



Attitude and associated factors of COVID-19 vaccine acceptance among health professionals in Debre Tabor Comprehensive Specialized Hospital, North Central Ethiopia; 2021: cross-sectional study

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Received: 14 April 2021 / Accepted: 8 June 2021 / Published online: 25 June 2021
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Abstract Control of coronavirus disease through vaccination is not merely dependent on vaccine efficacy and safety. Professional and general public acceptance is vital for the successful control of the virus. This study aimed (1) to assess health professionals' attitude towards COVID-19 vaccine acceptance; (2) to identify factors associated with health professional's attitude towards COVID-19 vaccine acceptance. An Institutional based cross-sectional study was conducted on health professionals working at Debre Tabor Comprehensive Specialized Hospital. A structured questionnaire containing 16 items was used to assess the attitude of health professionals on vaccine acceptance. Bivariable and multivariable logistic analysis was done to identify factors associated with the attitude of health professionals. In this study, 42.3% [95% CI (36.7–47.6)] participants had positive attitude to COVID-19 vaccine acceptance. Age 30–39 years [AOR 2.23; (CI 1.23–4.04)] and ≥ 40 years [AOR 5.51; (CI 2.47–12.30)] of respondents have positive attitude than their counterparts. Also physicians [AOR 3.67; (CI 1.90–7.09)], pharmacists [AOR 4.27; (CI 1.39–13.09)] and laboratory professionals [AOR 4.56; (CI 1.34–15.39)] have higher attitude to COVID vaccine acceptance than nurses. In conclusion, the attitude level of health professionals on COVID-19 vaccine acceptance was poor. Age and profession were factors significantly associated with the attitude level of health professionals for COVID-19 vaccine acceptance.

Keywords Health professionals · Attitude · Vaccine · Acceptance

Abbreviations

AOR	Adjusted Odds Ratio
CDC	Communicable Disease Control
COR	Crude Odds Ratio
COVID-19	Corona Virus Disease-2019
SNNP	South Nation Nationalities and Peoples
SPSS	Statistical Package for Social Science
USA	United States of America
WHO	World Health Organization

Introduction

Vaccines are life-saving inventions that have been responsible for the elimination and control of many infectious diseases in many parts of the world [14, 11]. In addition to providing direct immunity and preventing disease among vaccinated individuals, they have been shown to protect unvaccinated individuals through herd immunity, if a greater proportion of the population is immune [14, 13]. Since the occurrence of pandemic COVID 19, WHO and Health care institutions are working on prevention, diagnosis, and treatment including the development of vaccines [10].

Control of coronavirus disease (COVID-19) through vaccination is not merely dependent on vaccine efficacy and safety. Instead, the vaccine needs also to have health professionals and general public acceptance for successful control of the virus [4–24].

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Healthcare workers are being prioritized among the high-risk groups who will be considered as initial candidates for early vaccination. However, there is so much research studying factors that influenced the acceptance of vaccinations among the general population and health professionals of which included political party orientation, doubts toward expedited development/approval process, and perceived political interference. Many receptive participants preferred to wait until others have taken the vaccine; mandates that could increase resistance are unique for COVID [20]. Like the previous vaccines, the COVID-19 vaccine will be a big challenge to address [28]. In a recent survey, more than one-third of lay respondents were unsure or did not intend to take the vaccine for different reasons and beliefs [14, 28, 18].

Health care workers are a reliable source of information for vaccines and Health information delivered by them can improve adherence to vaccination recommendations. Thus, the role of healthcare workers becomes particularly important in advising patients and communities, and as well as through role modeling behavior. Nevertheless, health professionals are hesitant on COVID 19 vaccination most of them have an issue with the safety they thought it developed within a short period [10, 8]. So it is important to consider healthcare workers' attitudes about COVID-19 vaccination to overcome barriers and to have effective coverage of vaccination.

Therefore the objective of this study is to determine the attitude and associated factors towards COVID 19 Vaccine acceptance among healthcare workers working in Debre Tabor Comprehensive Specialized Hospital.

Methods

Study area and period

The study was conducted in Ethiopia at the South Gondar zone of Debre Tabor Comprehensive Specialized Hospital from February 5 to March 20, 2021. Debre Tabor Comprehensive Specialized Hospital is found in Debre Tabor Town and South Gondar Zone is among one of the 10 administrative zones in the Amhara region. The Town is found about 669 km northwest of Addis Ababa, the capital city of Ethiopia, and 97 km southwest of Bahir Dar, the capital city of the Amhara region. This town has a latitude and longitude of 11°51'N 38°1'E/11.850°N 38.017°E with an elevation of 2706 m above sea level. The Hospital is the only Comprehensive Specialized Hospital in the South Gondar Zone.

Study design

An Institutional based cross-sectional survey was conducted on health professionals working in South Gondar zone Debre Tabor Comprehensive Specialized Hospital.

Study populations

All health professionals working at Debre Tabor Comprehensive Specialized Referral Hospitals of North Central Ethiopia were the study populations.

Source populations

All physicians, Anesthetists, Nurses, Midwives, Pharmacists, and laboratory professionals that work at Debre Tabor Comprehensive Specialized Referral Hospitals of North Central Ethiopia during the study period were source populations.

Inclusion criteria

All physicians, Anesthetists, Nurses, Midwives, Pharmacists, and laboratory professionals that work at Debre Tabor Comprehensive Specialized Referral Hospitals of North Central Ethiopia during the study period.

Exclusion criteria

Health professionals with sick, annual, and maternity leave during the study period and those unwilling to participate in the study were excluded.

Dependent variable

Attitude level of health professionals towards COVID-19 vaccine acceptance.

Independent variable

Socio-demographic characteristics gender, age, marital status, religion, ethnicity, educational level, year of experience, presence of the family member, and monthly income.

Sample size determination and sampling procedure

The predetermination of sample size was not done but, an institutional-based survey that included all health professionals working in the hospital during the data collection period was studied.

Data collection instrument and procedures

The attitude level of health professionals measured with a data collection tool adapted from a study done in the USA on health care workers [28]. The data collection instrument has 16 attitude questions measured with a five-point Likert scale (strongly disagree, disagree, neutral, agree, and strongly agree). Before the application of this tool in our setup, it was evaluated by the expert committee of Debre Tabor University and got approval on applicability in our setup without modification. The data was collected using a structured self-administered questionnaire which was distributed to the study participants by data collectors. Six health professionals' in which one data collector from each department (physician, anesthetist, pharmacist, laboratory professional, nurse, and midwife) collected the data after they were given adequate training.

Data quality assurance

To assure the data collection instrument pretest was done on 5% of study participants that work at Debre Markos referral hospital. One day of training was given for data collectors and the collected data was checked for its completeness by all data collectors.

Data entry and analysis

The data were entered into Epidata version 4.2.0.0 and exported to SPSS version 20 for analysis.

Descriptive statistics were carried out, and both bi-variable and multivariable logistic regression analyses were used to identify factors associated with the attitude level of health professionals to COVID-19 vaccine acceptance. Variables with a p -value of less than < 0.2 in the bivariable logistic analysis were fitted into a multivariable logistic regression analysis and a multicollinearity test was done. Both crude odds ratio (COR) in bivariable logistic regression and adjusted odds ratio (AOR) in multivariable logistic regression with the corresponding 95% confidence interval were calculated to show the strength of association. In multivariable logistic regression analysis, variables with a p -value < 0.05 were considered statistically significant.

Ethical clearance

Ethical clearance was obtained from Debre Tabor University Ethical Review Committee of College of Health Science Research and Community Service Coordination Service. A permission letter was obtained from Debre Tabor Comprehensive Specialized Hospital and informed consent was taken from all study participants after telling the objective and significance of the study. The

confidentiality and anonymity of study participants' responses were ensured.

Operational definitions

Positive attitude: when study participants respond 50% or more of attitude questions.

Negative attitude: when study participants respond to less than 50% of attitude questions.

Result

Socio-demographic characteristics of study participants

A total of 327 study participants were involved, but about 319 participants completely respond to the survey with a 97.6% response rate. Eight incomplete questioners are excluded from the analysis. The majority of study participants were males 203 (63.6%) and 157 (49.2%) participants were between the age of 30–39 years. About 260 (81.5%) were married and 269 (84.3%) have family members. The dominant ethnic group and religion of study participants were Amhara 260 (81.5%) and Orthodox 225 (70.5%). A higher number of study participants were nurses 128 (40.1%). Of study participants, 53.3% of them were BSc and below and 50.5% were with work experience of 1–5 years. About 42.6% of study participants have greater than 9000 Ethiopian birr monthly income (Table 1).

Attitude level of health professionals for COVID -19 vaccine acceptance

About 135 (42.3%) [95% CI (36.7–47.6)] study participants had positive attitude to COVID-19 vaccine acceptance (Fig. 1). About 54 (62.8%) physicians, 11 (64.7%) Pharmacists, 10 (66.7%) laboratory professionals, 9 (36.0%) Anesthetists, 39 (30.5%) Nurses and 12 (25.0%) midwives had positive attitude of COVID-19 vaccination.

In this study, the Median attitude score of respondents towards COVID-19 vaccination was 38 (IQR 23, 31–54, Range 18–80). About 129 (40.4%) of study participants agreed on they don't trust the information provided by the government about COVID severity and 28 (8.8%) disagreed. Also, only 30 (9.4%) of study participants agreed that they don't trust doctors recommending Vaccines while 85 (26.6%) disagreed they don't trust doctor's recommendation of COVID vaccination (Table 2).

Table 1 Socio-demographic characteristics of health professionals (n = 319)

Variables	Frequency (319)	Percentage (100%)
Age (years)		
20–29	113	35.4
30–39	157	49.2
≥ 40	49	15.4
Sex		
Male	203	63.6
Female	116	36.4
Profession		
Physician	86	27.0
Anesthetist	25	7.8
Nurse	128	40.1
Midwife	48	15.0
Pharmacy	17	5.3
Laboratory	15	4.7
Marital status		
Unmarried	59	18.5
Married	260	81.5
Having family members		
Yes	269	84.3
No	50	15.7
Religion		
Orthodox Christian	225	70.5
Protestant	65	20.4
Muslim	23	7.2
Others	6	1.9
Ethnicity		
Amhara	260	81.5
Oromo	12	3.8
Tigrie	20	6.3
SNNP	23	7.2
Others	4	1.3
Educational level		
BSc degree and below	170	53.3
MSc and above	149	46.7
Work experience (years)		
1–5	161	50.5
6–10	116	36.4
> 10	42	13.2
Income (Ethiopian birr)		
< 3000	16	5.0
3000–6000	77	24.1
6001–9000	90	28.2
> 9000	136	42.6

Factors Associated health professionals attitude regarding COVID-19 vaccine acceptance

In the bivariable logistic analysis, the attitude of health professionals on COVID-19 vaccine acceptance was significantly associated with age, profession, religion, and ethnicity. The multivariable logistic analysis showed that health professionals with the age of 40 or above 5.51 (AOR 5.51; 95% CI 2.47–12.30) and age with 30–39 years 2.23 (AOR 2.23; 95% CI 1.23–4.04) were more to have a positive attitude to COVID-19 vaccination than professionals within the age of 20–29 years. The odds of physicians being positive attitude was 3.67 (AOR 3.67; 95% CI 1.90–7.09) than nurses. Pharmacists were 4.27 (AOR 4.27; 95% CI 1.39–13.09) times more positive for COVID vaccine acceptance than nurses while laboratory professionals were 4.56 (AOR 4.56; 95% CI 1.34–15.39) time more positive towards vaccine acceptance (Table 3).

Discussion

COVID-19 spread is dramatically increasing in Africa and based on daily reports of the ministry of health in Ethiopia, the spread is a devastating and great concern for the country [11–13]. COVID-19 with multiple challenges is greatly affecting all systems of the country of Ethiopia and it is alarming for the gov't, stakeholders, and every citizen of the country to combat the pandemic [171]. In Ethiopia, overall health professional's knowledge, attitude, and practice to COVID-19 are poor [19]. Also, low-level preparedness to prevent the pandemic with limited personal protective equipment supplies contributes to the rapid spread of COVID-19 in Ethiopia [17–19]. The preparedness level to combat the pandemic in the study area was low and daily reports of COVID-19 positive patients are rapidly increasing [29].

Currently, WHO, CDC, and other collaborative organizations plan to implement the COVID-19 vaccine globally with optimal safety and minimal cost [21–23]. Health professionals are front lines to be affected by the pandemic and should be exemplary to take the vaccine and promote the importance of the vaccine for effective prevention to the community [154]. Ethiopia currently starts vaccination primarily on health professionals, high risks, and communities that live in major cities [6]. Health professionals' intention for vaccination is not yet known but, community acceptance for vaccination was low [6].

In the current study, the attitude of health professionals for COVID vaccination was low, about 42.3% this result was higher than studies done in the Democratic Republic of Congo 27.7% and USA 36% [28, 23] this variation may be the time frame that data was taken before the vaccine was

Fig. 1 Attitude level of health professionals for COVID-19 vaccine acceptance

Attitude of health professionals to COVID-19 vaccine acceptance

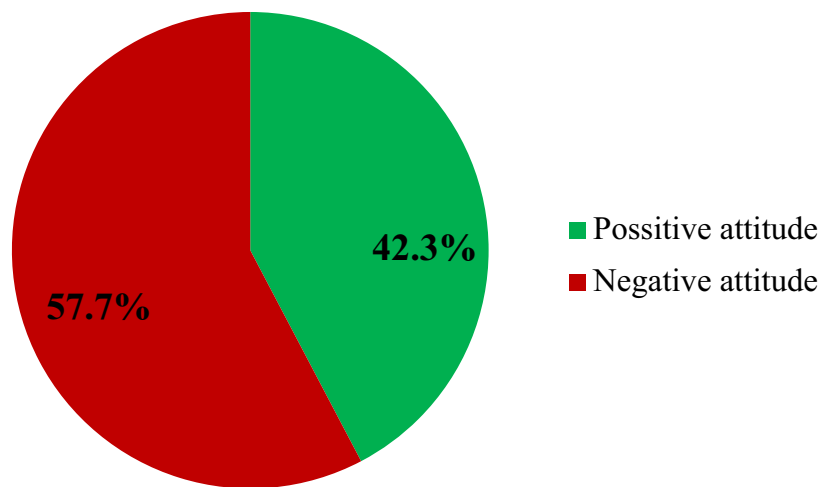


Table 2 Attitude of health professionals regarding COVID-19 acceptance (n = 319)

Attitude towards COVID-19 vaccine acceptance	SD (%)	DA (%)	N (%)	A (%)	SA (%)
I do not believe vaccine works	27 (8.5)	57 (17.9)	57 (17.9)	98 (30.7)	80 (25.1)
I don't believe vaccines are safe	40 (12.5)	42 (13.2)	39 (12.2)	115 (36.1)	83 (26.0)
I don't get vaccinated for religious reasons	116 (36.4)	73 (22.9)	47 (14.7)	38 (11.9)	44 (13.8)
I don't get vaccinated for personal freedom of choice	35 (11.0)	58 (18.2)	42 (13.2)	97 (30.4)	87 (27.3)
I do not get vaccinated because of fear of needles	72 (22.6)	69 (21.6)	40 (12.5)	74 (23.2)	64 (20.1)
I am worried about Side effects of a covid-19 vaccine	25 (7.8)	60 (18.8)	49 (15.4)	93 (29.2)	92 (28.8)
I am worried about effectiveness of COVID vaccine	51 (16.0)	51 (16.0)	44 (13.8)	95 (29.8)	94 (29.5)
I am worried about the pocket cost of the vaccine	41 (12.9)	72 (22.6)	44 (13.8)	94 (29.5)	68 (21.3)
I am worried about the adverse effects of the vaccine on preexisting conditions	30 (9.4)	48 (15.0)	39 (12.2)	97 (30.4)	104 (32.6)
I do not need a vaccine for my risk level	31 (9.8)	58 (18.2)	46 (14.4)	97 (30.4)	86 (27.0)
I have a prior reaction to other vaccines and I am worried about the reaction to COVID vaccination	97 (30.4)	104 (32.6)	39 (12.2)	38 (11.9)	41 (12.9)
I am worried about the rapidity of the development of the COVID vaccine	32 (10.0)	36 (11.3)	45 (14.1)	117 (36.7)	89 (27.9)
I don't trust pharmaceutical companies making vaccine	33 (10.3)	29 (9.1)	38 (11.9)	105 (32.9)	114 (35.7)
I don't trust FDA/CDC overseeing the Vaccine development	31 (9.7)	31 (9.7)	28 (8.8)	117 (36.7)	112 (35.1)
I don't trust doctors recommending Vaccine	137 (42.9)	85 (26.6)	45 (14.1)	30 (9.4)	31 (9.7)
I don't trust the information provided by the government about COVID severity	41 (12.9)	28 (8.8)	33 (10.3)	129 (40.4)	88 (27.6)

SD strongly disagree, DA disagree, N neutral, A agree, SA strongly agree

given to the major of world. But another study done in the USA 57.5% and Greek 78.5% showed that health professionals have great intentions to be vaccinated [27, 25]. The possible explanation for this might be variation in knowledge level about the vaccine, variation in governmental policies, and coverage of social media.

This study showed that age was associated with an attitude of COVID vaccine acceptance and respondents with age 30–39 with AOR 2.23 (1.23–4.04) and 40 or above AOR 5.51 (2.47–12.30) have positive attitude compared to their counterparts. This result nearly similar to

a study done in Greek in which age greater than 45 years were OR 2.01 (1.36–12.3) associated with positive attitude [25]. The possible reason for this might be as age increases the chance of comorbid illness increases and cause a high risk for COVID -19, so this increases intension for vaccination [27].

In this study, the profession was another factor associated with an attitude of health professionals to COVID-19 vaccine acceptance and physicians were AOR 3.67 (1.90–7.09) times more positive for vaccine acceptance. This result is supported by a study done in the Democratic

Table 3 Factors associated with health professionals towards COVID-19 vaccine acceptance

Variables	Attitude level		Crude odds ratio 95% CI	Adjusted odds ratio 95% CI	p-value
	Positive 135 (42.3%)	Negative 184 (57.7%)			
Age (years)					
20–29	29 (25.7%)	84 (74.3%)	1		
30–39	72 (45.9%)	85 (54.1%)	2.63 (1.03, 6.69)	2.23 (1.23, 4.04)	0.008*
≥ 40	34 (69.4%)	15 (30.6%)	6.11 (1.39, 26.92)	5.51 (2.47, 12.30)	0.000*
Profession					
Physician	54 (62.8%)	32 (37.2%)	2.80 (1.09, 7.24)	3.67 (1.90, 7.09)	0.000*
Anesthetist	9 (36.0%)	16 (64.0%)	0.79 (0.26, 2.37)	1.14 (0.43, 2.99)	0.791
Nurse	39 (30.5%)	89 (69.5%)	1		
Midwife	12 (25.0%)	36 (75.0%)	0.57 (0.24, 1.34)	0.72 (0.32, 1.61)	0.419
Pharmacy	11 (64.7%)	6 (35.3%)	3.82 (1.13, 12.97)	4.27 (1.39, 13.09)	0.011*
Laboratory	10 (66.7%)	5 (33.3%)	4.56 (1.26, 16.48)	4.56 (1.34, 15.39)	0.015*
Religion					
Orthodox	105 (46.7%)	120 (53.3%)	1		
Protestant	18 (27.7%)	47 (72.3%)	0.57 (0.26, 1.26)	0.49 (0.23, 1.04)	0.063
Muslim	9 (39.1%)	14 (60.9%)	0.57 (0.18, 1.78)	0.61 (0.20, 1.84)	0.382
Others	3 (50.0%)	3 (50.0%)	1.85 (0.23, 14.69)	1.55 (0.23, 10.47)	0.654
Ethnicity					
Amhara	115 (44.2%)	145 (55.8%)	1		
Oromo	5 (41.7%)	7 (58.3%)	0.63 (0.14, 2.80)	1.06 (0.27, 4.12)	0.939
Tigrie	7 (35.0%)	13 (65.0%)	2.69 (0.81, 8.92)	1.93 (0.62, 5.97)	0.254
SNNP	7 (30.4%)	16 (69.6%)	0.45 (0.12, 1.62)	0.44 (0.13, 1.56)	0.191
Others	1 (25.0%)	3 (75.0%)	0.80 (0.06, 10.21)	0.69 (0.06, 8.27)	0.768

*p value < 0.05, 1 = reference

Republic of Congo which showed that physicians' OR 1.59 (1.02–2.44) time to have a positive attitude [23]. The reason for this might be variation in the educational background may affect attitude. Also being pharmacist AOR 4.27 (1.39–13.09) and laboratory professional AOR 4.56 (1.34–15.39) were more likely to have a positive attitude than their counterparts. The possible explanation for this might professional related clinical exposure to COVID-19 might increase the perception of the vaccine's importance and attitude.

This study shows a poor attitudinal level of health professionals for COVID-19 vaccination, so the government and policymakers in the health sectors of Ethiopia should address the concerns of health professionals and give continuous professional development training on the effectiveness and safety of COVID-19 vaccines to build an attitude of health professionals on vaccine acceptance.

Limitations of the study

One limitation of the present study was that single health institution professionals were studied which might not

generalize other organizations' health professionals' attitude levels. Additionally, a comparison of attitudinal level with health professionals and community was not done. Furthermore, additional studies are required to establish whether the results of the present study are similar to those found in other health institution professionals.

Conclusion

The attitude level of health professionals on COVID-19 vaccine acceptance was less than 50% which is indicative of a poor attitude to accept vaccination. Age and profession were factors significantly associated with the attitude level of health professionals for COVID-19 vaccine acceptance. So, since health professionals are front liners to combat the pandemic, mandatory measures are required to achieve proper vaccine acceptance and coverage.

Acknowledgements We would like to acknowledge Debre Tabor University for ethical permission and Debre Tabor Comprehensive Specialized Hospital for giving permission letter also; all study participants for their co-operation during data collection.

Funding Self-funded.

Declarations

Conflict of interest There is no conflict of interest.

Ethical approval and consent to participate To keep the ethical soundness of the research, an ethical approval letter was obtained from Debre Tabor University. Written consent was also secured before data collection.

Data sharing statement The data will be shared upon reasonable request.

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