is crucial to perform effective strategic planning to educate the general population, who are still at a higher risk of developing a health emergency.

A global survey study involving 13,426 participants from 19 countries targeting the acceptance of COVID-19 vaccinations in the general population reported China with the highest (88.6%) and lowest (54.8%) in Russia.<sup>11</sup> Moreover, middle-income countries, such as Brazil, India, and South Africa, also show positive public acceptance.<sup>11</sup> However, vaccine acceptance is more or less in harmony with the initial planning in developing countries like India.<sup>12</sup> An Ethiopian study reported that one-fourth of participants (24.2%) had a positive attitude towards COVID-19 vaccination, and around (40.8%) respondents were aware of COVID-19 vaccination.<sup>13</sup> A similar study from Jordan revealed that less than half (37.4%) of respondents showed a positive attitude towards COVID-19 vaccination, and around (26.3%) of respondents are still unsure about vaccination. The main concern of the general public refused to take vaccination fearing of side-effects of newly launched vaccines against COVID-19 but agreed to take after the licensing of pharmaceutical companies with the proper establishment of favourable effects of vaccines.<sup>14</sup>

A study from Bangladesh revealed that more than half (74.5%) of the general population showed a positive attitude towards COVID-19 vaccination with a mean attitude score of 9.34 (2.39), and quite a few (8.5%) still showed some amount of hesitancy towards vaccination. It was more amongst the geriatric population, low literacy level, comorbidities, and less confidence in its healthcare system.<sup>15</sup> In the United Kingdom, it was found that only a few respondents exhibited high levels of uncertainty about vaccines and had a negative attitude towards COVID-19 vaccination, it was seen higher among individuals from ethnic groups, education level, monthly income, and poor knowledge regarding the high level of mutation of this deadly disease among the general population.<sup>16</sup>

Another study from Malta reported that half of the participants had a positive attitude towards COVID-19 vaccination and were willing to take the vaccination. Vaccine hesitancy was a major setback in public opinion as one-third of participants were still in a dilemma towards vaccination, and some of them were not in favour of COVID-19 vaccination, and they refused to take it even after robust safety trials.<sup>5</sup> The result was incongruent with the study done on the general population of India and found that most of the respondents showed a positive attitude towards vaccination and are willing for COVID-19 vaccination as soon as their chance will come and agreed to recommend their family and friends.<sup>17</sup>

The present study results also suggested no relation of socio-demographic variables with attitude scores in the rural area. However, there is a significant association of the history of COVID-19 positive status in family and friends in an urban area. Another study from India showed that participants more than 45 years of age and socio-economic status were significantly associated with attitude scores. The willingness to pay for the vaccine was also significantly positively associated with socio-economic status, and the willingness to recommend the vaccine to family and friends

**Table 1. Socio-demographic and health profile of participants**

Variable	Rural (n= 385)	Urban (n=385)	Total (n=770)	t-value / Chi-square value	P value
<b>Age (in years)</b>					
Mean ± SD	41.18±15.53	39.59±14.12	40.38±14.82	1.48 <sup>a</sup>	0.137
18-35 years	155 (40.3)	128 (33.2)	283 (36.7)	4.28 <sup>b</sup>	0.117
36-54 years	143 (37.1)	165 (42.9)	308 (40)		
55-72 years	87 (22.6)	92 (23.9)	179 (23.3)		
<b>Gender</b>					
Male	171 (44.1)	186 (48.4)	378 (49)	1.17 <sup>b</sup>	0.278
Female	214 (55.6)	199 (51.6)	392 (51)		
<b>Occupation</b>					
Government job	63 (16.2)	81 (21.0)	144 (18.7)	36.35 <sup>b</sup>	<0.001
Private job	81 (21.3)	95 (24.6)	176 (22.9)		
Self employed	139 (36.1)	68 (17.6)	207 (26.8)		
Labourer	82 (21.3)	101 (26.2)	183 (23.7)		
Unemployed	20 (5.1)	40 (10.3)	60 (7.8)		
<b>Monthly income (Indian rupee)</b>					
5000-10,000	91 (23.6)	89 (23.1)	180 (23.3)	9.64 <sup>b</sup>	0.021
10,001-20,000	136 (35.3)	100 (26)	236 (30.6)		
20,001-30,000	105 (27.2)	128 (33.2)	233 (30.2)		
30,000 above	53 (13.8)	68 (17.7)	121 (15.7)		
<b>Education</b>					
Illiterate	88 (22.9)	61 (15.9)	149 (19.3)	10.07 <sup>b</sup>	0.039
Primary	108 (28.1)	101 (26.2)	209 (27.2)		
Secondary	69 (17.9)	96 (24.9)	165 (21.4)		
Graduation	98 (25.5)	100 (26)	198 (25.7)		
Post-graduation	22 (5.7)	27 (7)	49 (6.4)		
<b>No of family members</b>					
1-2 members	52 (13.5)	71 (18.4)	123 (15.9)	4.82 <sup>b</sup>	0.089
3-4 members	144 (37.4)	150 (39)	294 (38.2)		
> 4 members	189 (40.09)	164 (42.6)	353 (45.8)		
<b>Family type</b>					
Nuclear	184 (47.8)	196 (51)	380 (49.4)	0.74 <sup>b</sup>	0.387
Joint	201 (52.2)	189 (49.0)	390 (50.6)		
<b>Religion</b>					
Hindu	333 (86.4)	336 (87.2)	669 (86.8)	0.88 <sup>b</sup>	0.829
Muslim	30 (7.7)	24 (6.2)	54 (7.01)		
Sikh	12 (3)	14 (3.6)	26 (3.4)		
Others	10 (2.6)	11 (2.8)	10 (2.7)		
<b>Marital status</b>					
Unmarried	151 (39.2)	172 (44.7)	323 (41.9)	2.78 <sup>b</sup>	0.248
Married	223 (57.9)	200 (51.9)	423 (54.9)		
Widow/ Divorced	11 (2.9)	13 (3.4)	24 (3.2)		
<b>Health care worker</b>					
Yes	14 (3.6)	21 (5.5)	35 (4.5)	1.46 <sup>b</sup>	0.225
No	371 (96.4)	364 (94.5)	735 (95.5)		

Variable	Rural (n= 385)	Urban (n=385)	Total (n=770)	t-value / Chi-square value	P value
<b>Presence of comorbidities</b>					
Yes	85 (22.1)	103 (26.8)	188 (24.5)	2.28 <sup>b</sup>	0.131
No	300 (77.9)	282 (73.2)	582 (75.5)		
<b>If yes specify</b>					
Hypertension	45 (52.8)	54 (52.5)	99 (52.6)	1.95 <sup>b</sup>	0.375
Diabetes mellitus	22 (25.6)	34 (33)	56 (29.9)		
Others	18 (5.6)	15 (3.9)	33 (4.2)		
<b>Did you become COVID-19 positive</b>					
Yes	51 (13.2)	60 (15.6)	111 (14.5)	0.85 <sup>b</sup>	0.355
No	334 (86.8)	325 (84.4)	659 (85.5)		
<b>Hospitalization due to COVID-19 (n=111)</b>					
Yes	40 (78.4)	58 (96.6)	98 (88.3)	8.86 <sup>b</sup>	0.002
No	11 (21.5)	2 (3.3)	13 (11.7)		
<b>Family members /friends become Covid-19 positive</b>					
Yes	50 (13)	61 (15.8)	111 (14.4)	1.27 <sup>b</sup>	0.259
No	335 (87)	324 (84.2)	659 (85.6)		
<b>Death due to COVID-19 in family/friends (n=111)</b>					
Yes	35 (70)	48 (78.6)	83 (74.8)	1.09 <sup>b</sup>	0.294
No	15 (30)	13 (21.4)	28 (25.2)		
<b>Vaccinated for COVID-19</b>					
Yes	38 (9.9)	70 (18.2)	108 (14.1)	11.02 <sup>b</sup>	<0.001
No	347 (90.1)	315 (81.8)	662 (85.9)		
<b>Any side effects observed</b>					
Yes	29 (76.4)	40 (57.4)	69 (63.9)	3.92 <sup>b</sup>	0.047
No	9 (23.6)	30 (42.6)	39 (36.1)		
<b>If yes specify</b>					
Fever/ sore throat	10 (2.6)	11 (2.8)	21 (2.7)	4.20 <sup>b</sup>	0.117
Injection site pain	21 (52.5)	8 (27.5)	29 (42.1)		
Weakness/body ache	9 (22.5)	10 (34.5)	19 (27.5)		

<sup>a</sup> t-test; <sup>b</sup> Chi-square test

**Table 2. Attitude of participants towards COVID-19 vaccination**

Areas	Mean±SD	Negative attitude (15-35); n (%)	Neutral attitude (36-55); n (%)	Positive attitude (56-75); n (%)	Total; n (%)	Chi-square value (P value)
Rural population (n=385)	49.22±12.89	39 (10.1)	266 (69.1)	80 (20.8)	385 (100)	6.345 (0.041)
Urban population (n=385)	50.01±11.88	37 (9.6)	238 (61.8)	110 (28.6)	385 (100)	

was found to be significantly associated with place of residence.<sup>17</sup>

A study done in Kuwait showed a significant association of gender with attitude scores as the male population was more willing to accept a COVID-19 vaccine than females,

and participants who previously received an influenza vaccine were more likely to accept a COVID-19 vaccine. In contrast, participants who were suffering from comorbidities were less willing to accept vaccination.<sup>18</sup>

India is a diverse nation that needs a multi-dimensional

**Table 3. Association of attitude scores with socio-demographic and health variables of the rural population (n=385)**

Variables	$\beta$	t-value/ f-value	P value
<b>Age</b>			
18-35 years	0.026	0.500 <sup>a</sup>	0.617
36-54 years			
55-72 years			
<b>Gender</b>			
Male	-	1.677 <sup>c</sup>	0.094
Female			
<b>Occupation</b>			
Government job	-	0.574 <sup>b</sup>	0.799
Private job			
Self-employed			
Labourer			
Unemployed			
<b>Monthly income (in Indian currency)</b>			
5,000-10,000	0.011	0.214 <sup>a</sup>	0.830
10,001-20,000			
20,001-30,000			
30,000 above			
<b>Education</b>			
Illiterate	-	1.163 <sup>b</sup>	0.327
Primary			
Secondary			
Graduation			
Post-graduation			
<b>No. of family members</b>			
1-2 members	0.047	0.910 <sup>a</sup>	0.363
3-4 members			
> 4 members			
<b>Family type</b>			
Nuclear	-	1.055 <sup>c</sup>	0.292
Joint			
<b>Religion</b>			
Hindu	-	0.662 <sup>b</sup>	0.619
Muslim			
Sikh			
Others			
<b>Marital status</b>			
Unmarried	-	1.256 <sup>b</sup>	0.286
Married			
Widow/ Divorced			
<b>Health care worker</b>			
Yes	-	0.436 <sup>c</sup>	0.661
No			
<b>Presence of comorbidities</b>			

Variables	$\beta$	t-value/ f-value	P value
Yes	-	0.557 <sup>c</sup>	0.578
No			
<b>Did you become Covid-19 positive</b>			
Yes	-	1.405 <sup>c</sup>	0.161
No			
<b>Previous hospitalization due to COVID-19</b>			
Yes	-	0.267 <sup>c</sup>	0.790
No			
<b>Family members /Friends become Covid-19 positive</b>			
Yes	-	0.606 <sup>c</sup>	0.545
No			
<b>Death due to COVID-19 in family</b>			
Yes	-	2.785 <sup>c</sup>	0.006
No			
<b>Vaccinated for COVID-19</b>			
Yes	-	2.530 <sup>c</sup>	0.012
No			

$\beta$  Standardized Beta Value; <sup>a</sup> linear regression; <sup>b</sup> ANOVA test; <sup>c</sup> t-test

approach for the vaccination campaign, which is a challenging task. During the initial stages of the pandemic, the rural areas were the least affected compared to urban sectors. However, in the second wave, there was a significant rise in rural areas. The fundamental evidence for concern on vaccine drive between rural and urban is logistical constraints such as poor infrastructure, unskilled workers, and the lack of resources.<sup>19</sup>

The first limitation is the sample composition, originating in rural and urban areas, disabling further generalisation of the results. The second is that the survey was conducted when vaccination phase II started in the general population aged above 45 years; resulting uncertainty was more prevalent younger age groups. Third, the vaccine motivation campaign was not active during the data collection period affecting the study findings. The current study's recommendations suggest that a community-focused approach is required to deal with people's mentality and mindset. Furthermore, the findings recommend interventional studies compared to rural and urban to attain more accuracy in the results.

## CONCLUSION

The COVID-19 pandemic was, in some aspects, the worst pandemic in history, causing substantial mortality and morbidity rates, but the introduction of the COVID-19 vaccine offered a ray of hope for a better future. Negative attitudes towards vaccination and hesitancy or unwillingness regarding vaccination are the major concerns that need to be addressed. People in India currently have mainly neutral attitude regarding vaccination, requiring more authentic, reliable, and adequate information to assist them in deci-

sion-making. Positive attitudes and perceived usefulness of vaccination in the general population is crucial for a successful vaccination plan and prevention of new epidemics waves in the future.

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## CONTRIBUTIONS

RS, PJ, and VS conceptualised the study. VAS, LC, LM and RS performed the literature review. LC, VAS, and PJ wrote the first draft. RS, VS and LM supervised the study. All authors provided critical feedback on the manuscript and have agreed to be accountable for all aspects of the work.

## CONFLICT OF INTEREST DISCLOSURES

The authors completed the ICMJE Unified Competing Interest form at (available upon request from the corresponding author), and declare no conflicts of interest.

## FUNDING

None

## ETHICS

Ethical approval was obtained from the institutional ethics committee (119/IEC/IM/NF/2021), dated 09 April 2021.

**Table 4. Association of attitude scores with socio-demographic variables of urban population**

Variables	$\beta$	t-value/ f-value	P value
<b>Age</b>			
18-35 years	0.047	0.917 <sup>a</sup>	0.360
36-54 years			
55-72 years			
<b>Gender</b>			
Male	-	0.214 <sup>c</sup>	0.831
Female			
<b>Occupation</b>			
Government job	-	3.091 <sup>b</sup>	0.002
Private job			
Self-employed			
Labourer			
Unemployed			
<b>Monthly income (in Indian currency)</b>			
5000-10,000	0.017	0.326 <sup>a</sup>	0.745
10,001-20,000			
20,001-30,000			
30,000 above			
<b>Education</b>			
Illiterate	-	0.796 <sup>b</sup>	0.529
Primary			
Secondary			
Graduation			
Post-graduation			
<b>No. of family members</b>			
1-2 members	0.101	1.991 <sup>a</sup>	0.047
3-4 members			
> 4 members			
<b>Family type</b>			
Nuclear	-	0.869 <sup>c</sup>	0.386
Joint			
<b>Religion</b>			
Hindu	-	0.690 <sup>b</sup>	0.599
Muslim			
Sikh			
Others			
<b>Marital status</b>			
Unmarried	-	0.191 <sup>b</sup>	0.826
Married			
Widow/ Divorced			
<b>Health care worker</b>			
Yes	-	0.706 <sup>c</sup>	0.481
No			
<b>Presence of comorbidities</b>			



Variables	$\beta$	t-value/ f-value	P value
Yes	-	1.722 <sup>c</sup>	0.086
No			
<b>Did you become Covid-19 positive</b>			
Yes	-	0.654 <sup>c</sup>	0.514
No			
<b>Previous Hospitalization due to COVID-19</b>			
Yes	-	1.449 <sup>c</sup>	0.146
No			
<b>Family members become Covid-19 positive</b>			
Yes	-	0.436 <sup>c</sup>	0.663
No			
<b>Death due to COVID-19 in family</b>			
Yes	-	1.146 <sup>c</sup>	0.252
No			
<b>Vaccinated for COVID-19</b>			
Yes	-	0.345 <sup>c</sup>	0.730
No			

$\beta$  Standardized Beta Value; <sup>a</sup> linear regression; <sup>b</sup> ANOVA test; <sup>c</sup> t-test

#### CORRESPONDENCE

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**Table 5. Attitudes regarding COVID-19 Vaccination**

No	Question	Attitude frequency; n (%)				
		Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
1	I think COVID-19 vaccination is safe	52 (6.8)	247 (32.1)	123 (16)	90 (11.7)	258 (33.5)
2	I think the COVID-19 vaccination have undergone enough safety trials.	75 (9.7)	161 (20.9)	135 (17.5)	114 (14.8)	285 (37)
3	I think pharmaceutical companies follow all rules and regulations in manufacturing the COVID-19 vaccination according to the Government norms.	30 (3.9)	81 (10.5)	95 (12.3)	139 (18.1)	425 (55.2)
4	I will advise my relatives and friends to take the COVID-19 vaccination.	35 (4.5)	119 (15.5)	135 (17.5)	275 (35.7)	206 (26.8)
5	I think we have enough evidence to prevent the reoccurrence of COVID-19 after vaccination.	178 (23.1)	245 (31.8)	130 (16.9)	46 (6.0)	171 (22.2)
6	I think the COVID-19 vaccination will prevent the mutation of the virus.	105 (13.6)	195 (25.3)	208 (27.0)	58 (7.5)	204 (26.5)
7	I think people are still having doubts regarding efficacy of COVID-19 vaccination	88 (11.4)	321 (41.7)	109 (14.2)	23(3.0)	229 (29.7)
8	I think people refuse to take the COVID-19 vaccination due to their some religious beliefs.	227(29.5)	165 (21.4)	137 (17.8)	52 (6.8)	189 (24.5)
9	I think a person should take COVID-19 vaccination according to his/her will, and there should be no outside pressure for vaccination.	68 (8.8)	127 (16.5)	148 (19.2)	87 (11.3)	340 (44.2)
10	I don't want to take the COVID-19 vaccination because I fear doctors, needles and hospitals.	125 (16.2)	202 (26.2)	181 (23.5)	111 (14.4)	151 (19.6)
11	I am worried about the safety of the COVID-19 vaccination.	68 (8.8)	102 (13.2)	132 (17.1)	176 (22.9)	292 (37.9)
12	I think the COVID-19 vaccination will have good after-effects.	78 (10.1)	112 (14.5)	279 (36.2)	190 (24.7)	111 (14.4)
13	I am worried about the side effects of COVID-19 vaccination on my pre-existing disease conditions.	70 (9.1)	214 (27.8)	151 (19.6)	96 (12.5)	239 (31.0)
14	I have good immunity power; that is why I don't think I need COVID-19 vaccination.	259 (33.6)	187 (24.3)	114 (14.8)	74 (9.6)	136 (17.7)
15	I do not think the COVID-19 vaccination cost is appropriate.	89 (11.6)	226 (29.4)	322 (41.8)	50 (6.5)	83 (10.7)



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