



## COVID-19 vaccine acceptance and associated determinants in Addis Ketema Sub-city, Addis Ababa, Ethiopia: A community-based study

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### ABSTRACT

**Background:** Despite the global surge in the Corona virus disease (COVID-19) pandemic, people's efforts to combat the pandemic have been insufficient. The world has experienced a number of challenges in terms of COVID-19 vaccine acceptance. Therefore, understanding the community's willingness to receive the vaccine will aid in the creation and implementation of effective COVID-19 immunization. As a result, the aim of this study was to assess the magnitude of COVID-19 vaccine acceptance and associated factors among adults in Addis Ababa, Ethiopia.

**Methods:** A community-based cross-sectional study with 419 household heads was undertaken in Addis Ababa, Ethiopia. To identify factors associated with the outcome and independent variables, bi-variable and multi-variable logistic regression analyses were used. A 95% confidence interval and a p-value of less than 0.05 were deemed sufficient to declare a significant association.

**Results:** The level of COVID-19 vaccine acceptance was 46.3 % (95 % CI: 43.87–48.73). Moreover, age groups above 58 years (AOR = 0.38, 95% CI: 0.17, 0.84), chronic disease (AOR: 2.09, 95 % CI: 1.28–3.42), a positive attitude (AOR: 1.64, 95 % CI: 1.29–2.04), being a Muslim (AOR: 0.36, 95 % CI: 0.19–0.71) and social support (AOR: 1.7, 95 % CI: 1.04–2.79) were all significantly related to COVID-19 vaccine acceptance.

**Conclusion:** The findings of this study revealed a lower rate of COVID-19 vaccination acceptance. Age, chronic disease, attitude, and social support were significant predictors of COVID-19 vaccine acceptance. Therefore, emphasis should be given for community mobilization, especially for the elderly, those with limited social engagement, and those who have a negative attitude toward COVID-19 vaccination.

### Introduction

The novel corona-virus disease 2019 (COVID-19), continues to cause significant morbidity and death throughout the world and resulted a significant loss of human life [1]. Globally, 6,039,440 fatalities and over 455,565,230 confirmed cases were reported as of March 13, 2022 [2]. The World Health Organization (WHO) announced a global campaign of prevention, early detection, and medical treatment in response to the incident, which was declared a pandemic in early 2020 [3]. Subsequently, multiple COVID-19 vaccines were developed and tested in various clinical trials on a variety of populations [4,5].

Vaccines are life-saving inventions that have helped to eradicate and control a wide range of infectious diseases throughout the world [6]. Vaccination against COVID-19 can significantly lower hospital stays and

serious illnesses; a recent modeling study predicted that in the first year of the vaccine's introduction, COVID-19 vaccinations were responsible for the reduction of approximately 14 million deaths [7]. However, vaccine hesitancy described as a "delay in acceptance or refusal of vaccination despite the availability of vaccination services" posed a serious threat to global health [8]. Refusal to receive the COVID-19 vaccine is a major barrier to global efforts to control the pandemic and mitigate its consequences on the economy and public health [9,10]. According to the World Health Organization (WHO) report, vaccine resistance and hesitancy were among the top ten health risks during 2021 [11].

Ethiopia made the COVID-19 vaccine available since March 13, 2021, and several vaccines were introduced after a national deployment and vaccination plan was developed in accordance with the WHO

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prioritization road-map particularly with front-line health workers, clinical supportive staff, the elderly with underlying conditions, and other high-risk groups receiving priority for vaccination [12,13].

Globally, the overall acceptance of the COVID-19 vaccine was reported to be low, with 85.2 % of participants refusing the vaccination [14]. In Ethiopia, only 31.4 % of the general population was willing to accept the COVID-19 vaccine [15]. Moreover, age, gender, marital status, educational level, occupation, place of residence, religion, monthly income, history of COVID-19 infection, family history of COVID-19 infection, chronic illness, being tested, vaccine rumors, personal beliefs, perception with vaccine safety, and a lack of vaccine distribution have all been identified as determinant factors [16–18].

As a result of the rapid development, testing, approval, and public distribution of COVID-19 injections, the attitudes and views of population towards the vaccine are probably going to have changed during the pandemic [19,20]. As a result public COVID-19 vaccine hesitation is a major barrier to the delivery [21,22]. However, there is just a little proof of vaccine acceptance following the administration of the COVID-19 buster dose [23]. Moreover, recently various COVID-19 vaccination acceptance surveys have revealed a significant level of regional and global variations in the level of acceptance and associated determinants [24,25]. To establish the most effective vaccination strategy in Ethiopia, it is necessary to comprehend the general public's awareness, behavior, hesitancy, and factors influencing their desire to use the COVID-19 vaccine. Moreover, it is necessary to identify the current context-specific factors related with the Ethiopian populations in general and the population of Addis Ababa in particular. Therefore, the aim of this study was to determine the level of COVID-19 vaccine acceptance and associated determinants in Addis Ketema Sub-city, Addis Ababa, Ethiopia, in 2022.

## Methods

### Study area and period

The study was conducted in Addis Ababa, Ethiopia. Addis Ababa is divided into 11 sub-cities, with an estimated total population of more than 5.2 million people. Addis Ketema Sub-city is located in Addis Ababa's northwestern region, bordering the sub-cities of Gullele in the north, Arada in the east, Lideta in the south, and Wolfe-Keranio in the west. The study was conducted among adult household heads in Addis Ketema sub-city from May 1st to June 1st, 2022. This study is reported according to STROCSS 2021 guidelines [26].

### Study design

A community-based cross-sectional study was carried out. Cross-sectional study designs are commonly referred to as one-shot design that are most appropriate for studies that use a cross-section of the population to determine the prevalence of a phenomenon, situation, problem, attitude, or issue. It assist in creating a broad "picture" of things as they are at the time the study is conducted.

### Eligibility criteria

All household heads over the age of 18 who had resided in the study area for at least six months were included in the study. Besides, respondents who were psychologically or seriously ill at the time of the survey, as well as those who had closed their houses on three occasions, were omitted, and the next household head was questioned, and the typical pattern continued.

### Sample size determination and sampling procedure

Sample size was determined using a single population proportion formula by considering the study done in Sodo Town, Southern Ethiopia,

on COVID-19 vaccination acceptance of 45.5 % [27] as a proportion, with an assumption of a 95 % confidence interval and a 5 % margin of error.

$$n = \frac{(Z_{\alpha/2})^2 P(1-P)}{d^2}$$

Finally, considering a 10 % non-response rate, 419 people were needed for the study.

There were eleven districts in the Addis Ketema sub-city. Random samples were drawn from each district and distributed proportionally based on the number of households in each district using a simple random selection technique. Finally, the study participants for the study were picked via simple random selection, with the house number serving as the sample frame.

### Study variables and operational definitions

#### Dependent variable

Acceptance of COVID-19 vaccination was considered the outcome variable. Respondents we asked whether or not they would accept a COVID-19 vaccination if it become available to the general population (Yes or No).

#### Independent variable

- **Socio-demographic factors** (age, gender, marital status, level of education, monthly income, religion, and so on).
- **Health status and exposure-related factors** (history of COVID-19 infection, family history of COVID-19 infection, having chronic disease, source of information about COVID-19 vaccine, and so on), and
- **Knowledge- and attitude-related factors** (COVID-19 vaccine-related knowledge, COVID-19 vaccine-related attitude, and so on) were all taken as predictor variables.

**Respondents' knowledge of the COVID-19 vaccination** was calculated by adding all relevant knowledge-related "yes" (one) and "no" (zero) questions. Respondents who scored greater than or equal to the mean value were considered to have good knowledge, while those who scored less than the mean value of the sum of knowledge assessment questions were considered to have poor knowledge [28].

**Respondents' attitudes towards the COVID-19 vaccine:** COVID-19 vaccine related attitude was calculated by adding all relevant attitude questions to "agree" (1), and "disagree" (0) questions. Respondents were classified as having a positive attitude if their responses were greater than or equal to the mean value of all questions, and as having a negative attitude if their responses were less than the mean value of all attitude related questions [15].

**Intention to accept the COVID-19 vaccine:** COVID-19 vaccine acceptance was assessed using "yes" and "no" questions. "Did you have any intention to accept the COVID-19 vaccine if it becomes available in the future?" was the question posed to respondents. Responses that were "yes" were given a score of 1, and responses that were "no" were given a score of 0. Respondents who received a score of 1 were therefore assumed to have the intention to receive the COVID-19 vaccination, whereas respondents who received a score of 0 were presumed to have no intention to do so [28].

### Data collection and analysis

The data collection tool was developed after reviewing a number of studies [15,16,28]. Variables from earlier systematic review studies were incorporated for the theoretical analysis and identification of factors responsible for COVID-19 vaccine hesitation [29,30]. The survey questionnaire was divided into five sections. The first section includes socio-demographic variables (7 items), the second section includes health status and exposure-related factors (12 items), the third section includes knowledge (9 items), and the fourth section includes attitude (9

items). Part five was used to assess factors related to friends and family (13 questions) and, finally, acceptance of COVID-19 vaccine-related factors (1 item). The validity of the questionnaire content were evaluated by subject-matter experts, including researchers and medical educators. Cronbach's alpha was used to assess reliability; the result was 0.77, indicating that there was no violation of reliability. The tool were pretested among 21 respondents in nearby Yeka sub-city district five before the date of the actual data collection. We made adjustments in the questionnaire and these data were precluded from the final analysis.

Data was entered into EPI-DATA software and then exported to SPSS version 26 for further analysis. In order to ascertain the relationship between the dependent variable and the independent variables, a binary logistic regression analysis was carried out. Then significant variables were considered candidate variables for multi-variable logistic regression analysis if their p-value was less than 0.25. The presence of an association between explanatory variables and respondents' acceptances of the COVID-19 vaccine was assessed using an adjusted odds ratio and a 95 % confidence interval. A significance level of less than 0.05 was used to declare the presence and strength of association between the dependent and independent variables.

## Results

### Socio-demographic characteristics of the study participants

This study had 408 study participants and a response rate of 97.4 %. Men made up 229 (56.1 %) of the study participants. The respondents' mean ( $\pm$ SD) age was  $38.5 \pm 14.7$  years with a range of 18 to 71 years, and the majority of participants (219, or 53.7 %), were married. The majority of participants (148, 36.3 %) were self-employed, with 175 (42.9 %) holding a diploma or higher. Furthermore, 352 (86.3 %) of the participants live in cities, and the majority of them, 207 (50.7 %), are orthodox Christians (Table 1).

### Health status of participants and exposure-related factors

In response to inquiries regarding their exposure and health status, 296 (72.5 %) and 299 (73.3 %) of the participants stated that neither they nor anyone in their family had ever had COVID-19 infection.

**Table 1**  
Socio-demographic characteristics of respondents.

Variables	Category	Frequency	Percent
Age	18–27	91	22.3
	28–37	156	38.3
	38–47	52	12.7
	48–57	41	10.0
	>58	68	16.7
Sex	Male	229	56.1
	Female	179	43.9
Educational status	Illiterate	33	8.1
	primary education	77	18.9
	secondary education	123	30.1
	Diploma and above	175	42.9
Marital status	Never married	138	33.8
	Married	219	53.7
	Divorced	23	5.6
	Widowed	28	6.9
Occupational status	government employee	108	26.5
	private employee	90	22.1
	self-employed	148	36.3
	Unemployed	52	12.6
	Others	10	2.5
	Residence	Urban	352
	Rural	56	13.7
Religion	Orthodox	207	50.7
	Muslim	91	22.3
	Protestants	103	25.3
	Others	7	1.7

However, 108 (26.5 %) of them had tested, and the results showed that 57 (14.4 %) of them were positive and the remaining 51 (12.5 %) were free of the illness. Out of them, 190 (46.6 %) were concerned about catching COVID-19 in the future. Out of all the participants, only 91 (22.3 %) reported that they had a chronic illnesses. The prevalence of diabetes, hypertension, COPD, asthma, renal, and cardiac disease was 70 (17.2 %), 68 (16.7 %), 38 (9.3 %), 31 (7.6 %) and 37 (9.2 %), respectively. Besides this, the majority 247 (60.5 %) believed that they had a medium risk of developing this illness. Additionally, 226 people (54.4 %) think there is a treatment for COVID-19. (Table 2).

### Knowledge and attitude towards the COVID-19 disease and vaccine

When asked about their awareness of COVID-19 and the vaccine, participants replied that the illness's symptoms include fever, cough, otitis media, chills, headache, loss of smell, and no symptoms at all. The majority of study participants 279 (68.4 %)—reacted to the mode of COVID-19 transmission through inhalation of respiratory droplets from infected patients and 260 (63.7 %) contact with contaminated objects, while 238 (58.3 %) did so through eating or touching wild animals, 181 (44.4 %) did so through consuming unclean food, and 140 (34.3 %) did so through consuming unclean water. The following were mentioned by the respondents as COVID-19 infection prevention strategies: wearing a face mask; taking vitamin C; refraining from touching the face, mouth, or eyes; washing hands with normal soap; using detergent; taking zinc; avoiding meat; and utilizing herbs. In terms of knowledge of the COVID-19 vaccine, 312 (76.5 %) believe they are aware of its development and 312 (76.5 %) believe it is effective. However, 261 (64.0 %) think that using an excessive amount of the COVID-19 vaccine is risky because 219 (53.7 %) think it increases immune disease and 219 (53.7 %) think it increases allergic reactions (Table 3).

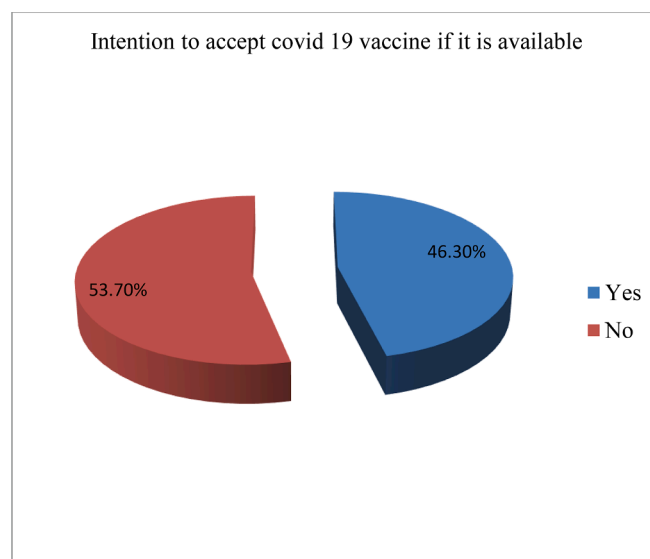
Regarding attitudes toward the COVID-19 vaccine, 301 respondents (73.8 %) agreed that it is safe and should be used to encourage family and friends to get immunized, while 110 respondents (27 %) disagreed. The majority of respondents (29.1 %) were unsure whether vaccination was the best way to combat COVID-19 spread.

**Table 2**  
Health status of the study participants.

Variables	Category	Frequency	Percent
History of COVID-19 infection	Yes	112	27.5
	No	296	72.5
Family history of COVID-19 infection	Yes	109	26.7
	No	299	73.3
Increased risk of getting COVID-19 in the future	Yes	190	46.6
	No	218	53.4
Tested for COVID-19	Yes	108	26.5
	No	300	73.5
If tested your result	Positive	57	14.0
	Negative	51	12.5
Do you have any history of chronic disease	Yes	91	22.3
	No	317	77.7
Do you have a history of diabetes mellitus	Yes	68	16.7
	No	340	83.3
Do you have a history of chronic obstructive pulmonary disease	Yes	42	10.3
	No	366	89.7
Do you have a history of hypertension	Yes	70	17.2
	No	338	82.8
Do you have a history of bronchial asthma	Yes	38	9.3
	No	370	90.7
Do you have a history of renal disease	Yes	31	7.6
	No	377	92.4
Do you have a history of cardiac disease	Yes	38	9.3
	No	371	90.8
Perception of the risk of these exposure	high-risk	64	15.7
	medium risk	247	60.5
	low risk	97	23.8
Do you believe that there is a cure for COVID-19	Yes	226	55.4
	No	182	44.6

**Table 3**  
Knowledge-related factors.

Category	Response	Frequency	Percent		
What are the symptoms of COVID-19	Fever	Yes	347	85.0	
		No	61	15.0	
	Chills	Yes	284	69.6	
		No	124	30.4	
	Cough	Yes	350	85.8	
		No	58	14.2	
	Otitis media	Yes	318	77.9	
		No	90	22.1	
	Headache	Yes	265	65.0	
		No	143	35.0	
Loss of smell and taste	Yes	217	53.2		
	No	191	46.8		
No symptom	Yes	93	22.8		
	No	315	77.2		
How is COVID-19 transmitted	Drinking unclean water	Yes	140	34.3	
		No	268	65.7	
	Eating unclean food	Yes	181	44.4	
		No	227	55.6	
	Contact of contaminated object	Yes	260	63.7	
		No	148	36.3	
	Inhalation of respiratory droplet to infected Patients	Yes	279	68.4	
		No	129	31.6	
	Prevention of COVID-19 infection	Eating or touching wild animals	Yes	238	58.3
			No	170	41.7
Wearing face mask		Yes	308	75.5	
		No	100	24.5	
Washing hand with regular soap		Yes	287	70.3	
		No	121	29.7	
Using detergent		Yes	241	59.1	
		No	167	40.9	
Social distancing		Yes	320	78.4	
		No	88	21.6	
Avoid touching face mouth nose eyes	Yes	295	72.3		
	No	113	27.7		
Consume vitamin C	Yes	308	75.5		
	No	100	24.5		
Consume Zink	Yes	212	52.0		
	No	196	48.0		
Avoid eating meat	Yes	192	47.1		
	No	216	52.9		
Consume herbs	Yes	170	41.7		
	No	238	58.3		
Does COVID-19 vaccination increase allergic reaction	Yes	219	53.7		
	No	189	46.3		
Does vaccination increase out immune disease	Yes	223	54.7		
	No	185	45.3		



**Fig. 1.** Intention of respondents to accept covid-19 vaccines.

had a statistically significant association with COVID-19 vaccine acceptance at a p-value less than 0.25. In multi-variable logistic regression analysis, variables with a p-value less than 0.05 were considered as determinants of COVID-19 vaccine acceptance. As a result age groups above 58 years (AOR = 0.38, 95% CI: 0.17, 0.84), having a chronic disease (AOR: 2.09, 95% CI: 1.28–3.42), positive attitude (AOR: 1.64, 95% CI: 1.29–2.04), being a Muslim (AOR: 0.36, 95% CI: 0.19–0.71) and social support (AOR: 1.7, 95% CI: 1.04–2.79) were all significantly related to COVID-19 vaccine acceptance (Table 4).

**Discussion**

To bring an end to the COVID-19 pandemic, ongoing attempts are being done. In various nations, including Ethiopia, different COVID-19 vaccinations have been made available. Effective COVID-19 vaccination promotion strategies would be developed and put into action with an understanding of the communities’ readiness for the immunization as well as the significant factors influencing their acceptance. As a result, the aim of this study was to determine the level of vaccine acceptance and associated factors in Addis Ketema Sub-city, Addis Ababa, Ethiopia.

According to the findings of this study, the rate of vaccination acceptance was 46.3%. Overall low level of COVID-19 vaccination acceptance rate has been documented, which could have significant implications for the inefficiency, ineffectiveness, and long-term sustainability of COVID-19 control measures. The results of the current study were consistent with earlier research from Kuwait (53.1%) [31], and Wolaita Sodo town, Ethiopia, 46.1% [32].

However, the current finding was lower than study finding of Bangladesh (61.2%) [33], China (82.6%) [34], and Ethiopia (62.6%) [16]. The possible reason for the discrepancy is that the study carried out in Ethiopia were conducted a year before this study, during a time when the pandemic was devastating and the vaccine was thought to be groundbreaking and the only treatment available. In the other hand convenience sampling procedures were employed in the Chinese study, which involved selecting participants based on their interest in the COVID-19 vaccination, while online surveys were utilized to gather data from Bangladesh, potentially leading to exaggerated replies. Differences in study periods may also be a major factor in all cases.

The current finding, however, was higher than a prior study finding from Addis Ababa, Ethiopia (19.1%) [35] and from Zambia 46.3%. It’s possible that the variation from Zambia is due to the sample process (hard copy interviewer-based questioners), the timing of data collection, and/or a geographical difference. Due to the data collection method

*The intention of study participants to accept the COVID-19 vaccine*

If the vaccine becomes available in the future, 46.3% (95% CI: 43.87–48.73) of study participants claimed that they would use it (Fig. 1). Health status percentages had an average score of 49.2%. From the 408 respondents, 203 (49.8%) had a chronic illness or had been exposed to COVID-19 virus disease, while 165 (40.4%) had sufficient knowledge of COVID-19 and the vaccine (with a percentage mean score of 37.24%). However, only 45.3% of them, with a percentage mean score of 24%, had a favorable attitude toward the vaccine. In addition, 189 (46.3%) of the participants said that friends or other social figures influenced them.

*Predictors of vaccine acceptance*

In the binary logistics regression model, variables such as age, educational level, occupational status, religion, health and exposure status of the study participants, knowledge, attitude, and social support

**Table 4**  
Factors affecting COVID-19 vaccine acceptance.

Variables	Category	Vaccine acceptance		COR (95 % CI)	AOR (95 % CI)
		Yes	No		
Age	18–27	42	49	1	1
	28–37	53	103	1.67 (0.98, 2.83)	1.62 (0.84, 3.11)
	38–47	23	29	1.08 (0.55, 2.14)	0.96 (0.39, 2.35)
	48–57	28	13	0.39 (0.18, 0.87)	0.43 (0.16, 1.14)
	>58	43	25	0.49 (0.26, 0.95)	<b>0.38 (0.17, 0.84)*</b>
Educational status	Illiterate	21	12	1	1
	Primary education	32	45	2.46 (1.06, 5.71)	1.32 (0.42, 4.10)
	Secondary education	55	68	2.16 (0.98, 4.78)	0.94 (0.34, 2.63)
	Diploma and above	81	94	2.03 (0.94, 4.38)	0.61 (0.23, 1.64)
Occupational status	Government employee	49	59	1	1
	Private employee	46	44	0.79 (0.45, 1.39)	0.84 (0.40, 1.77)
	Self employed	68	80	0.98 (0.59, 1.61)	0.81 (0.44, 1.46)
	Unemployed	26	36	1.87 (0.93, 3.76)	2.17 (0.98, 4.83)
Religion	Orthodox	93	114	1	1
	Muslim	53	38	0.59 (0.36, 0.96)	<b>0.36 (0.19, 0.71)*</b>
	Protestants	43	67	1.27 (0.79, 2.04)	1.23 (0.65, 2.30)
Health and exposure status	Free from chronic disease	111	94	1	1
	Had a chronic disease	78	125	1.89 (1.28, 2.81)	<b>2.09 (1.28, 3.42)*</b>
Knowledge	Poor knowledge	118	125	1	1
	Good knowledge	71	94	1.25 (0.84, 1.86)	1.42 (0.87, 2.31)
Attitude	Negative attitude	95	128	1	1
	Positive attitude	94	91	1.52 (1.01, 2.06)	<b>1.64 (1.29, 2.04)*</b>
Social supports	Yes	77	112	1	1
	No	112	107	1.52 (1.03, 2.26)	<b>1.70 (1.04, 2.79)*</b>

\* =p-value less than 0.05.

used to calculate the acceptance rate and the different study period where no information about the vaccination was available, in the context of the Addis Ababa study.

Respondents' ages showed a strong correlation with their willingness to accept COVID-19 vaccination. People over the age of 58 had a 38 % less acceptance of COVID-19 vaccine compared to those between the ages of 18 and 27 years. Theories of behavioral change lend support to it [36]. Individuals are classified into five categories in behavioral change models, and as they aged, they become skeptical of innovations or new things. Because the COVID-19 vaccination is a new thing, they might be hesitant to accept it.

The second socio-demographic factor linked to COVID-19 vaccine acceptance was religion. Being a Muslim had a 64 % lower odds of accepting COVID-19 vaccinations. This result was consistent with earlier literature [37,38]. The need to enlighten the public about the safety and effectiveness of the COVID-19 vaccine underscores the possibility that the lack of adequate information from religious and medical authorities may be the cause.

This study also found a significant and positive association between the health status of individuals and COVID-19 vaccine acceptance. The odds of having chronic disease and exposure to COVID-19 vaccine acceptance were nearly two times higher among those who have chronic diseases such as hypertension, diabetes, asthma, cardiac disease, and renal disease. It was consistent with different studies [16,39]. A higher chance of case fatality is associated with higher frequency of health-risk behaviors in COVID-19-infected persons. It might make patients more receptive to the COVID-19 vaccination.

The odds of having a positive attitude were nearly two times higher for the acceptance of COVID-19 vaccine. This finding was supported by different research findings [31,37], indicating that those who believe the vaccine is safe and important are willing to take it without suspicion.

It was discovered that accepting the COVID-19 vaccination and having strong social support were related. There was almost twice as much likelihood that friends and family would encourage someone to get the COVID-19 vaccinations. The social control hypothesis explains the ways in which various aspects of family relationships may impact health-related behaviors [35]. Family interactions affect health behaviors through both indirect and direct control mechanisms, claims the social control theory. By applying rules to oneself, one can exercise indirect social control. People with strong family ties feel more accountable to themselves [40].

#### Limitations of the study

The findings of this study are limited to the Addis Ketema sub-city. The discovery may not apply to adults in Addis Ababa and Ethiopia. In addition, the study was based on prior experience and exposure which may have been influenced by recollection bias, social desirability bias, and subjective beliefs about the chronic disease.

#### Conclusion

This study led to the conclusion that only a small percentage of study participants accepted the COVID-19 vaccination. Additionally, acceptance of the COVID-19 vaccine was significantly influenced by age, religion, health status, attitude toward the vaccine, and social support. As a result, emphasis should be given for community mobilization, especially for the elderly, those with limited social engagement, and those who have a negative attitude toward COVID-19 vaccination. A qualitative study into the reasons behind the lower acceptance rate could be beneficial for future studies.

#### Ethical consideration

Ethical approval was obtained from Yanet College Research and Review Board with an ID Y/13/2022. Then permission letter was secured from Addis Ababa city administration higher officials. The data was collected after obtaining written informed consent from each study participant.

#### Consent for publication

Not applicable

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## CRedit authorship contribution statement

**Genanew Kassie Getahun:** Writing – review & editing, Visualization, Formal analysis. **Hailu Sefefe:** Validation, Funding acquisition, Formal analysis, Conceptualization. **Tewodros Shitemaw:** Writing – original draft, Validation, Formal analysis, Conceptualization. **Betselot Yirsaw Wubete:** Writing – original draft, Supervision, Formal analysis.

## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Data availability

Data will be made available on request.

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