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Determinants of COVID-19 vaccine uptake and barriers to being vaccinated among first-round eligibles for COVID-19 vaccination in Eastern Ethiopia: A community based cross-sectional study

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Abstract

Objective: Coronavirus disease is a deadly virus that continues to afflict many countries worldwide. Ethiopia has planned to give vaccines to 20% of the population by March 2022. This study aimed to assess determinants of vaccine uptake and barriers to being vaccinated among first-round eligibles for coronavirus disease vaccination in Harar, eastern Ethiopia.

Methods: A community-based cross-sectional study design was conducted among 820 randomly selected coronavirus disease first-round eligible groups in Harar from August 20 to September 15, 2021. Descriptive summary statistics were done. Logistic regression analyses were computed to identify associations between dependent and independent variables. Variables with a p value of <0.05 were declared statistically significant.

Result: Out of 820, only 39.4% of participants took the coronavirus disease vaccine. The main barriers to being vaccinated were, belief vaccine has no use (24%), and belief vaccine causes blood clots (17.9%). Being a merchant (adjusted odds ratio: 7.9, 95% confidence interval: 2.6, 24), people who had no schooling (adjusted odds ratio: 2.5, 95% confidence interval: 1.3, 4.9), having attitude below the mean score (adjusted odds ratio: 2.1, 95% confidence interval: 1.4, 2.8), having coronavirus disease prevention practice above the mean score (adjusted odds ratio: 2.1, 95% confidence interval: 1.4, 2.8), and family size <5 members (adjusted odds ratio: 0.64, 95% confidence interval: 0.4, 0.9) were found to be significantly associated with coronavirus disease vaccination.

Conclusion: Overall, coronavirus disease-19's first-round vaccination status was low. The number of people vaccinated was higher among 50–60 age groups than those who are >60 years. Being female, being a person with no schooling, being a merchant, being a farmer, and having low coronavirus disease prevention practice was found to be significantly associated with coronavirus disease vaccination. We recommend that the Federal Ministry of Health, Harari Regional Health Bureau, and other concerned stakeholders should work more diligently to provide continued campaigning on coronavirus disease vaccination and better vaccine awareness creation, as this is the only way out of this epidemic.

Keywords

coronavirus disease, vaccine, vaccination, reasons, determinants

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Introduction

Coronavirus disease-19 (COVID-19) is one of the types of viruses that make humans develop illnesses.[1,2] According to World Health Organization (WHO), in 2021 globally, there have been more than 218 million confirmed cases of COVID-19, including more than 4 million deaths. In Africa, there have been more than 5 million confirmed cases, and more than 100,000 deaths. In Ethiopia, there have been more than 300,000 confirmed cases with 4711 deaths.[3,4]

Among infected patients, COVID-19 causes persistent symptoms including prolonged anxiety, chest pain, dizziness, palpitation, and weight loss. Though COVID-19 infection usually causes a mild form of infection in the affected individuals, older adults and people with comorbidities like respiratory, cardiovascular, and diabetes have more severe illness and death. In addition, this pandemic causes major traits to community health services and had considerable influence on many parts of life.[5–9]

Nations across the world have launched various COVID-19 prevention measures, including restricted movement, quarantine, and nationwide lockdown. Individual and community actions of improved hand hygiene, physical distancing, and the use of face masks were also implemented. Despite the global implementation of such measures, the burden of the pandemic has not been reduced significantly. Thus, a large-scale COVID-19 vaccination campaign across the globe seems to be the only way out of this epidemic.[10–13]

Vaccines are an effective and ideal solution that can reduce the high burden of disease worldwide, including disease prevention, reduction of the severity of disease and death,[14,15] as well as reducing the impact of a pandemic on the health system and economy of nations.[16,17] As of September 2021, 40.3% of the world population has received at least one dose of the COVID-19 vaccine. About 5.46 billion doses have been administered globally, and 33.54 million are now administered each day. Among these, only 1.8% of people in low-income countries have received at least one dose. The total number of COVID-19 vaccination doses administered in Africa as of 30 September 2021 was more than 1.4 million. The Ethiopian Ministry of Health has planned to give vaccines to 20% of the population by March 2022.[4,18–24]

Despite these efforts to decrease the burden of COVID-19 through vaccination and other WHO-recommended COVID-19 preventive measures, community vaccine reluctance is a growing challenge worldwide and is hindering efforts to control its spread. Globally, there has been a rise in COVID-19 vaccine hesitancy. There are many determinants of vaccine uptake and barriers such as vaccine safety issues, fear of getting COVID-19 infection, fear of genetic effects, and doubt in vaccine.[25,26] In addition, other factors that contribute to vaccine uptake include concerns about side effects and effectiveness, as well as retirement and job loss due to the pandemic.[27–29] So far, there have been no prior studies conducted in Ethiopia that address determinants of vaccination status and barriers to being vaccinated. In Ethiopia, when the first-round COVID-19 vaccine was launched by the Federal Ministry of Health (FMoH), the eligible groups include people aged 50–60 years with comorbidity and above 60 years of age. Therefore, this study aimed to assess determinants of vaccination status and barriers to being vaccinated among first-round eligibles for COVID-19 vaccination in Harar, eastern Ethiopia.

Methods and materials

Study area and period

The Harari region is one of the 10 regions in Ethiopia, which is located 526 km away from the capital city, Addis Ababa, with an estimated area of 334 km^2 and an estimated total population of 246,000. Approximately 60% of the population live in urban areas. In the Harari region, there are 42,312 people aged ⩾50 years; among these 25,092 live in urban and 17,220 live in rural areas. There are nine districts in the Harari region. Within the districts, there are six urban and three rural districts. This study was conducted in Harar, Eastern Ethiopia, from 20 August to 15 September 2021.

Study design

A community-based cross-sectional study design was used to assess determinants of vaccination status and barriers to being vaccinated among first-round eligibles for COVID-19 vaccination in Harar, eastern Ethiopia.

Sample size determination and sampling technique

We calculated samples using a single proportion formula with a 95% confidence interval and a 5% margin of error,[30] a 10% non-response rate, and an assumption of 50% proportion, finally multiplied by 2 (design effects), by adding 10% (77), the final sample size was 845.

The study participants were classified into two strata based on their residence areas (urban and rural). The total sample size was proportionally allocated to the sample population for urban and rural populations aged ⩾50 years, which is 501 for urban and 344 for rural. Then, the study participants were randomly selected from each stratum.

Eligibility

All the first-round COVID-19 vaccine-eligible groups (age 50 and above) in Harar were our source population. Study participants who volunteered to participate in the study during the data collection period were included in the study. Those who did not have the willingness to participate in the study were excluded from the study.

Data collection tool and procedure

Data were collected by the face-to-face interview method using the pretested structured questionnaire. The questionnaire was adapted after reviewing relevant literature,[31–33] and WHO COVID-19-recommended prevention measures guideline.[34] The questionnaire consisted of two parts: the first part was sociodemographic-related variables (age, sex, marital status, religion, occupational status, level of education, average monthly income, and family size) and the second part included COVID-19 prevention-related variables (knowledge, attitude, practice, and acceptance of the COVID-19 vaccine). For all knowledge, attitude, and practice questions participants who answered the "correct answer" or "Yes" were given a "1 score," whereas participants who gave the "wrong answer" or "No" were given a "0 score." But, for two attitude questions, "taking traditional food/mixture could prevent viruses" and "chewing chat can prevent the virus," if respondents say "NO" it was regarded as a correct answer, then during analysis it was recoded as "Yes" then it was "scored as 1." Acceptance of the COVID-19 vaccine was our outcome variable. The data were collected by six third-year public health students.

Data quality control

To assure the quality of the data, a 3-day training was given for data collectors on how to interview and collect data. A pretest was done on 5% of the questionnaire on Aboker Woreda. Close supervision of the data collectors was carried out by the authors. The internal consistency of the questionnaire was 0.784 Cronbach's alpha. Collected data were checked both in the field and at the end of each day after data collection, before data entry, for completeness, and missing values. Double data entry was performed by two authors.

Statistical analysis

After data were collected, it was checked for completeness, clarity, and consistency. The data were coded and entered into Epidata v.3.0 and analyzed using SPSS v.26. Summary statistics were computed to summarize the result in the form of percentages, mean, and standard deviation (SD). Logistic regression (bivariate and multivariate) analysis was computed to assess the association between the dependent and independent variables and to adjust the effect of confounding variables, respectively. Finally, those variables in the multivariate analysis with a p value of <0.05 were declared as having a statistically significant association.

Ethics considerations

The protocol of this study for subject recruitment process and participation in the study adhered to the Declaration of Helsinki's guidelines and an ethical approval letter was obtained from Harar Health Science College Institutional Health Research Ethics Committee with reference no. IHREC 2/2102/21/2/14.

Result

Sociodemographic characteristics of study participant

A total of 820 participants participated in the study, which is a 97% response rate. Of these participants, the majority, 722 (88.1%), were between 50 and 60 years of age. The mean age of study participants was 55.9 with a ± 3.7 SD. Regarding their educational status, 312 (38.1%) had attended above-secondary school. From the total participants, 463 (56.5%) lived in <5 family-sized houses (Table 1).

Knowledge toward recommended COVID-19 prevention measures among study participants

Out of 820, the majority, 714 (87.1%), knew that washing their hands for 20 s could prevent the virus. Seven hundred twelve of the study participants knew that sneezing/coughing into their arm/elbow can prevent virus transmission. Out of the total participants, 776 (94.6%) of them knew that wearing a mask can prevent virus transmission (Table 2).

Attitude toward COVID-19 prevention among Harar population

Among 820 participants, 526 (64.1%) of them thought that taking traditional food/mixture could prevent viruses. Of these, 330 (40.2%) and 196 (21.9%) were living in urban and rural areas, respectively. Out of a total of 820, 237 (28.9%) believe that chewing chat can prevent the virus (Table 3).

Practice toward COVID-19 prevention measure among Harar population

From a total of 820, about 459 (56%) of the participants avoided shaking hands while greeting. The majority, 674 (82.2%) of them, used face masks. Among study participants only, 382 (46.6%) of them stayed at home quite often during the pandemic period. Regarding vaccination status, only 323 (39.4%) of them took the COVID-19 vaccine (Table 4).

Reason for not being vaccinated among first-round COVID-19 vaccine eligibles

Out of 497 (60.6%) participants who did not receive the vaccine, 197 (24%) believed it had no use, 147 (17.9%) believed it could cause blood clots, 98 (12%) stated that they "did not get a chance to be vaccinated," and 55 (6.7%) believed it was forbidden by their religion.

Table 1. Sociodemographic characteristics of study participants by residence in Harar, Ethiopia, 2021.

Sociodemographic variables	Urban (n = 497)	Rural (n = 323)	Total (N = 820)	Percentage
Age				
50–60 years	433 (52.8%)	289 (35.2%)	722	88.1
⩾60 years	64 (7.8%)	34 (4.1%)	98	11.9
Sex				
Male	243 (29.6%)	173 (21.1%)	416	50.7
Female	254 (31%)	150 (18.3%)	404	49.3
Marital status				
Single	187 (22.8%)	90 (11%)	277	33.8
Married	275 (33.5%)	208 (25.4%)	483	58.9
Divorced	18 (2.2%)	12 (1.5%)	30	3.6
Widow	13 (1.6%)	6 (0.7%)	19	2.3
Separated	4 (0.5%)	7 (0.8%)	11	1.3
Religion				
Orthodox	146 (17.8%)	17 (2.1%)	163	19.9
Muslim	292 (35.6%)	301 (36.7%)	593	72.3
Catholic	12 (1.5%)	1 (0.12%)	13	1.6
Protestant	41 (5%)	1 (0.12%)	42	5.1
Wakefata	6 (0.7%)	3 (0.4%)	9	1.1
Occupational status				
Housewife	92 (11.2%)	60 (7.3%)	152	18.5
Marchant	155 (18.9%)	50 (6.1%)	205	25
Civil servant	154 (18.8%)	42 (5.1%)	196	23.9
Labor work	63 (7.7%)	56 (6.8%)	119	14.5
Farmer	13 (1.6%)	115 (14%)	128	15.6
Driver	20 (2.4%)	0 (0.0%)	20	2.4
Level of education				
Unable to read and write	21 (2.6%)	90 (11%)	111	13.5
Primary education	121 (14.7%)	55 (6.7%)	176	21.5
Secondary education	134 (16.3%)	87 (10.6%)	221	26.9
Above-secondary education	221 (26.9%)	91 (11.1%)	312	38.1
Average monthly income				
<5000 ETB	292 (35.6%)	210 (25.6%)	502	61.2
5000–9999 ETB	163 (19.9%)	86 (10.5%)	249	30.4
10,000–14,999 ETB	32 (3.9%)	15 (1.8%)	47	5.7
⩾15,000 ETB	10 (1.2%)	12 (1.5%)	22	2.7
Family size				
<5	294 (35.8%)	169 (20.6%)	463	56.5
5–9	185 (22.6%)	133 (16.2%)	318	38.8
⩾10	18 (2.2%)	21 (2.6%)	39	4.7

n: frequency number in each stratum; N: total number; ETB: Ethiopian Birr.

Table 2. Knowledge toward recommended COVID-19 prevention measure among general population of Harar, Ethiopia, 2021.

Knowledge toward COVID-19 prevention	Urban n = 497	Rural n = 323	Total N = 820	Percentage
Do you know washing hands for 20 s can prevent the virus?				
Yes	432 (52.7%)	282 (34.4%)	714	87.1
No	65 (7.9%)	41 (5%)	106	12.9
Do you know sneezing or coughing into arm/elbow can prevent spread of virus?				
Yes	446 (54.4%)	266 (32.4%)	712	86.8
No	51 (6.2%)	57 (6.9%)	108	13.2

(Continued)

Table 2. (Continued)

Knowledge toward COVID-19 prevention	Urban n = 497	Rural n = 323	Total N = 820	Percentage
Do you know virus can be transmitted by shaking hands?				
Yes	422 (51.5%)	285 (34.7%)	707	86.3
No	75 (9.1%)	38 (4.6%)	113	13.7
Do you know maintaining safe distance at least one meter can protect from the virus?				
Yes	404 (49.3%)	263 (32.1%)	667	81.3
No	93 (11.3%)	60 (7.3%)	153	18.7
Do you know touching face can transfer the virus?				
Yes	402 (49%)	262 (32%)	664	81
No	95 (11.6%)	61 (7.4%)	156	19
Do you know staying at home can decrease the chance of getting infected?				
Yes	385 (47%)	243 (29.6%)	628	76.6
No	112 (13.7%)	80 (9.7%)	192	23.4
Do you know wearing the mask can prevent the virus?				
Yes	468 (57.1%)	308 (37.6%)	776	94.6
No	29 (3.5%)	15 (18.3%)	44	5.4

n: frequency number in each stratum; N: total number.

Table 3. Attitude toward COVID-19 prevention among general population of Harar, Ethiopia, 2021.

Attitude toward COVID-19 prevention	Urban n = 497	Rural n = 323	Total N = 820	Percentage
Do you think social distancing reduce virus transmission?				
Yes	393 (47.9%)	255 (31%)	648	79.1
No	104 (12.7%)	68 (8.3%)	172	20.9
Do you think using sanitizer can reduce virus transmission?				
Yes	427 (52.1%)	268 (32.7%)	695	84.8
No	70 (8.5%)	55 (6.7%)	125	15.2
Do you believe staying at home keep you safe?				
Yes	367 (44.8%)	221 (26.9%)	588	71.7
No	130 (15.8%)	102 (12.4%)	232	28.3
Do you think traditional food/mixture can prevents virus?				
Yes	330 (40.2%)	196 (21.9%)	526	64.1
No	167 (20.4%)	127 (15.5%)	294	35.9
Do you believe chewing chat prevent the virus?				
Yes	130 (15.8%)	107 (13%)	237	28.9
No	367 (44.7%)	216 (26.3%)	583	70.1
Do you believe being vaccinated can prevent the virus?				
Yes	386 (47.1%)	241 (29.4%)	627	76.5
No	111 (13.5%)	82 (10%)	193	23.5

n: frequency number in each stratum; N: total number.

Factors associated with COVID-19 vaccination uptake among first-round eligibles

In bivariate and multivariate analysis, sociodemographic, level of knowledge, attitude, and practice were computed to identify the factors associated with vaccination status.

Females were 1.6 (adjusted odds ratio (AOR): 1.6, 95% confidence interval (CI): 1.1, 2.3) times more likely to be vaccinated when compared with males. Merchants were 7 (AOR: 7.9, 95% CI: 2.6, 24) times more likely to be vaccinated than drivers. People who had no schooling were 2.5 (AOR: 2.5, 95% CI: 1.3, 4.9) times more likely to be vaccinated than people who had attended above-secondary school.

People who had an attitude below the mean score toward recommended COVID-19 prevention were 2 (AOR: 2.1, 95% CI: 1.4, 2.8) times more likely to be vaccinated than people who had an attitude above the mean score. People who had practiced above the mean score toward recommended COVID-19 prevention were 2 (AOR: 2.1, 95% CI: 1.4, 2.8) times more likely to be vaccinated than people who had practiced below the mean score.

Table 4. Practice toward recommended COVID-19 prevention measure among population of Harar, Ethiopia, 2021.

Practice toward COVID-19 prevention	Urban n = 497	Rural n = 323	Total N = 820	Percentage
Do you wash your hands for 20 s?				
Yes	342 (41.7%)	223 (27.2%)	565	68.9
No	155 (18.9%)	100 (12.2%)	255	31.1
Do you sneeze/cough into arm/elbow?				
Yes	365 (44.5%)	218 (26.6%)	583	71.1
No	132 (16.1%)	105 (12.8%)	237	28.9
Do you avoid shaking hands?				
Yes	287 (35%)	172 (21%)	459	56
No	210 (25.6%)	151 (18.4%)	361	44
Do you maintain a social distance at least one meter?				
Yes	307 (37.4%)	189 (23%)	496	60.5
No	190 (23.2%)	134 (16.3%)	324	39.5
Do you avoid touching your face?				
Yes	252 (30.7%)	204 (24.9%)	456	55.6
No	245 (29.9%)	119 (14.5%)	364	44.4
Do you stay at home quite often?				
Yes	237 (28.9%)	145 (17.7%)	382	46.6
No	260 (31.7%)	178 (21.7%)	438	53.4
Do you use face mask?				
Yes	418 (51%)	256 (31.2%)	674	82.2
No	79 (9.6%)	67 (8.2%)	146	17.8
Do you take COVID-19 vaccine?				
Yes	230 (28%)	93 (11.3%)	323	39.4
No	267 (32.6%)	230 (28%)	497	60.6

n: frequency number in each stratum; N: total number.

People with <5 family size were 36% (AOR: 0.64, 95% CI: 0.4, 0.9) less likely to be vaccinated than people with ⩾10 family size (Table 5).

Discussion

This study is the first survey in Harari Regional State, Ethiopia, that aimed to assess the determinants of vaccination status as well as barriers to being vaccinated among first-round eligibles for COVID-19 vaccination in Harar, Ethiopia.

Overall, in this study, from the total participants, only 39.4% had taken the first round of the COVID-19 vaccine. This is much lower than the findings reported from the United States and France, of which 80%,[35] and 69%[36] had taken the first round of the COVID-19 vaccine. The possible explanation for this observed difference could be due to differences in awareness among the populations, more access to information in developed countries, and the availability of adequate resources (vaccines, facilities, and health personnel).

In our study, the majority, 88.1%, were between the ages of 50 and 60 years old, and 59.9% and 40.1% lived in urban and rural areas, respectively. Among this age group, 38.6% have taken the first round of the COVID-19 vaccine. On the other hand, people aged >60 years comprise 11.9% and 65.3% were living in urban areas, and 34.7% live in rural areas. Of these age groups, 44.9% were vaccinated. According to this result, people above 60 years of age were better vaccinated than people in the age group of 50–60 years. This observed difference could be due to the elderly's greater concern about the severity of the pandemic, as well as the higher mortality observed among these age groups due to the COVID-19 pandemic.

Our finding revealed that, out of the total participants, males (44%) had more vaccine coverage than females (34.6%). This finding is inconsistent with the findings reported from the United States and France, where more females were vaccinated than males.[35,36] The possible reason for this discrepancy might be due to a difference in gender equality, equity and women empowerment, health care system, educational status, and access to information between developed and developing countries.

In this study, 94.6% of participants knew that wearing a face mask can prevent virus transmission. However, only 82.2% of them wear face masks. Even among those who knew that wearing a face mask could prevent the virus, only 39.9% had taken the vaccine. Similarly, among those who wear face masks, only 44.9% have taken the vaccine. This might be due to the overconfidence they had in wearing face masks, which means they believe that using face masks was enough to prevent virus transmission.

Table 5. Factors associated with COVID-19 vaccination uptake among first-round vaccine eligibles in Harar, Eastern Ethiopia, 2021.

	Vaccinated		COR CI: 95%	p value	AOR CI: 95%	p value
	Yes	No				
Age						
50–60 years	279 (38.6%)	443 (61.4%)	1.3 (0.8, 1.9)	0.235	1.3 (0.8, 2.1)	0.26
⩾60 years	44 (44.9%)	54 (55.1%)	1			
Sex						
Male	183 (44%)	233 (56%)	1	0.006	1.6 (1.1, 2.3)	**0.012***
Female	140 (34.7%)	264 (65.3%)	1.5 (1.1, 1.9)			
Marital status						
Single	125 (45.1%)	152 (54.9%)	1	0.014	1.3 (0.9, 1.9)	0.148
Married	174 (36%)	309 (64%)	1.5 (1.1, 1.9)	0.851	0.42 (0.2, 1.1)	0.056
Divorced	13 (43.3%)	17 (56.7%)	1.1 (0.5, 2.3)	0.5	1.4 (0.4, 4.9)	0.6
Widowed	4 (21.1%)	15 (78.9%)	3 (0.9, 9.5)	0.24	0.3 (0.1, 1.3)	0.117
Separated	7 (63.6%)	4 (36.4%)	0.5 (0.1, 1.6)			
Occupational status						
Housewife	46 (30.1%)	106 (69.7%)	6.9 (2.4, 20)	0.0001	2.6 (0.7, 8.4)	0.124
Marchant	46 (22.4%)	159 (77.6%)	10.4 (3.6, 30)	0.0001	7.9 (2.6, 24)	**<0.001***
Civil servant	128 (65.3%)	68 (34.7%)	1.6 (0.5. 4.6)	0.386	1.2 (0.4, 3.8)	0.748
Labor work	44 (37%)	75 (63%)	5.1 (1.7, 15)	0.003	2.7 (0.8, 8.7)	0.089
Farmer	44 (34.4%)	84 (65.6%)	5.7 (1.9, 16)	0.001	4.5 (1.4, 14)	**0.009***
Driver	15 (75%)	5 (25%)	1			
Level of education						
Not schooling	23 (20.7%)	88 (79.3%)	4.7 (2.8, 7.9)	0.0001	2.5 (1.3, 4.9)	**0.008***
Primary education	50 (28.4%)	126 (71.6%)	3.1 (2.1, 4.7)	0.0001	1.7 (1.1, 2.8)	**0.049***
Secondary education	77 (34.8%)	144 (65.2%)	2.3 (1.6, 3.3)	0.0001	1.1 (0.7, 1.7)	0.650
Above-secondary education	173 (55.4%)	139 (44.6%)	1			
Average monthly income						
<5000 ETB	188 (37.5%)	314 (62.5%)	1.2 (0.5, 2.7)	0.743	0.89 (0.3, 2.4)	0.833
5000–9999 ETB	103 (41.4%)	146 (58.6%)	0.98 (0.4, 2.3)	0.96	0.95 (0.3, 2.6)	0.953
10,000–14,999 ETB	23 (49%)	24 (51%)	0.72 (0.3, 2)	0.534	0.49 (0.2, 1.6)	0.241
⩾15,000 ETB	9 (41%)	13 (59%)	1			
Family size						
<5	178 (38.4%)	285 (61.6%)	0.5 (0.2, 1.5)	0.202	0.64 (0.4, 0.9)	**0.018***
5–9	132 (41.5%)	186 (58.5%)	0.4 (0.14, 1.4)	0.161	0.49 (0.1, 1.7)	0.241
⩾10	13 (33.3%)	26 (66.7%)	1			
Knowledge toward COVID-19 prevention						
Above mean knowledge (>5.93)	263 (43%)	353 (57%)	1			
Below mean knowledge (<5.93)	60 (29.4%)	144 (70.6%)	1.8 (1.3, 2.5)	0.001	0.9 (0.6, 1.4)	0.631
Attitude toward COVID-19 prevention						
Above mean attitude (>4.1)	167 (51.7%)	156 (48.3%)	1			
Below mean attitude (<4.1)	156 (31.4%)	341 (68.6%)	2.3 (1.7, 3.1)	0.0001	2.1 (1.4, 2.8)	**<0.001***
Practice toward COVID-19 prevention						
Above mean practice (>4.8)	263 (55.1%)	214 (44.9%)	1			
Below mean practice (<4.8)	60 (17.5%)	283 (82.5%)	2.99 (2.2, 4)	0.0001	2.6 (1.8, 3.7)	**<0.001***

COR: crude odds ratio; CI: confidence interval; AOR: adjusted odds ratio; ETB: Ethiopian Birr.
Bold*, p value < 0.05 significant.

This study revealed that merchants were 7 times more likely to be vaccinated than drivers.

The possible explanation for this observed difference could be due to the fact that merchants are usually available in their residential area, while drivers frequently move out of town as a result of the nature of their occupation. Therefore, they could miss the chance to be vaccinated.

Even though most previous studies had shown that educated people tend to get vaccinated than uneducated, our study revealed, people who had no schooling were 2.5 times more likely to be vaccinated than people who had attended above-secondary school. This could be due to the fact that uneducated people are more likely to accept the recommended vaccine without contemplating the potential side

effects of the vaccine, while the educated could have more awareness about the side effects of the vaccine and thus may hesitate to take the vaccine.

People with <5 family size were 36% less likely to be vaccinated than people with ⩾10 family size. This could be due to the fact that people with more family members may feel more responsible for their large family, which may lead them to be vaccinated more often than people with low family size.

In our study, people who had scored attitude and practice of prevention measures below the mean score toward COVID-19 prevention were 2 times more likely to be vaccinated than people who had an attitude and practice above the mean score. This might be due to the fact that people who have a negative attitude and poor practice toward COVID-19-recommended preventive measures may perceive vulnerability to acquiring COVID-19 infection, thus this may compel them to be vaccinated.

Limitation of the study

The study used a cross-sectional study design. Therefore, there is a temporal issue. In addition, this study does not incorporate qualitative methods. If the study had used qualitative methods, it could have provided more detailed in-depth information to explain complex issues such as behavior and attitudinal factors which may not be adequately addressed by the quantitative method. Therefore, we suggest qualitative studies be conducted in the future.

Conclusion

Overall, COVID-19 first-round vaccination status among eligible groups in Harar was low. The number of people vaccinated was higher among 50–60 age groups than those who are above 60 years of age. The main reasons for not being vaccinated are the perception that vaccines have no use and fear of side effects. Being female, being a person with no schooling, being a merchant, being a farmer, and having low COVID-19 prevention practice were found to be significantly positively associated with COVID-19 vaccination status among first-round eligibles. We recommend that the FMoH should revise the existing program and strategies to enforce COVID-19 vaccine uptake by formulating rules and regulations upon different institutions. Harari Regional Health Bureau should conduct house-to-house vaccination campaign to reach every segment of the community, in addition to involving health extension, social workers, community, and religious leaders in mobilizing the community to improve COVID-19 vaccine uptake. Moreover, other concerned stakeholders should work more diligently to provide continued better vaccine awareness creation, as this is the only way out of this epidemic.

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Author contributions

All authors equally contributed to conceptualization, data curation, formal analysis, funding acquisition, investigation, methodology, project administration, resources, software, supervision, validation, visualization, roles/writing—original draft; writing—review & editing and approving the final version manuscript to be submitted to the journal.

Data availability

Any time, the corresponding author provides an additional resource on request.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethical approval

The protocol of this study for subject recruitment process and participation in the study adhered to the Declaration of Helsinki's guidelines and an ethical approval letter was obtained from Harar Health Science College Institutional Health Research Ethics Committee with reference no. IHREC 2/2102/21/2/14.

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Informed consent

Oral informed consent was obtained from participants before collecting data. All participants provided their consent prior to participating in the study. Participation was completely voluntary, and participants were free to withdraw from the study at any time without any consequence. Confidentiality of all information has been maintained. This form of obtaining consent was approved by the IEC.

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Supplemental material

Supplemental material for this article is available online.

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