

# Awareness and Attitude Towards COVID-19 Vaccination and Associated Factors in Ethiopia: Cross-Sectional Study

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**Background:** Coronavirus disease (COVID-19) is a deadly virus that continues to afflict many countries worldwide. The development of a COVID-19 vaccine to combat the disease's spread and devastating effects is still ongoing, and as the pandemic progresses, new, more effective vaccines are likely to be created. The aim of this study was to assess awareness and attitude towards COVID-19 vaccination in Ethiopia.

**Methods:** A population-based cross-sectional e-survey was conducted among 425 participants from March 13, 2021 to April 10, 2021. The survey was conducted using a structured and self-reported questionnaire containing informed consent along with three sections (socio-demographic, awareness, and attitude); a multivariable logistic regression model was performed to determine the variables predicting awareness towards COVID-19 vaccinations.

**Results:** The mean score of awareness was 4.3 (SD=1.1) out of 7, with the overall awareness of 40.8%, and the mean score of attitudes was 4.09 (SD=2.16) out of 9, with an overall "positive attitude" score of 24.2%. College and above educational level (AOR=2.21, 95% CI=1.32, 4.62), had access to mass media (AOR=4.75, 95% CI =2.74, 8.24), and urban residency (AOR=2.83, 95% C.I = 1.57, 5.09) were significantly associated with awareness towards COVID-19 vaccination.

**Conclusion:** In Ethiopia, there is a poor knowledge toward COVID-19 vaccines, according to the current report. The findings indicate that authorities should implement an urgent health education program and disseminate more reliable information. Using the media, policy-makers should take measures to ensure adequate awareness of COVID-19 vaccinations with various stakeholders.

**Keywords:** attitude, awareness, COVID-19, Ethiopia, vaccination

## Introduction

Coronavirus disease (COVID-19) is a fatal viral disease that continues to afflict many countries around the world. SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) is a new coronavirus strain that has spread across the world and become a major public health concern.<sup>1</sup> The COVID-19 epidemic was declared a pandemic by the World Health Organization (WHO) on March 11, 2020.<sup>2</sup> During this survey, COVID-19 has affected 223 countries, resulting in over 133.978 million reported cases and 2.9 million deaths.<sup>3</sup>

At least seven separate vaccines across three channels have been carried out in countries as of February 18, 2021. Vaccination is prioritized for vulnerable groups in all countries. Simultaneously, more than 200 additional vaccine candidates are

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being developed, with more than 60 of them in clinical trials. COVAX is a component of the ACT Accelerator, which WHO and collaborators launched in 2020. COVAX, the vaccines cornerstone of the ACT Accelerator convened by CEPI, Gavi, and WHO, aims to bring the COVID-19 pandemic's acute phase to an end.<sup>4</sup>

The development of a COVID-19 vaccine to combat the disease's spread and devastating effects is still ongoing, and as the pandemic progresses, new, more effective vaccines are likely to be developed. Vaccine delivery is continuing, and the public acceptance of the COVID-19 vaccine is critical.<sup>5,6</sup> Given the urgency of mass vaccination against SARS-CoV-2 strategies, vaccine hesitancy is becoming increasingly recognized as a serious public health problem that necessitates extensive research among different population groups to fully understand its triggers and prevalence.<sup>7,8</sup>

Ethiopian authorities decided to use the COVID-19 vaccine from Astra Zeneca via the COVAX Facility. Ethiopia received 2.184 million doses of COVID-19 vaccines on March 7, 2021. Ethiopian Airlines delivered Astra Zeneca vaccines approved and manufactured by Serum Institute of India (SII) at Bole International Airport.<sup>9</sup> The Ethiopian Ministry of Health introduced the COVID-19 vaccine at a high-level national event held at Eka Kotebe COVID-19 Hospital on March 13, 2021, where front-line health workers were vaccinated to mark the start of the vaccination campaign.<sup>10</sup>

However, there is a lot of debate about COVID-19 vaccinations among Ethiopians in general. A large percentage of Ethiopians are hesitant to get the COVID-19 vaccine. According to a global survey of potential COVID-19 vaccine approval, 48% of the study populations are uncertain about the COVID-19 vaccines and whether or not they would get the vaccine.<sup>11</sup> Similarly, a Chinese study discovered that only slightly more than half of their population (54%) planned to get vaccinated.<sup>12</sup> While the most important measure of contribution to the spread of the virus is to prevent oneself from being exposed to COVID-19, it is therefore vital to vaccinate the most vulnerable group of people as soon as possible.<sup>13</sup> There is no research on COVID-19 vaccination awareness and attitudes in Ethiopia. As a result, the aim of this study was to assess awareness and attitude towards COVID-19 vaccination in Ethiopia.

## Methods

A population-based cross-sectional explanatory e-survey was conducted in Ethiopia. The survey took place from

March 13, 2021 to April 10, 2021, coinciding with the start of COVID-19 vaccination campaign in Ethiopia. This research used a Google Form to collect data from respondents about their awareness and attitude towards COVID-19 vaccination. During data collection, a shared connection was created and disseminated publicly on various social media platforms (Facebook, Telegram, and Email).

The author shared the link to the questionnaire on the social media sites listed above, and in order to comply with the website's terms and conditions regarding the responses of respondents, the following question was added at the end of the questionnaire on Google Forms: "By submitting this form, do you consent to the Term and Conditions of Google Forms?" and if they agreed with this Term and Conditions of Google Forms their responses can be submitted.

As a result, I am assured that my data collection process complied with the Google Forms website's Terms and Conditions. The survey was advertised with online contact mode and only volunteers were included without intensive. The response rate was enhanced by re-communicating with participants and multiple entries from the same individual was prevented by giving code to each participant. The questionnaire included closed-ended questions about the respondents' socio-demographics characteristics and awareness towards COVID-19 vaccine. The inclusion criteria of participant were (a) being an Ethiopian, (b) having voluntary to participate, (c) age greater than or equal to 18, (d) user of the social media, and (e) can read and understand the national language Amharic. The study was conducted following the Checklist for Reporting Result of Internet ESurveys guidelines.<sup>14</sup>

Since there has been no prior research on awareness and attitude toward COVID-19 vaccine in Ethiopia, I decided that the best assumption (P) would be 50%. Sample size was estimated using the single population proportion formula with the following factors in mind: marginal error of 0.05, 95% confidence interval, and p-value 0.5. For this analysis, assume a 10% non-response rate. The final sample size of 425 participants was estimated.

## Measurement

Awareness towards COVID-19 vaccine was measured based on survey tool and guidance.<sup>15</sup> The questioner about awareness had 7 items as presented in Table 1 with a category ("Yes", "No"). The awareness level was assessed by

**Table 1** Awareness of Respondents Towards COVID-19 Vaccine in Ethiopia, 2021 (n=425)

Variables	Frequency	Percent (%)
<b>Do you heard about the COVID-19 vaccine?</b>		
Yes	295	46.3%
No	130	53.7%
<b>Is COVID-19 vaccine effectiveness?</b>		
Yes	71	16.7%
No	354	83.3%
<b>Currently there is effective cure for COVID-2019</b>		
Yes	373	12.2%
No	52	87.8%
<b>Currently there is effective vaccine to protect against COVID-19</b>		
Yes	340	80%
No	52	20%
<b>COVID-19 vaccine started in Ethiopian</b>		
Yes	318	74.8%
No	107	25.2%
<b>The newly discovered COVID-19 vaccine differ from other vaccine</b>		
Yes	173	40.7%
No	252	59.3%
<b>Even if there is a vaccine other preventive measures are very important</b>		
Yes	262	38.4%
No	163	61.6%

assigning 1 point for each correct answer and the knowledge level indicated by two categories: Poor for (of 7 <5 items) and good for (of 7 >4 items). Q1: Do you heard about the COVID-19 vaccine?, Q2: Is COVID-19 vaccine effective?, Q3: Currently there is no effective cure for COVID-2019, Q4: Currently there is an effective vaccine to protect against COVID-19?, Q5: COVID-19 vaccine started in Ethiopian?, Q6: The newly discovered COVID-19 differ from other vaccine?, and Q7: Even if there is a vaccine other preventive measures are very important?

The attitude level was also assessed by assigning one point for each correct answer and the attitude level indicated by two categories (“agree”, “disagree”). Negative attitude (of 9 <6 items) and positive attitude (≥6 of 9 item). Q1: Is the newly discovered COVID-19 vaccine is

safe? Q2: Is the COVID-19 is essential for us, Q3: will you take the COVID-19 vaccine? Q4: Is the vaccine the only solution for COVID-19? Q5: Is the COVID-19 vaccine should be distributed fairly? Q6: Is important to get the vaccine? Q7: worry about unforeseen impact? Q8: Preferred natural immunity rather than vaccine? and Q9: will make the vaccine available for all citizens for free? The awareness and attitude question adopted from different studies.<sup>16,17</sup>

The data was coded, washed, recoded, and entered into epi-data version 3.1 before being transferred to SPSS window version 21 for analysis. To present the data, a table, graph, and a statement were used. Bivariate logistic regression analysis was used to investigate the relationship between independent and dependent variables. All variables in the bivariate logistic regression model with a p-value less than 0.25 were entered into the multivariable logistic regression model to control for potential confounding, and variables in the multiple logistic regression model with a p-value less than or equal to 0.05 were considered statistically significant.

## Result

### Socio-Demographic Characteristics

A total of 425 participants in this study were included. The average age of participants was 29.2 years (SD=9.8). Approximately half were male 216 (50.8%) and 195 (45.8%) had college and above followed by secondary school 180 (42.4%). Most were single/divorced/widowed 309 (72.5%) (Table 2).

### Awareness Towards COVID-19 Vaccine

The mean score of awareness was 4.3 (SD=1.1) out of 7, with the overall awareness of 40.8%. The mean score of awareness was significantly high among participants who reported having college and above level of education, have mass media, and urban residency. Less than half of respondents 46.3% heard about COVID-19 vaccination, 83.3% of participants know that currently there is no effective cure for COVID-19, and 80% know that as there is an effective vaccine for COVID-19 (Table 1).

### Attitude Towards COVID-19 Vaccine

The distribution of each of the attitude items towards the COVID-19 vaccine is presented in Figure 1. The mean score of attitudes was 4.09 (SD=2.16) out of 9, with an overall “positive attitude” score of 24.2%. From

**Table 2** Socio-Demographic Characteristics of Respondents in Ethiopia, 2021 (n=425)

Variables	Frequency	Percent (%)
<b>Age</b>		
18–29	223	52.5%
30–49	185	43.5%
>49	17	4.0%
<b>Sex</b>		
Male	216	50.8%
Female	209	49.2%
<b>Religion</b>		
Orthodox	148	34.7%
Muslim	70	16.4%
Protestant	202	47.4%
Catholic	5	1.2%
<b>Occupation</b>		
Merchant	44	10.3%
Government employee	155	36.4%
Daily laborer	79	18.5%
Students	132	31.0%
<b>Educational status</b>		
Primary education	50	11.7%
Secondary education	180	42.3%
Collage and above	195	45.8%
<b>Mass media</b>		
Yes	277	65%
No	148	35%
<b>Residence</b>		
Urban	358	84%
Rural	67	16%

participants, 40.7% of participants agreed that the newly discovered COVID-19 vaccine is safe, only 30% of respondents agreed on the COVID-19 vaccination is essential, and 56.9% of respondents agreed that the vaccine will be fairly distributed (Figure 1).

## Factors Associated with Participants' Awareness Towards COVID-19 Vaccine

After adjusting for the potential confounding, multivariable logistic regression analysis with backward conditional method indicated that educational level, place of residence, and communication media (mass media) were significantly associated with awareness towards COVID-19 vaccine. Educational level was one that was significantly associated with the level of awareness towards COVID-19 vaccination. Participants who have college and above the

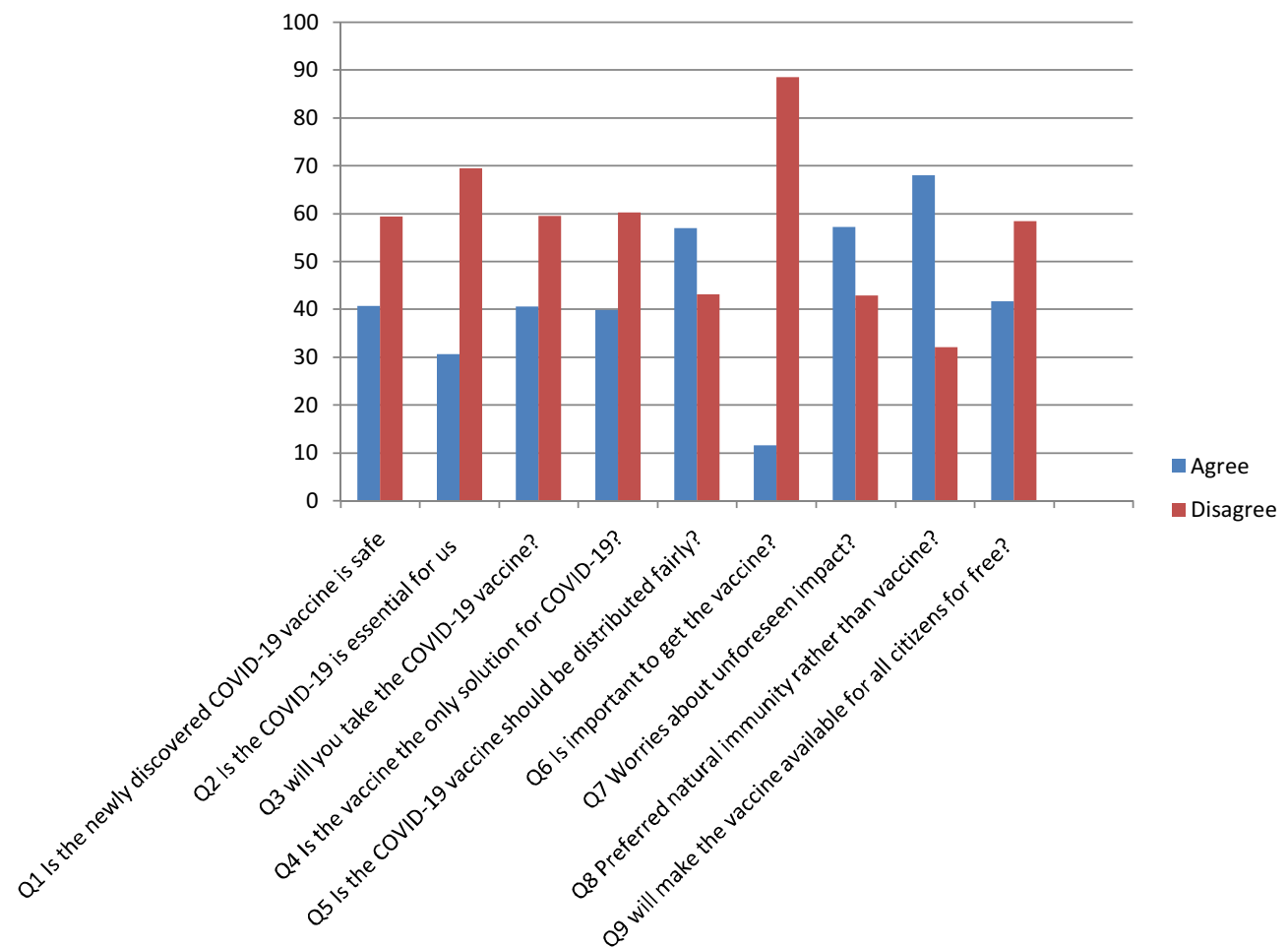
educational level were 2.21 time (AOR=2.21, 95% CI=1.32, 4.62) more likely to have awareness towards COVID-19 vaccination as compared with participants who have primary educational level. Odds of awareness towards COVID-19 vaccine were higher among participants who had access to mass media. Participants who have mass media have 4.75 time (AOR=4.75, 95% CI =2.74, 8.24) more likely to have knowledge about COVID-19 vaccine than when compared with participants have no access to mass media. Residency was another factor that affects awareness about COVID-19 vaccine. Among participants who live in the urban area, there were more than two-folds (AOR=2.83, 95% C.I = 1.57, 5.09) to have more awareness than participants who live in rural area (Table 3).

## Discussion

Vaccination is credited with eradicating smallpox and controlling infectious diseases in many parts of the world (for example, rubella, diphtheria, polio). As a result, scientists have been working feverishly to develop and test new vaccines to defend against SARS-CoV-2, with unprecedented scientific progress on COVID-19.<sup>18</sup>

The COVID-19 vaccine has been framed as the perfect solution for halting the current pandemic. A large number of vaccine candidates are being developed, and several clinical trials with promising results have recently been published, leading to a number of countries authorizing specific vaccines for use in vaccination programs in Ethiopia, the government has already started the COVID-19 vaccination for risky groups.<sup>10</sup> Despite the fact that Ethiopia has several vaccination programs, the complete newness of the COVID-19 vaccination roll-out raises concerns regarding vaccine knowledge, attitude, delivery, and acceptance. It also raises concerns about the general public's awareness of the COVID-19 vaccine and vaccination. The findings of a novel study conducted in Ethiopia to determine awareness toward the COVID-19 vaccine and related factors are presented in this paper. The results of this study will be critical in the development of a COVID-19 vaccine knowledge and health education program.

COVID-19 vaccination awareness was poor (40.8%) in the current report, compared to 78% in a study conducted in Bangladesh.<sup>16</sup> COVID-19 vaccine awareness was found to be affected by educational level, communication media (mass media), and place of residence in this study. Awareness regarding COVID-19 vaccine was not significant in terms of participant's sex and age. The result from



**Figure 1** Attitude towards COVID-19 vaccine in Ethiopia, 2021 (n=425).

of current study was similar to a study done in Bangladesh.<sup>16</sup>

One of the important associated factors with awareness of the COVID-19 vaccine is educational level. Participants with educational level college and above have a better understanding of the COVID-19 vaccine than those with a primary education. The current study's findings in line with those of a study conducted in Syria and Bangladesh.<sup>16,19</sup> The possible reason might be that those with a high level of education (a diploma or higher) have more access to information, and comprehension abilities will help them to know and react towards COVID-19 vaccine.

Another aspect that was associated with COVID-19 vaccine awareness was the presence of mass media. Participants who have access to the media are 1.6 times more likely to be aware of the COVID-19 vaccine than those who do not. The current study's finding is similar with those of a study conducted in Sheka, Ethiopia.<sup>20</sup>

The COVID-19 vaccine was launched by the Ethiopian Ministry of Health at a high-level national event held at Eka Kotebe COVID-19 Hospital on March 13, 2021. The event was broadcast live on various television outlets, and the COVID-19 vaccination was also advertised in the media. Vaccination information is available to those who have access to the media.<sup>10</sup> The location of one's residence is also a significant factor in COVID-19 vaccination knowledge. Respondents who live in an urban environment are more than twice as likely to be aware about COVID-19 vaccination as those who do not live in an urban setting. Research conducted in Bangladesh supports the findings of this study.<sup>16</sup>

## Conclusion

The COVID-19 pandemic continues to wreak havoc on lives and livelihoods around the world, but the COVID-19 vaccine offers a ray of hope for the future. In Ethiopia, there is a poor knowledge toward COVID-19 vaccines,

**Table 3** Factors Associated with Awareness Towards COVID-19 Vaccine in Ethiopia, 2021 (n=425)

Variables	Frequency	Percent (%)	Crude OR With 95% C.I	Adjusted OR With 95% C.I
<b>Sex</b>				
Male	216	50.8%	2.26(1.5, 3.38)	1.05(0.63, 1.76)
Female	209	49.2%		
<b>Educational status</b>				
Primary education	50	11.7%		
Secondary education	180	42.3%	1.63(0.84, 3.14)	1.36(0.67, 2.75)
Collage and above	195	45.8%	2.65(1.4, 4.99)	2.21(1.32, 4.62)*
<b>Mass media</b>				
Yes	277	65%	4.09(2.69, 6.22)	4.7(2.74, 8.24)*
No	148	35%		
<b>Residence</b>				
Urban	358	84%	2.15(1.27, 3.63)	2.8(1.57, 5.09)*
Rural	67	16%		

**Note:** \*Significant association at P-value <0.05.

according to the current report. The findings indicate that authorities should implement an urgent health education program and disseminate more reliable information. Using the media, policymakers and various stakeholders should take measures to ensure adequate knowledge towards COVID-19 vaccinations through the community.

## Ethical Consideration

Ethical clearance was obtained from Wolaita Sodo University College of Health Science and Medicine Ethical Review Board with reference number CHSM/ERC/38. Online informed consent was obtained from participants, and this study was conducted in accordance with the declaration of Helsinki. Anonymity and confidentiality were ensured.

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## Disclosure

The author declares that there is no conflict of interest.

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