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Research Article

Eagerness to Acceptance of Covid-19 Vaccine among Health Care Workers in Oromia Regional State, Ethiopia. An Online Based Cross-Sectional Study, 2021

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Abstract

Background: The COVID-19 pandemic is expected to continue to impose enormous burdens of morbidity and mortality while severely disrupting societies and economies worldwide. Vaccines are a key strategy to stop the escalation of the COVID-19 pandemic. Vaccines are the effective way to control and prevent a several diseases, save lives, and reducing current health emergency, as well as increasing the immunity of the population.

Objective: To find out eagerness to acceptance of COVID-19 vaccine among health care workers in oromia regional state, Ethiopia: An online-based cross-sectional study.

Methods: An online based cross sectional study design were carried out from April 18, 2021 to June 19, 2021. Data was collected through employing online questioner, and then the collected data were coded and analyzed by statistical packages for social sciences 25.0 version statistical software. The statistical significance was set at a P-value ≤0.05.

Findings: The current study revealed that 178 (42.2%) of health care workers intended to receive the COVID-19 vaccines. The results of our study showed that the majority of participants don't believe that COVID-19 vaccine is effective and safe (n=279.66.1%), and couldn't save lives (n=228, 54.1%). Factors such as age group >55 (AOR: 2.75; 95% CI: 1.092-5.472; P=0.008), Female(AOR: 1.86; 95% CI: 1.243-2.796; P=0.003), nurses (AOR: 2.17; 95% CI: 0.621-5.087; P=0.0094) and midwives (AOR: 2.521; 95% CI: 2.497-8.24; P=0.0002), married (AOR: 1.74; 95% CI: 0.218-4.530; P=0.006), health care workers who had contact with COVID-19 patient were twice as likely to accept the vaccine (AOR: 1.93; 95% CI: 1.360- 3.784; P=0.0001) and health care workers who indicated that they had more serious medical condition (AOR: 2.61; 95% CI: 0.981-3.618; P=0.007) proved to be significant predictors of the acceptability of the COVID-19 vaccine. Factors such as taking vitamin C (AOR: 1.624; 95% CI: 0.945-2.596; P=0.0003), poor safety of vaccines (AOR: 7.041; 95% CI: 3.692-13.375; P=0.000), those believe effective medicine avail for treating COVID-19 (AOR: 2.16; 95% CI: 1.596-3.485; P=0.0076), no adequate trials about COVID-19 (AOR: 7.041; 95% CI: 3.692-13.375; P=0.000), and unwanted side effects of the vaccines (AOR: 3.422; 95% CI: 1.448-8.096; P=0.005) were identified as indicators why health care workers would decline uptake of COVID-19 vaccines.

Conclusion and Recommendation: Our survey revealed that the eagerness to acceptance of covid-19 vaccine among health care workers in oromia regional state was somewhat meagre. Nurses and Midwives were more likely to accept the COVID-19 vaccines than others health care workers. Oromia health bureau should have to give training about COVID-19 vaccine to all health care workers.

Keywords: Eagerness; COVID-19; Vaccine; Acceptance; Ethiopia

Abbreviations

BEFO: Biiroo Eegumsa Fayyaa Oromiyaa; COVID-19: Coronavirus Disease 2019; ETB: Ethiopian Birr; HCWs: Health Care Workers; H1N1: Swine flu; SARS-CoV-2: Severe Acute Respiratory Syndrome Coronavirus-2; TV: Television; U.S: United States; WHO: World Health Organization

Introduction

The coronavirus disease 2019 (COVID-19) pandemic has spread across the world with millions infected and hundreds of thousands dead [1]. Coronavirus disease 2019 (COVID-19), caused by Severe

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Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2), is believed to have originated from the Huanan Seafood Wholesale Market, Wuhan, Hubei province, China which was declared as a pandemic by the World Health Organization [2]. While most countries impacted have developed successful response strategies and observed significant improvements, the U.S (as of June 28, 2020) leads globally with 2.50 million cases and over 125,000 deaths [3]. The spread of SARS-CoV-2, the causative agent of COVID-19, has resulted in an unprecedented global public health and economic crisis [4]. The outbreak was declared a pandemic by the World Health Organization on March 11, 2020, and development of COVID-19 vaccines has been a major undertaking in fighting the disease. As of December 2020, many candidate vaccines have been shown to be safe and effective at generating an immune response with interim analysis of phase III trials suggesting efficacies as high as 95% [5]. Since the first case was detected in Egypt on the 14th day of February 2020, the number of cases in Africa has been on a steady rise, though has remained lower than the rest of the world [6]. With over 1.3 billion people and a weak health system plagued by lack of healthcare infrastructure and shortages of health manpower, limited access to social protection and low health literacy, the public health measures implemented at the start of the pandemic will not be sufficient to stop further progress of the virus in Africa or end the pandemic. A COVID-19 vaccine may be the most practical and feasible solution for Africa. Several vaccine candidates are currently under different stages of development and some maybe available for phase 3 trials before the end of 2020 [7]. Vaccines are a key strategy to stop the escalation of the COVID19 pandemic [8]. While large-scale vaccine rejection threatens herd immunity goals, large-scale acceptance with local vaccine rejection can also have negative consequences for community (herd) immunity, as clustering of non-vaccinators can disproportionately increase the needed percentage of vaccination coverage to achieve herd immunity in adjacent geographical regions and encourage epidemic spread [9]. There are certain beliefs and barriers regarding vaccination among the general population. Vaccine coverage and its acceptance varies with respect to behaviour of the people, geography, and time [10]. Furthermore, certain key factors such as severity of the disease, previous vaccination history, lack of belief in health care services, route of administration of vaccine, economic and educational status of the individuals, recommendations from doctors, and cost of vaccine also determines the acceptance of vaccines. The first and foremost public concern about the novel vaccines against new emerging pandemics is the safety and effectiveness of candidate vaccines as witnessed in 2009 H1N1 pandemic [11].

Governments, public health officials and advocacy groups must be prepared to address hesitancy and build vaccine literacy so that the public will accept immunization when appropriate. Anti-vaccination activists are already campaigning in multiple countries against the need for a vaccine, with some denying the existence of COVID-19 altogether [12]. Misinformation spread through multiple channels could have a considerable effect on the acceptance of a COVID-19 vaccine. The accelerated pace of vaccine development has further heightened public anxieties and could compromise acceptance [13]. The public's willingness to accept a vaccine is therefore not static; it is highly responsive to current information and sentiment around a COVID-19 vaccine, as well as the state of the epidemic and perceived risk of contracting the disease. Under these current plausible COVID-19 vaccine acceptance rates, possible levels of existing protective immunity though it is unclear whether post-infection immunity confers long-term immunity and the rapidly evolving nature of misinformation surrounding the pandemic [14], it is unclear whether vaccination will reach the levels required for herd immunity. Vaccine hesitancy is reported as one of the major threats to global health by WHO. High vaccine coverage is needed to flatten the epidemic curve. Vaccine hesitancy affects not only the individual who is hesitant to take the vaccine, but the whole community, making it difficult to reach the threshold to confer herd immunity [15]. There are certain beliefs and barriers regarding vaccination among the general population.

The study were investigate the intention to accept a future COVID-19 vaccine to determine the factors associated with intent to accept or refuse the vaccine, and help the government in identifying the risk health care workers and develop better strategies for mass vaccination against COVID-19.

Methodology

Study design, period and study area

A cross-sectional study design was conducted in 21 zone of Oromia regional state. The Oromia regional state have population of approximately about 55 million people and covers an area of around 286,612km^2. Oromia regional state have 100 hospitals in which 62 were primary hospitals, 36 were general hospitals and 4 were referral hospitals except Shashemene referral hospitals and Jimma university specialized hospitals. There were 20,541 HCWs with sex composition of 11,422 males and 9,119 females in Oromia regional state hospitals in which 7793 were worked in primary hospitals, 9411 were worked in general hospitals, 1839 were worked in referral hospitals. The study design was carried out for 3 months (from April 18, 2021 to June 19, 2021).

Study participants

All HCWs who were at study area during the study period was study population. Willingness to consent and those capable of using internet on a smart phone or computer, Age above 18 years of age and current place of work in Oromia regional state were included in the study. Younger (aged less than 18 years) HCWs, non-health care employees and those unwilling to participate were excluded.

Sample size determination & sampling technique

The sample size was determined by using the single population proportion formula: Due to absence of data in the country, proportion of population who had eagerness to acceptance of covid-19 vaccine among health care workers was assumed to be 50%. Then, n= $((Za/2)^2 P(1-P))/d^2$, n= $((1.96)^2\ 0.5(1-0.5))/(0.05)^2$ =384. By adding 10% contingency for non-response rate, a total of 422 study participants were involved. The multi stage sampling techniques were used to approach the participants. Then, the sample size to each selected hospitals was allocated proportionally. Finally, the study participants were selected randomly.

Study variables

Dependent variable was vaccine acceptance, and independent variables were socio demographic factors (age, gender, education

status, religion, occupation, marital status, monthly income, employment status, occupation and work place of the respondents), Acceptance rate regarding COVID-19 vaccine, Factors that may hinder COVID-19 vaccine acceptance.

Data collection instruments

Due to limitations in doing face-to-face research during the current active COVID-19 outbreak, this study did an online survey during the period April 18, 2021 to June 19, 2021, were collected from HCW individuals aged greater than 18 years across 21 zone of Oromia regional state. Well-designed online self-administered questionnaire has been used to collect data for assessing to determine the acceptance rate of a COVID-19 vaccine in HCWs. The questionnaire was translated into local languages (Oromiffa). Acceptance rate regarding COVID-19 vaccine in HCWs had five parts. Part I. Socio-demographic parameters. The socio-demographic parameters included (age, gender, education status, religion, occupation, marital status, monthly income, employment status, category of health care workers and work place of the respondents) it also include presence of chronic illness. Part II. Beliefs toward COVID-19 vaccine/vaccination were dichotomized as Yes=1 and 0=No. Part III. COVID-19 vaccine acceptance were 5-point Likert scale (5=Completely agree, 4=Somewhat agree, 3=Neutral/no opinion, 2=Somewhat disagree, 1=Completely disagree) with questions about acceptance and concerns regarding COVID-19 vaccines. Part IV. Factors that can improve COVID-19 vaccine acceptance were dichotomized as Yes=1 and No=0, and in addition, respondents were asked questions on their COVID-19 experience, including previous contact with a COVID-19 patient, whether a member of their household, relatives, friends, or neighbours has been diagnosed with COVID-19. Part V. Factors that may hinder COVID-19 vaccine acceptance were trichotomized as Yes=1, No=0 and none=I don't know.

Data quality assurance

The questioner translated from English to Oromiffa and back to English to check the consistency. To ensure the quality, the questionnaire checked for completeness, accuracy, clarity and consistency by the principal investigator. HCWs have been informed of detailed information with practice on how to complete and sent the questionnaire. Duplication of responses were controlled by restricting to one response.

Statistical analysis

Data were cleaned and analyzed through employing SPSS 25.0 version statistical Software. Categorical variables were presented as numbers and percentages, while continuous variables were presented as median and standard deviation. Chi-square test for categorical variables as appropriate. Dichotomized responses were presented as proportions. Bivariate analysis was used to examine the association between exposure and outcome variables, and regression analysis to derive the odds ratios (OR) and their 95% confidence intervals (95% CI) for variables significant at bivariate analysis. Multivariate binary logistic regression analysis were used to identify the determinants of intention to vaccinate and the associated factors that perhaps hinder COVID-19 vaccine acceptance. All variables were considered statistically significant at 95% confidence interval ($p \leq 0.05$).

Ethical approval

The study was commenced after approved by health research directorate of Oromia regional health bureau (Ref: BEFO/HBTFU/146/10239). The study participants were informed about behind the scenes, and oral consent were obtained from each participant. All the HCWs were informed about the objectives of the study, and they agreed and signed a consent form before participation. Behind the scenes were kept and anonymous, and data were accessible only to the researchers.

Table 1: Socio-demographic characteristics of healthcare worker's in Oromia regional state, Ethiopia (n=422).

Variable	Category	Frequency	Percent
Age	19-34 Years	213	50.5
	35-54 Years	181	42.9
	>54 Years	28	6.6
Sex	Male	225	53.3
	Female	197	46.7
Residence	Urban	384	91
	Rural	38	9
Income	<5000	146	34.6
	5001-10000	228	54
	>10000	48	11.4
Religion	Protestant	171	40.5
	Orthodoxy	129	30.6
	Muslim	88	20.9
	Others	34	8.1
Marital Status	Single	214	50.7
	Married	181	42.9
	Divorced	19	4.5
	Widowed	8	1.9
Profession	Doctors	51	12.1
	Nurse	128	30.3
	Pharmacy	70	16.6
	Psychiatry	45	10.7
	Midwives	75	17.8
	Clinical Lab	31	7.3
	Others	22	5.2
Any Chronic Illness	Yes	78	18.5
	NO	344	81.5
Any Addiction	Yes	57	13.5
	No	365	86.5
Source of Information	TV	219	51.9
	Websites	109	25.8
	Telegram/ Facebook	67	15.9
	Others	27	6.4
Prevalence of COVID -19 Vaccine Acceptance	Yes	178	42.2
	No	244	57.8

Operational definitions

Coronavirus disease 2019 (COVID-19) is caused by Severe

Table 2: Beliefs toward COVID-19 vaccine among health care workers in Oromia regional state, Ethiopia (n=422).

Statement	Frequency (%)	
	Yes	No
Do you believe covid-19 vaccine could save lives?	194(45.97)	228(54.03)
Do you believe covid-19 vaccine is effective and safe?	143(33.89)	279(66.11)
If you are vaccinated do you need to wear face mask and wash your hands regularly?	342(81.04)	80(18.96)
Do you believe covid19 vaccine is available in Ethiopia?	41(9.72)	381(90.28)
Could vaccine will stop the transmission of Covid-19?	203(48.11)	219(51.89)
Is Covid-19 vaccine currently avail in Ethiopia?	125(29.6)	297(70.4)
Could Covid-19 vaccine only protect new infections?	309(73.23)	114(26.77)
Would you take covid19 vaccine and recommend others?	101(23.94)	321(76.06)
Is isolation and treatment of people who are infected with COVID19 are effective to reduce the spread of the virus?	405(95.97)	17(4.03)

Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), a novel zoonotic coronavirus that emerged from Wuhan, China.

Vaccine: A product that stimulates a person's immune systems to produce immunity to a specific disease, protecting the person from that disease.

Results

Socio-demographic characteristics of healthcare worker's

There were a total of 422 health care workers who completed the online survey, of the 422 health care workers, more than half (n=214, 56%) were aged 19-34 years. The majority of the health care workers were males (n=148, 50.5%), Protestant (n=171, 40.5%), living in an urban area (n=384, 91%), and earn monthly income between 5001- 10000 (n=228, 54%). The majority of health care workers were nurses (n=128, 30.3%), and midwives (n=75, 17.8%). In terms of marital status, (n=214, 50.7%) of the health care workers were single. Majority (n=344, 81.5%) of the health care workers reported no chronic disease and had no any addiction (n=365, 86.5%). The source of information for them majorly was TV (n=219, 51.9%). The prevalence of COVID-19 vaccine acceptance among health care workers were (n=178, 42.2%) (Table 1).

Beliefs toward COVID-19 vaccine/vaccination

The results of our study showed that the majority of participants don't believe that COVID-19 vaccine is effective and safe (n=279, 66.1%), and couldn't save lives (n=228, 54.1%). In terms of face mask the most of participants were confident to wear face masks, and wash their hands regularly even if they get vaccinated, (n=342, 81%), as well as they believe that vaccine could not stop the transmission of the COVID-19, (n=219, 51.9%) and only protect new infections (n=309, 73.3%). The majority of respondents were believes that COVID-19 vaccine is not available in Ethiopia at that moment, (n=297, 70.4%). Majority (n=405, 95.9%) of the participants were strongly believes that it is important to isolate and treat people who are infected with COVID-19 are effective ways to reduce the spread of the virus, and only few of respondents were take covid-19 vaccine shots and recommend others (n=101, 23.9%) (Table 2).

COVID-19 vaccine acceptance measurement

The results of the study showed that about (n=90, 21.3%) had completely disagree in the information provided by the media is the

Table 3: COVID-19 vaccine acceptance scale among health care workers in Oromia regional state, Ethiopia (n=422).

Statement	Frequency	Percent
Are you accept COVID-19 vaccine if generally available?		
Completely Agree	98	23.23
Somewhat Agree	46	10.9
Neutral/No Opinion	132	31.29
Somewhat Disagree	49	11.6
Completely Disagree	97	22.98
Could you accept COVID-19 vaccine if government recommended it only?		
Completely Agree	61	14.46
Somewhat Agree	102	24.18
Neutral/No Opinion	122	28.9
Somewhat Disagree	57	13.5
Completely Disagree	80	18.96
Are you trust in the information provided by the media in the fight against COVID-19		
Completely Agree	79	18.72
Somewhat Agree	98	23.22
Neutral/No Opinion	102	24.17
Somewhat Disagree	53	12.56
Completely Disagree	90	21.33
Are you think that sunshine will make COVID-19 vaccine lose its effect?		
Completely Agree	32	7.58
Somewhat Agree	61	14.45
Neutral/No Opinion	245	58.06
Somewhat Disagree	53	12.56
Completely Disagree	31	7.35
Have taken the vaccine if available free (Without Payment)?		
Completely Agree	178	42.18
Somewhat Agree	98	23.22
Neutral/No Opinion	102	24.17
Somewhat Disagree	33	7.82
Completely Disagree	11	2.61

Table 4: Factors that can improve COVID-19 vaccine acceptance among health care workers in Oromia regional state, Ethiopia (n=422).

Statement	Frequency (%)	
	Yes	No
Have you trained on COVID 19 vaccine?	140(33.2)	282(66.8)
Are you contact with COVID-19 patient?	207(49.1)	215(50.9)
Are your member of household diagnosed with COVID-19?	172(40.8)	250(59.2)
Would having more serious medical condition escalate willingness to accept COVID 19 vaccine?	224(53.1)	198(46.9)
Is the person you know/your friend/your family member passed away (die) by COVID-19?	149(35.3)	373(64.7)
Have tested for COVID-19?	396(93.8)	26(6.2)
Is your results of COVID test negative?	417(98.1)	5(1.9)

Table 5: Factors that perhaps hinder COVID-19 vaccine acceptance among health care workers in Oromia regional state, Ethiopia (n=422).

Statement	Frequency (%)		
	Yes	No	I don't know
Is ordinary flu vaccine protect you from COVID- 19?	126(29.9)	205(48.6)	91(21.6)
Adequate trials about COVID-19 vaccine/safety	59(14)	234(55.5)	129(30.6)
Will taking vitamin C or other vitamins protect you from COVID-19?	147(34.8)	184(43.6)	91(21.6)
Is there evidence that perhaps eating garlic protect you against COVID-19?	123(29.1)	194(46.0)	105(24.9)
Is there effective medicine avail for treating COV ID-19?	106(26.1)	204(48.3)	112(26.6)
Is COVID-19 virus human made, and deliberately released?	143(33.9)	189(44.8)	90(21.3)
If I vaccinated why I use face mask, so the vaccine had no value against COVID-19 virus?	241(57.1)	148(35.1)	33(7.8)
Is fear of side effects prevent you from taking vaccine for prevention of COVID-19 virus?	235(55.7)	130(30.8)	57(13.5)

fight against COVID-19. Also, majority (n=122, 28.9%) of the health care workers had neutral/no opinion to accept COVID-19 vaccine if government recommended it only. Furthermore, more than half (n=245, 58.1%) of health care workers neutral/no opinion that the COVID-19 vaccine will lose its effect with sunshine. Majority (n=178, 42.2%) of respondents were completely agree to take the vaccine if available free and if generally available (n=98, 23.3%) (Table 3).

Factors that can improve COVID-19 vaccine acceptance

Majority (n=396, 93.8%) of our respondents tested for COVID-19 and being negative (n=417, 98.1%). About (n=215, 50.9%) of the respondents indicated that they had not been in contact with any COVID-19 patient, and (n=250, 59.2%) respondents indicated that no member in their households had been diagnosed with COVID-19. Also (n=373, 64.7%) of the respondents had none of their relatives/ friends been died with COVID-19. Majority (n=282, 66.8%) of the participants were not trained about COVID-19 vaccine. More than half (n=224, 53.1%) of respondents were judge as having more serious medical condition escalate willingness to accept COVID-19 vaccine (Table 4).

Factors that may hinder COVID-19 vaccine acceptance

Preponderance (n=143, 33.9%) of health care workers were unwilling to accept the COVID-19 vaccines due to concern about the COVID-19 virus human made, and deliberately released. Also majority (n=234, 55.5%) of HCWs were unwilling to accept the COVID-19 vaccines due to concern about the safety. (n=126, 19.9%) respondents were had misunderstanding about flu vaccine as it protect s/he from COVID-19 virus. Also, taking vitamin C or other vitamins (n=147, 34.8%), eating garlic (n=123, 29.1%), and effective medicine avail for treating COVID-19 virus (n=106, 26.1%) were unwilling to accept due to concern of they protect against COVID-19 respectively. About (n=235, 55.7%) and (n=241, 57.1%) of them were unwilling to accept the COVID-19 vaccines due to concern after side effects of the vaccine, and wear of face mask after s/he vaccinated, respectively (Table 5).

Logistic regression model for eagerness to accept COVID-19 vaccine among health care workers

Results showed that the acceptance rate for vaccination against COVID-19 was (n=178, 42.2%) as shown in Table 1. Participants in the age group >55 were 3 times as likely to accept the vaccine (AOR: 2.75; 95% CI: 1.092-5.472; P=0.008). Female subject s were twice as likely to accept the vaccine (AOR: 1.86; 95% CI: 1.243-2.796; P=0.003). Nurses (AOR: 2.17; 95% CI: 0.621-5.087; P=0.0094) and Midwives (AOR: 2.521; 95% CI: 2.497-8.24; P=0.0002) were more likely to accept the COVID-19 vaccines than others profession. Participants who were married (AOR: 1.74; 95% CI: 0.218-4.530; P=0.006) were more likely to accept vaccine. Health care workers who had contact with COVID-19 patient were twice as likely to accept the vaccine (AOR: 1.93; 95% CI: 1.360-3.784; P=0.0001) than who hadn't contact with COVID-19 patients. Health care workers who indicated that they had more serious medical condition were 3 times as likely to accept the vaccine (AOR: 2.61; 95% CI: 0.981-3.618; P=0.007) than who hadn't (Table 6).

Logistic regression model for factors that perhaps hinder acceptance of COVID-19 vaccine among healthcare workers

Taking vitamin C or other vitamins were 2 times as likely to hinder acceptance of COVID-19 vaccine (AOR: 1.624; 95% CI: 0.945-2.596; P=0.0003) and those believe effective medicine avail

Table 6: Logistic regression model for eagerness to accept COVID-19 vaccine among health care workers in Oromia regional state, Ethiopia (n=422).

Acceptance of COVID-19 vaccine	n (%)	AOR (95% CI)	P-value
Age			
19-34 years	213(50.5)	Ref	
35-54 years	181(42.9)	0.75(0.311-1.811)	0.75
>55 years	28(6.6)	2.75(1.092-5.472)	0.008**
Sex			
Male	225(53.3)	Ref	
Female	197(46.7)	1.86(1.243-2.796)	0.003**
Category of health care workers			
Doctor	51(12.1)	Ref	
Nurse	128(30.3)	2.17(0.621-5.087)	0.0094**
Pharmacy	70(16.6)	1.092(0.433-2.754)	0.853
Psychiatry	45(10.7)	1.498(0.555-4.041)	0.425
Midwives	75(17.8)	3.521(2.497-8.247)	0.0002**
Clinical lab.	31(7.3)	1.306(0.493-3.461)	0.592
Others	22(5.2)	0.996(0.324-3.060)	0.996
Marital status			
Single	214(50.7)	Ref	
Married	181(42.9)	1.74(0.218-4.530)	0.006**
Divorced	19(4.5)	1.143(0.248-1.263)	0.864
Widowed	8(1.9)	0.461(0.79-2.682)	0.389
Those who were trained on COVID 19 vaccine			
No	282(66.8)	Ref	
Yes	140(33.2)	1.421(1.20-1-936)	0.091
Contact with COVID-19 patient			
No	215(50.9)	Ref	
Yes	207(49.1)	1.93(1.360-3.784)	0.0001**
Member of household diagnosed with COVID-19			
No	250(59.2)	Ref	
Yes	172(40.8)	1.078(0.715-1.6250	0.075
More serious medical condition escalate willingness to accept COVID 19 vaccine			
No	224(53.1)	Ref	
Yes	198(46.9)	2.61(0.981-3.618)	0.007**
Person you know/your friend/your family member passed away (die) by COVID-19			
No	373(64.7)	Ref	
Yes	149(35.3)	1.068(0.709-1.607)	0.754

AOR: Adjusted Odd Ratios, CI: Confidence Interval
*P value <0.05, **P value <0.01

for treating COVID-19 were 2 times as likely to hinder acceptance of COVID-19 vaccine (AOR: 2.16; 95% CI: 1.596-3.485; P=0.0076). Fear of side effects (AOR: 3.422; 95% CI: 1.448-8.096; P=0.005) and why wearing face mask after vaccination (AOR: 4.738; 95% CI: 2.272-9.978; P=0.000) were 3 times and 5 times as likely to hinder acceptance of COVID-19 vaccine respectively. No adequate trials about COVID-19 vaccine were 7 times as likely to hinder acceptance of COVID-19 vaccine (AOR: 7.041; 95% CI: 3.692-13.375; P=0.000)

Table 7: Logistic regression model for factors that hinder acceptance of COVID-19 vaccine among health care workers in Oromia regional state, Ethiopia (n=422).

Factors that hinder acceptance of COVID-19 vaccine	n (%)	AOR (95% CI)	P-value
Ordinary flu vaccine protect you from COVID-19			
Yes	126(29.9)	Ref	
No	205(48.6)	0.566(0.2681.192)	0.134
I don't know	91(21.6)	0.137(0.298-1.180)	0.598
Taking vitamin C or other vitamins protect you from COVID-19			
Yes	147(34.8)	Ref	
No	184(43.6)	1.624(0.945-2.596)	0.0003**
I don't know	91(21.60	1.024(0.524-2.016)	0.808
There evidence that perhaps eating garlic protect you against COVID-19			
Yes	123(29.1)	Ref	
No	194(46.0)	0.907(0.477-1.726)	0.767
I don't know	105(24.9)	0.796(0.397-1.5976)	0.52
There effective medicine avail for treating COVID-19			
Yes	106(26.1)	Ref	
No	204(48.3)	2.16(1.596-3.485)	0.0076**
I don't know	112(26.6)	0.998(0.488-2.041)	0.097
COVID-19 virus human made, and deliberately released			
Yes	143(33.9)	Ref	
No	189(44.8)	1.01(0.486-1.548)	0.064
I don't know	90(21.3)	0.769(0.285-1.428)	0.976
I vaccinated why I use face mask, so the vaccine had no value against COVID-19 virus			
Yes	264(62.6)	Ref	
No	104(24.6)	4.738(2.272-9.978)	0.000**
I don't know	54(12.8)	0.523(0.241-1.134)	0.101
Fear of side effects prevent you from taking vaccine for prevention of COVID-19 virus			
Yes	235(55.7)	Ref	
No	130(30.8)	3.422(1.448-8.096)	0.005**
I don't know	57(13.5)	0.241(0.098-0.593)	0.001
Adequate trials about COVID-19 vaccine			
Yes	59(14)	Ref	
No	234(55.5)	7.041(3.692-13.375)	0.000**
I don't know	129(30.6)	0.418(0.0731-1.008)	0.147

AOR: Adjusted Odd Ratios, CI: Confidence Interval
*P value <0.05, **P value <0.01

(Table 7).

Discussion

Coronavirus disease 2019 (COVID-19) pandemic was first reported in Wuhan city, china on December 31, 2019 and its socio-economic and public health importance disease that cause a huge of economic losses, more than million death of people and affected a huge number of people in worldwide [16]. In public health, vaccination is one of the most important advances [17]. Scientists have been racing to develop and test new vaccines to protect against SARS-

CoV-2 and the speed of scientific discovery related to COVID-19 is unprecedented [18].

The current study displayed that the eagerness to acceptance of COVID-19 vaccine among health care workers. The prevalence of vaccine acceptance was 178 (42.2%), which was higher than the study done in Democratic Republic of the Congo (28%), Somalia (36.8%), Ghana 39% [19-21]. In Oromia regional state, government, public health agencies, and private healthcare systems perhaps work together to provide accurate information about the vaccines to HCW. In addition, the prevalence was lower than the study conducted in France (77.6%), chine (72.4%), United States (80%), Russia (55%), Saudi Arabia (64.7%), Egypt (45.9%) [22-27]. This perhaps in Oromia regional state HCWs have been exposed to conspiracy theories such as the claims that novel coronavirus was deliberately created and COVID-19's lethality for political gain. The acceptability of the COVID-19 vaccines in our study is approximately comparable to that of conducted in Hong Kong (40%) [28] had the intention to accepting the COVID-19 vaccine if available.

In our study, older HCWs were accept COVID-19 vaccines was similar to the study conducted in Democratic Republic of the Congo [19] which showed older HCWs accepted to get vaccinated. In addition older HCWs were accept COVID-19 vaccines was contrary to the study employed in Saudi Arabia [26] which showed younger people were willing to accept a vaccine. Because in our study older HCWs may be take COVID-19 vaccines than younger was due to the notion that older adults and people with serious comorbidities are particularly vulnerable to worse outcomes from COVID-19 can create considerable willing amongst the elderly.

The findings also revealed that female health care workers were more likely to accept the COVID-19 vaccines if available compared to males were same as the study done in Polish [29] study where an affirmative response was more from females. In addition, females were also more likely to accept a vaccine in our survey were, contrary to the study carried out in Nigeria, Ghana, Democratic Republic of the Congo [19,21,30] those showed the higher likelihood for male health care workers to accept COVID-19 vaccination has been attributed to increased risk perception of the disease in men compared to women. According to our survey female is most affected than men because they had more contact with patient than males and also women were more likely to had poor health status and others comorbidities.

The present study revealed that the majority (n=122, 28.9%) of the health care workers had neutral/no opinion to accept COVID-19 vaccine if government recommended it only which were contrary to the study conducted in Ghana [21] found that health care workers who had trust in the accuracy of the measures taken by the government in the fight against COVID-19 were more likely to accept COVID-19 vaccines if available. Also majority (n=178, 42.2%) of respondents take the vaccine if available free and if generally available (n=98, 23.3%). In our study the main source of information were TV which were consistent with the study carried out in Egypt [27] demonstrated that social media and TV media are the main source of knowledge for the participants.

Our study revealed that nurses (AOR: 2.17; 95% CI: 0.621-5.087; P=0.0094) and mid wives (AOR: 2.521; 95% CI: 2.497-8.24; P=0.0002) were more likely to accept the COVID-19 vaccines if available is contrary to the study employed in Ghana [21] which showed medical doctors were more likely to accept the COVID-19 vaccines if available compared to nurses and midwives. In our study nurse and midwives had more contact with patients/they also cleans the bed of patients because of that their willing to accept vaccine were escalated.

Our findings also showed that health care workers who had contact with COVID-19 patient were twice as likely to accept the vaccine (AOR: 1.93; 95% CI: 1.360-3.784; P=0.0001) than who hadn't contact with COVID-19 patient were contrary in the study conducted in Ghana [21] which revealed that the HCWs whose relatives have not been diagnosed with COVID-19 were less likely to accept the COVID-19 vaccines if available compared to health care workers whose relatives have been diagnosed with COVID-19. In addition our survey showed that the health care workers who indicated that they had more serious medical condition were 3 times as likely to accept the vaccine (AOR: 2.61; 95% CI: 0.981-3.618; P=0.007) than who hadn't were similar to the study conducted in Egypt [27] which were revealed the presence of comorbidities or chronic diseases were the main factors related to COVID-19 acceptance.

The study also revealed that concerns about the safety of vaccines (AOR: 7.041; 95% CI: 3.692-13.375; P=0.000) and unwanted side effects of the vaccine (AOR: 3.422; 95% CI: 1.448-8.096; P=0.005) were the main reasons why health care workers were unwilling to accept the COVID-19 vaccines were consistent with the study employed in Ghana [21] revealed that the safety of vaccines and unwanted side effects of the vaccine were the main reasons why health care workers were unwilling to accept the COVID-19 vaccines.

Conclusion and Recommendations

It is concluded from this study, eagerness to acceptance of covid-19 vaccine among health care workers in oromia regional state was somewhat low. Nurses and Midwives were more likely to accept the COVID-19 vaccines than others HCWs. Health care workers who had contact with COVID-19 patient were more likely to accept the vaccine than who hadn't contact with COVID-19 patient. Fear of side effects and wearing face mask after vaccination were more likely to hinder acceptance of COVID-19 vaccine. Oromia regional state should have to take promote vaccination of COVID-19 among health care workers by providing to them adequate training.

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