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Research

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COVID-19 vaccine uptake and its determinants among residents of South Gondar Zone, Northwest Ethiopia: a cross-sectional study

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Abstract

Introduction: *coronavirus disease (COVID-19) is a deadly viral infection caused by severe acute respiratory syndrome coronavirus 2. Control of COVID-19 through vaccination requires more than just vaccine efficacy and safety. Instead, the vaccine must be widely accepted by the population. The aim of this study was to determine the coverage of COVID-19 vaccine uptake and its determinants among the general population in South Gondar Zone, Northwest Ethiopia.* ***Methods:*** *a community-based cross-sectional study was conducted among 605 randomly selected eligible participants in South Gondar Zone from March 1 to 30, 2022. Descriptive summary statistics were done. Bivariable and multivariable binary logistic regression analyses were done. Variables with p-value of <0.05 were declared statistically significant.* ***Results:*** *of all participants, about 18.7% of them were vaccinated with any of the COVID-19 vaccines at least one dose. Age from 18 to 35 years (AOR=4.9, 95% CI: 1.72-12.84), attended college and above (AOR= 6.3, 95% CI: 1.37, 28.68), positive attitude towards COVID-19 vaccine (AOR= 8.01, 95% CI: 4.23-15.03), history of COVID-19 (AOR= 3.01, 95% CI; 1.29-6.98), history of contact (AOR = 2.6, 95% CI = 1.33-4.92), ever tested for COVID-19 (AOR = 0.313, 95% CI: 0.130-0.756) were determinant factors for COVID-19 vaccine uptake.* ***Conclusion:*** *COVID-19 vaccine uptake among adults aged above 12 years was very low. The main reasons for not being vaccinated were doubts about vaccine efficacy, fear of adverse effects, and lack of vaccine access. Therefore, different stakeholders should provide continued awareness creation on COVID-19 vaccine safety, importance, and efficacy.*

Introduction

Coronavirus disease (COVID-19) is a deadly viral infection caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). It continues to spread over the world, posing a serious public health concern [1]. COVID-19 has emerged as a major worldwide health threat, causing high rates of morbidity and mortality [2]. As of March 29, 2022, WHO had received reports of 481,756,671 confirmed COVID-19 cases worldwide, with 6,127,981 deaths [3]. Vaccines are life-saving inventions for the elimination and control of a variety of infectious diseases. Vaccination on a large scale creates herd immunity in the community, which is an efficient way to control infectious diseases by inhibiting pandemic disease spread [4,5]. Successful control of COVID-19 through vaccination requires more than just vaccine efficacy and safety. Instead, the vaccine must be widely accepted by the population [6-8]. COVID-19 vaccines can potentially minimize the spread of the virus from an infected individual to others, and vaccination against COVID-19 is one strategy to limit the pandemic's spread [9,10].

Concerns about vaccine safety, fear of contracting COVID-19, attitude, worry of genetic implications, and doubt about the vaccine were among the factors influencing COVID-19 vaccine uptake [11,12]. COVID-19 vaccine uptake can be influenced by a variety of beliefs and misconceptions among various population groups [13]. In low-resource settings, the refusal to take this vaccine is more pronounced [14]. In both developed and developing countries, vaccine hesitancy is becoming a major concern [15-17]. For instance, until March 29, 2022, approximately 66.1% and 59% of the world's population were partially and fully vaccinated for COVID-19, respectively. Vaccine uptake continues to lag in low-income nations, where only 15% of the population has received at least one dose of a vaccine. In Ethiopia, only 19% of the population was fully vaccinated until March 29, 2022 [18].

The acceptance and uptake of COVID-19 vaccination in Africa were extremely poor [19]. Similarly, in Ethiopia, community acceptance of vaccination was poor and dought on vaccine safety was the main reason among those who refused to take the vaccine. Likewise, due to misinformation spread on social media, many people in Addis Ababa are concerned and unwilling to accept the vaccine [20,21]. Moreover, there is poor awareness

(40.8%) of COVID-19 vaccines [22]. The Ethiopian Ministry of Health officially initiated a COVID-19 immunization campaign on November 16, 2021, with the goal of vaccinating everyone aged 12 and above. For the campaign, it has distributed over 6.2 million doses of COVID-19 vaccine (Sinopharm, AstraZeneca, Johnson, and Pfizer BioNtech). Only the Pfizer Biontch vaccine was provided to individuals aged 12 to 18 years, while the other vaccines were given to those aged 18 years and above across the country [23].

To our knowledge, there was no prior study on COVID-19 vaccine uptake and determinant factors among the general eligible population in the study area. Therefore, this study aimed to assess the magnitude of COVID-19 vaccine uptake and its determinant factors among the general eligible population for COVID-19 vaccination in South Gondar Zone, Northwest Ethiopia. To effectively expand vaccination coverage and develop herd immunity, first reside, it is necessary to understand the present level of vaccination and identify the common barriers.

Methods

Study design: a community-based cross-sectional study was conducted to assess the magnitude of COVID-19 vaccine uptake and its determinant factors in South Gondar Zone, Northwest Ethiopia from March 1 to 30, 2022.

Study setting and population: South Gondar Zone is one of the 18 administrative zones located in Amhara regional state with an estimated 2.3 million total population. Debre Tabor town is the Zonal center of the South Gondar Zone. It is located 667 km from Addis Ababa which is the capital city of Ethiopia and 98 km far from Bahir Dar which is the capital city of Amhara regional state. The Zone has 8 public hospitals that provide a broad range of medical services for all age groups. The source population was all COVID-19 vaccine-eligible populations (age>12) residing in South Gondar Zone. Whereas, the study population was all COVID-19 vaccine-eligible populations (age>12) residing in the selected woredas during the study period.

Eligibility criteria: all participants who were above 12 years, residing above 6 months in South Gondar Zone, and willing to participate in the study were included. While those unwilling to participate and critically ill (unable to respond) were excluded from the study.

Variables: COVID-19 vaccine uptake was an outcome variable, which was defined as the number of participants who received a certain vaccine dose (at least one COVID-19 vaccine dose) during the study period. "Have you been vaccinated with any of the COVID-19 vaccines at least once recently?" was used to assess it and "Yes" and "No" were the responses [24]. Independent variables included sociodemographic characteristics (age, sex, marital status, educational status, occupation, ethnicity, religion, family size, income, and residence), health-status related characteristics (self history of COVID-19 infection, history of COVID-19 infection in the family, ever been tested for COVID-19, history of contact with confirmed COVID-19 patients, history of chronic diseases), attitude and knowledge towards COVID-19 vaccine. Attitude to COVID-19 vaccine was assessed by 10 attitude assessment questions. Participants who scored above or equal to the mean attitude assessment questions were regarded to have a positive attitude toward COVID-19 vaccination, while those who scored below the mean were considered as having a negative attitude [25]. Knowledge on COVID-19 vaccine was assessed by 6 knowledge assessment questions. Participants who scored greater than or equal to the mean score of knowledge assessment questions were considered as having good knowledge, while those who scored less than the mean were considered as having poor knowledge towards the COVID-19 vaccine [22].

Sample size and sampling technique: the sample size was computed using a single population proportion formula by considering p = 39.4% (proportion of participants who had taken the

COVID-19 vaccine) [26], 95% confidence interval (CI), and 5% margin of error. By multiplying with a design effect of 1.5 and adding a 10% nonresponse rate, the final sample size was 605. A multistage random sampling technique was used to select study participants. Four woredas, namely, Farta woreda, Fogera woreda, Ebinat woreda, and Lay Gayint woreda, were selected out of the 18 woredas by using the lottery method. The total sample size was proportionally allocated for these four woredas, and a systematic random sampling technique was used to select the study participants.

Data resource and measurement

Data collection tool: we used a pretested structured questionnaire, which was adapted and prepared after reviewing relevant literatures.

Data collection: data were collected through a face-to-face interview method using interviewer-administered questionnaire. First, the questionnaire was prepared in English and translated into Amharic language and then back to English to ensure the accuracy of the translated version. The questionnaire includes socio-demographic, health status-related, knowledge and attitude towards COVID-19 vaccine-related, and COVID-19 vaccine uptake-related characteristics. The data were collected by six graduate health professionals.

Control of data quality: to assure the quality of data, a pretest was done on 5% of study participants in Smada woreda. Two days of training were given for data collectors on how to interview and collect data. The authors carried out daily supervision during the data collection period, and the collected data were checked for completeness, missing values, and consistency daily.

Data analysis: after the collected data were checked for completeness, clarity, and accuracy, it was entered into EPI Info version 7.7.1 and then exported to Statistical Package for Social sciences (SPSS) version 22 for analysis. Characteristics of the study participants were analyzed using descriptive statistics such as frequency and percentage and presented by tables and charts. Association between dependent and independent variables was analyzed first using bivariate logistic regression analysis to control confounders. Variables with $p \leq 0.2$ on bivariate logistic regression analysis were entered into a multivariable logistic regression analysis to analyze the association between the dependent variable and predictor variables. In multivariable binary logistic regression, independent variables with P-value <0.05 and Adjusted Odds Ratio at 95% CI were declared as determinant factors of COVID-19 vaccine uptake. The model goodness of fit was assessed by Hosmer-Lemisho test (P-value was greater than 0.05) and considered as statistically fit.

Ethical consideration: the study was approved by Debre Tabor University´s College of Health Sciences ethical review committee. Written informed consent was obtained from each participant after the purpose of the study was well explained and their willingness to participate was asked. In addition, for persons under the age of 18, consent was obtained from a parent or guardian before their inclusion. All participants were assured that their responses will remain secured and confidential.

Results

Socio-demographic characteristics: in this study, 605 respondents participated with a response rate of 100%. Overall, 334 of the participants were males (55.2%). Of the total participants, nearly half of them 289 (47.8%) belonged to the age group of 36-59 years with a mean age of 40.3(SD± 13.5) years. The majority of participants belonged to Amhara, 591(97.7%) by ethnicity and Orthodox Christian, 533 (88.1%) by religion. Most of them were urban residents 505 (83.5%) and educated with a college degree or above 262 (43.3%). The majority of the respondents were married, 325 (53.7%) and 477 (78.8%) of them had less than five people per household (**Table 1**).

Health status-related characteristics: majority of respondents had no self 532 (87.9%) and family history of COVID-19 infection 519 (85.8%). Majority of respondents, 409 (67.6%), had no history of contact with confirmed COVID-19 patients. About 147 (24.3%) respondents had been tested for COVID-19 and 42.2% of them had a positive test result. Around 157 (26%) study participants had a history of chronic disease of which only 25(16%) of them had taken the vaccine. Among these, hypertension (54.8%) was the major reported chronic disease followed by DM(26.2%) (Table 2).

Attitude and knowledge toward COVID-19 vaccine: half of the study participants, 305(50.4%) had a negative attitude while 300(49.6%) had a positive attitude toward COVID-19 vaccine. About 35.9% of participants agreed that currently given COVID-19 vaccines are safe. Nearly half of the participants, 52.9%, agreed that vaccines are accessible to all populations. Most of the participants 384 (63.5%) had poor knowledge on COVID-19 vaccine.

COVID-19 vaccine uptake: of all study participants, about 113 (18.7%) of them were vaccinated with any of the COVID-19 vaccines at least once. From vaccinated paricipants, 29.2% got advice from health professionals. Most of the respondents had taken Janssen, 93(82.3%) followed by AstraZeneca, 14 (12.4%). Less than half of the respondents 54 (47.8%) had symptoms after vaccination. Main symptoms reported were fever (51.9%), headache (22.2%), Joint pain (14.8%), and Chills (11.1%). In our study, the rest majority 492 (81.3%) participants had not received COVID-19 vaccine. The main mentioned reasons of participants were doubts about vaccine efficacy 212(43.1%), fear of adverse effects 162 (32.9%), and religious belief 49 (10%) (Figure 1).

Determinant factors of COVID-19 vaccine uptake: those variables with p-value <0.2 on bivariable binary logistic regression analysis were entered into a multivariable logistic regression model to control possible confounders and to identify determinants of COVID 19 vaccine uptake. Accordingly, age, marital status, educational status, income, history of COVID-19 infection, ever been tested for COVID-19, history of contact with confirmed COVID-19 patients, knowledge and attitude towards COVID-19 vaccine showed a statistically significant association with the COVID-19 vaccine uptake. Participants aged from 18 to 35 years were 4.9 times more likely to uptake COVID-19 vaccine (AOR= 4.9, 95% CI: 1.72-12.84) and those who are 36-59 years old were 2.3 times more likely to uptake COVID-19 vaccine (AOR= 2.3, 95% CI: 1.03-8.08) when compared to under 18-year respondents. Respondents who attended college and above were 6.3 times (AOR=6.3, 95% CI: 1.37-28.68) more likely to be vaccinated, while those who attended secondary school were 4.6 (AOR=4.6, 95% CI: 1.06-19.94) times more likely to take the vaccine compared to those who had no formal education. The probability of COVID-19 vaccine uptake was higher in participants with a positive attitude towards the COVID-19 vaccine (AOR=8.01, 95% CI: 4.23-15.03) than those who had a negative attitude. Participants who are widowed were 5.5 times (AOR=5.5, 95%CI: 1.64-18.26) more likely to be vaccinated than participants who are single. The likelihood of being vaccinated was higher in those who had a history of COVID-19 infection (AOR = 3.01, 95% CI: 1.29-6.98) compared to those who had no history of COVID-19 infection. Participants who had a history of contact with confirmed COVID-19 patients were 2.6 times more likely to uptake COVID-19 vaccine (AOR = 2.6, 95% CI: 1.33-4.92) compared to those who had no history of contact. The likelihood of COVID-19 vaccine uptake by those who had been tested for COVID-19 was reduced by 31.3% (AOR = 0.313, 95% CI: 0.130-0.756) compared to those who had never been tested for COVID-19 (Table 3).

Discussion

The study aimed to assess the level of COVID-19 vaccine uptake and its determinant factors in South Gondar Zone. Our study revealed that only 113(18.7%) participants were vaccinated for COVID-19 at least once. This was significantly lower

than the results reported from various studies conducted in China (84.22%) [27], France, 69% [28], Ontario, Canada, 81.6% [29], and US (57%) [30]. Similarly, it was also lower than the findings in the Harar region, Ethiopia [26] which reported that about 39.4% of participants had taken the vaccine and in the Penn State College of Medicine in Hershey, Pennsylvania [31], where the level of COVID-19 vaccine uptake 59.3%. This discrepancy could be attributed to differences in knowledge across population, greater access to information, and the availability of resources in developed countries, as well as the vaccine's late arrival in Ethiopia.

Our study indicated that age, income, marital status, educational status, history of COVID-19 infection, ever been tested for COVID-19, history of contact with confirmed COVID-19 patients, knowledge and attitude towards COVID-19 vaccine were determinant factors of the COVID-19 vaccine uptake. Also, COVID-19 vaccine uptake was higher among middle and older ages (18-35 and 35-59) when compared to younger age (under 18 years) respondents. This is an inconsistence with a study from the US in which adults where COVID-19 vaccination was highest among adults aged ≥65 years and lowest among adults aged 18-29 y ears [30]. In this study, respondents who attended college and above were 6.3 times more likely to be vaccinated than those who had no schooling. This is inconsistent with a study in the Harar region, Ethiopia [26] where participants with no formal education were 2.5 times more likely to uptake the vaccine compared to those who attended above-secondary school. This might be because educated people are more likely to accept the recommended vaccine.

Respondents who had a history of COVID-19 infection were 3 times more likely to uptake COVID-19 vaccine than those who had no history of COVID-19 infection. This is incontrary to a study in France where respondents who had a history of COVID-19 infection were less likely to be vaccinated [28]. Respondents who had a positive attitude towards the COVID-19 vaccine were 8.01 times more likely to be vaccinated than those who had a negative attitude. Likewise, a study in China reported that respondents who had a positive attitude towards the COVID-19 vaccine were 4 times more likely to uptake COVID-19 vaccine [27]. This might be a positive attitude toward COVID-19 vaccine, may discourage misleading information about the vaccine and outweigh its importance and then encourage vaccination. Respondent's main reasons for not being vaccinated were doubts about vaccine efficacy(43.1%) and fear of adverse effects (32.9%), while in China unvaccination (23.91%) is primarly due to personal health status [27]. This study has the following limitations. Firstly, it was a cross-sectional study in which the identification of causal factors may be very difficult, and secondly, it is challenging to predict the future behaviors of those who have not been vaccinated.

Conclusion

In this study, COVID-19 vaccine uptake (18.7%) among adults above 12 years was very low. This was insufficient to create herd immunity, as herd immunity requires nine out of ten people to reduce pandemic disease transmission. Age, income, marital status, educational status, history of COVID-19 infection, ever been tested for COVID-19, history of contact with confirmed COVID-19 patients, knowledge and attitude towards COVID-19 vaccine were determinant factors that influence COVID-19 vaccine uptake among adults in Ethiopia. The main reasons for not being vaccinated were doubts about vaccine efficacy, fear of adverse effects, lack of vaccine access, and being forbidden by their religion. Therefore, decision-makers and health managers in partnership with various stakeholders should revise and design strategies to enforce COVID-19 vaccine uptake. South Gondar Zone Health Bureau should provide continued awareness creation on COVID-19 vaccine safety, importance, and efficacy and enforce a house-to-house vaccination campaign. In addition to health professionals, community key informants such as the Women Development Army, community and

religious leaders should be involved in motivating and mobilizing the community to take the vaccine.

What is known about this topic

- *COVID 19 vaccination coverage was low in different countries. However, there is no available data on level of vaccine coverage among adults above 12 years in Ethiopia. Concerns about vaccine safety and fear of getting COVID-19 were factors influencing COVID-19 vaccine uptake which has been documented by some studies in world.*

What this study adds

- *Level of vaccine coverage among adults above 12 years was very low. The main reasons for not being vaccinated were doubts about vaccine efficacy, fear of adverse effects, lack of vaccine access, and being forbidden by their religion. Age, income, educational status, history of COVID-19 infection, ever been tested for COVID-19, attitude towards COVID-19 vaccine were determinant factors for vaccine uptake.*

Competing interests

The authors declare no competing interests.

Authors' contributions

All authors made substantial contributions to conceptualization, data curation, formal analysis, investigation, methodology, project administration, resources, software, supervision, validation, visualization, writing the original draft; writing review and editing and gave final approval of the version to be published.

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Tables and figures

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Table 2: health status-related characteristics of study participants residing in South Gondar Zone, Northwest Ethiopia, 2022

Table 3: determinant factors of COVID-19 vaccine uptake among the study participants residing in South Gondar Zone, Northwest Ethiopia, 2022

Figure 1: respondents' main reason for not being vaccinated COVID-19 Vaccine in South Gondar Zone residents, 2022

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Table 1: socio-demographic and economic characteristics of the study participants residing in South Gondar Zone, Northwest Ethiopia, 2022		
Variables		**Frequency (%)**
Age	Under 18	10(1.7%)
	18-35	239(39.5%)
	36-59	289(47.8%)
	60 and above	67(11.1%)
Sex	Male	334(55.2%)
	Female	271(44.8%)
Marital status	Married	325(53.7%)
	Single	204(33.7%)
	Widowed	45(7.4%)
	Divorced	31(5.1%)
Educational status	No formal education	61(10.1%)
	Primary education	123(20.3%)
	Secondary education	159(26.3%)
	Collage above	262(43.3%)
Occupation	Housewife	75(12.4%)
	Farmer	31(5.1%)
	Private employ	98(16.2%)
	Daily laborer	63(10.4%)
	Merchant	100(16.5%)
	Gov't employs	170(28.1%)
	Student	65(10.7%)
	Other	3(0.5%)
Ethnicity	Amhara	591(97.7%)
	Oromo	11(1.8%)
	Tigrai	3(0.5%)
Religion	Orthodox	533(88.1%)
	Catholic	9(1.5%)
	Protestant	41(6.8%)
	Muslim	22(3.6%)
Family size	<5	477(78.8%)
	≥5	128(21.2%)
Monthly income	<5000ETB	174(28.8%)
	5000-9999ETB	268(44.3%)
	10,000-1499ETB	125(20.7%)
	≥15,000ETB	38(6.3%)
Residence	Rural	100(16.5%)
	Urban	505(83.5%)

Table 2: health status-related characteristics of study participants residing in South Gondar Zone, Northwest Ethiopia, 2022		
Variables		**Frequency (%)**
History of COVID-19 infection	Yes	73 (12.1%)
	No	532(87.9%)
Family history of COVID-19 infection	Yes	86(14.2%)
	No	519 (85.8%)
History of contact with confirmed COVID-19 case	Yes	196(32.4%)
	No	409(67.6%)
Tested for COVID-19 infection	Yes	147(24.3%)
	No	458(75.7%)
If tested, test result	Positive	62(42.2%)
	Negative	85(57.8%)
History of chronic disease	Yes	157(26%)
	No	448(74%)
Types of chronic disease	DM	41(26.2%)
	Heart disease	12(7.6%)
	HIV/AIDS	12(7.6%)
	Hypertension	86(54.8%)
	Others	6(3.8%)

Table 3: determinant factors of COVID-19 vaccine uptake among the study participants residing in South Gondar Zone, Northwest Ethiopia, 2022

Variables	COVID-19 vaccine uptake		COR (95%CI)	AOR (95%CI)	P-value
	Yes (%)	No (%)			
Age					
Under 18	1(10%)	9(90%)	1	1	
18-35	39(16.3%)	200(83.7%)	4.98(1.68-12.03)	4.9(1.72-12.84)	**0.023***
35-59	56(19.4%)	233(80.6%)	2.48(1.08-7.9)	2.3(1.03-8.08)	**0.042***
60 and above	17(25.4%)	50(74.6%)	0.67(0.36-1.26)	1.27(0.554-2.93)	
Marital status					0.56
Single	27(13.2%)	177(86.8%)	1	1	
Married	66(20.3%)	259(79.7%)	1.67(1.03-2.71)	1.654(0.74-3.7)	0.22
Widowed	15(33.3%)	30(66.7%)	3.27(1.56-6.87)	5.5(1.64-18.26)	**0.006***
Divorced	5(16.1%)	26(83.9%)	1.26(0.45-3.56)	1.35(0.4-4.9)	
Occupation					0.65
House wife	9(12%)	66(88%)	1	1	
Farmer	3(9.7%)	28(90.3%)	0.78(1.98-3.12)	0.97(0.17-5.6)	0.97
Private employ	16(16.3%)	82(83.7%)	1.43(0.59-3.44)	0.82(0.3-2.35)	0.71
Daily laborer	8(12.7%)	55(87.3%)	1.07(0.38-2.95)	1.65(0.43-6.3)	0.46
Merchant	27(27%)	73(73%)	2.71(1.2-6.2)	2.53(0.92-6.9)	0.07
Government employ	39(22.9%)	131(77.1%)	2.18(1.01-4.8)	1.001(0.34-2.9)	0.99
Student	11(16.9%)	54(83.1%)	1.49(0.57-3.86)	2.31(0.54-9.8)	0.25
Other	0	3(100%)	0.00(0)	0.00	
Educational status					0.99
No formal education	3(4.9%)	58(95.1%)	1	1	
Primary education	24(19.5%)	99(80.5%)	4.69(1.35-16.24)	6.42(1.5-27.05)	**0.01***
Secondary education	30(18.9%)	129(81.1%)	4.5(1.31-15.33)	4.60(1.06-19.94)	**0.04***
Collage and above	56(21.4%)	206(78.6%)	5.26(1.58-17.4)	6.28(1.37-28.6)	
Income					**0.01***
<5000ETB	22(12.6%)	152(87.4%)	1	1	
5000-9999ETB	63(23.5%)	205(76.5%)	2.12(1.25-3.6)	2.01(1.89-4.53)	**0.048***
10000-1499ETB	19(15.2%)	106(84.8%)	1.23(0.64-2.4)	0.75(0.28-2.0)	0.57
≥15000 ETB	9(23.7%)	29(76.3%)	2.14(0.89-5.12)	1.64(0.29-3.68)	
Residency					0.95
Rural	15(15%)	85(85%)	1	1	0.617
Urban	98(19.4%)	407(80.6%)	1.36(0.75-2.46)	1.25(0.51-3.11)	
History of COVID-19 infection					
Yes	28(38.4%)	45(61.6%)	3.27(1.93-5.53)	**3.01(1.3-6.98)**	**0.01***
No	85(16%)	447(84%)	1	1	
Family history of COVID-19 infection					
Yes	24(27.9%)	62(72.1%)	1.87(1.108-3.15)	1.12(0.5-7.5)	0.777
No	89(17.1%)	430(82.9%)	1	1	
History of contact with COVID-19 infected patient					
Yes	54(27.6%)	142(72.4%)	2.25(1.48-3.42)	2.559(1.33-4.92)	**0.005***
No	59(14.4%)	350(85.6%)	1	1	
Ever been test for COVID-19					
Yes	39(26.5%)	108(73.5%)	1.87(1.20-2.91)	0.31(0.13-0.756)	**0.01***
No	74(16.2%)	384(83.8%)	1	1	
Knowledge towards COVID-19 vaccine					
Good	62(28.1%)	159(71.9%)	2.54(1.68-3.85)	1.58(0.92-2.7)	0.95
Poor	51(13.3%)	333(86.7%)	1	1	
Attitude towards COVID-19 vaccine					
Positive	96(32%)	204(68%)	7.97(4.61-13.76)	8.01(4.26-15.03)	**0.000****
Negative	17(5.6%)	288(94.4%)	1	1	

*P-value<0.05, **P-value<0.001

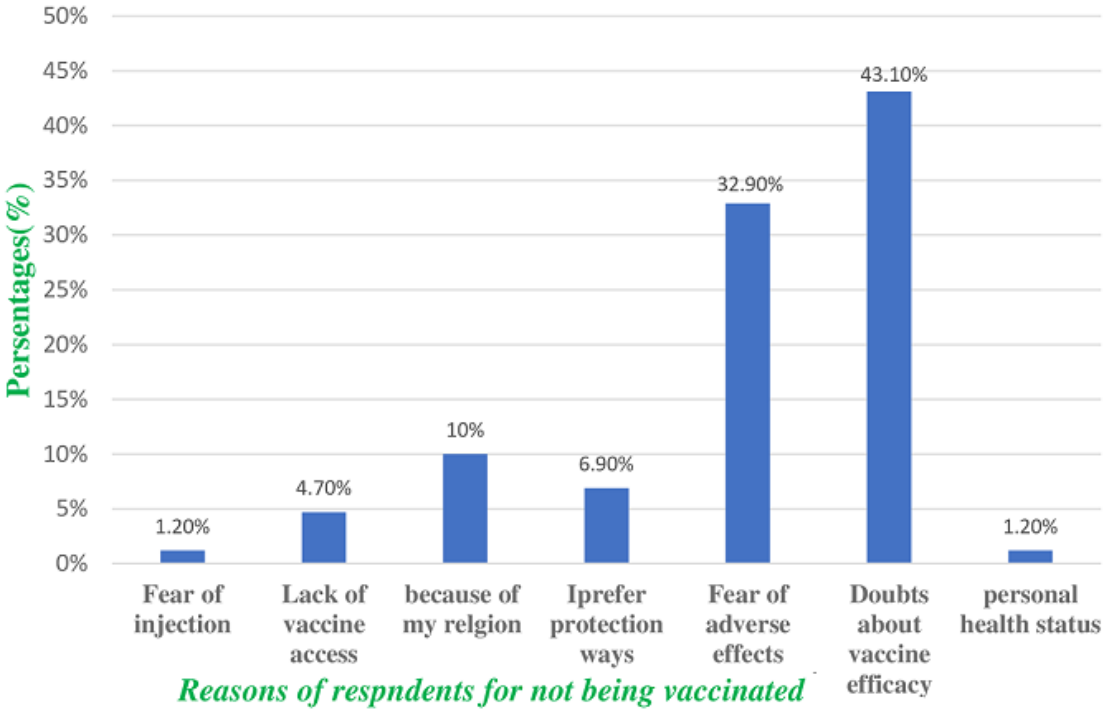

Figure 1: respondents' main reason for not being vaccinated COVID-19 Vaccine in South Gondar Zone residents, 2022