Assessment of COVID-19 vaccination-related knowledge, attitude and barriers among healthcare professionals working at governmental hospitals in South Gondar Zone, Ethiopia

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Abstract

Introduction: with COVID-19 vaccines being developed concurrently, it is clear that inadequate knowledge and poor attitudes among communities around the world provide a significant obstacle and continue to prevent the complete population from being immunized against highly contagious illnesses. The study's objective was to evaluate the knowledge, attitude, and barriers that healthcare professionals have towards the COVID-19 vaccine. *Methods:* a descriptive cross-sectional study was conducted through a self-administered questionnaire that was disseminated to health care professionals working in the South Gondar zone hospitals, in South Gondar Zone, Ethiopia. SPSS Statistics Version 25 was used to enter and evaluate the data that were gathered. To ascertain the relationship between independent and outcome variables, binary logistic analysis was performed. *Results:* a total of 450 respondents participated in the survey, and 90% of them completed and returned. The majority of the participants (94.44%) were aware of the COVID-19 vaccination. More than half of them (56.22%) had experience with COVID-19 treatment, and 54.7% had sufficient knowledge about COVID-19 immunization. The importance of the vaccine in maintaining population COVID-19 immunization coverage and in reducing COVID-19 incidence to prevent the onset of new epidemics, respectively, was positively viewed by more than two-thirds (74.43%) and 84.4% of the respondents, respectively. Furthermore, only 6.6% of respondents approved of pharmaceutical companies' advertising of the COVID-19 vaccine. *Conclusion:* according to the current study, healthcare professionals had a promising view of COVID-19 immunization. However, the overall percentage of positive responses to the attitude questions was only 48.34%. Additionally, more than 76.67% of the respondents reported that if the community does not receive the COVID-19 vaccination, the incidence of the virus will greatly grow. However, only about half of the respondents had adequate knowledge about the COVID-19 vaccination.

Introduction

A significant cause of morbidity and mortality in the general population is vaccine-preventable illnesses. Vaccinations are widely acknowledged as one of the most effective public health preventive strategies [1]. Globally, the COVID-19 pandemic is posing a threat to the lives of billions of people. Several vaccines are now being developed in laboratories using various sources, such as antibodies and small-molecule medicines. Around the world, this epidemic has had a substantial impact on the economy, human health, and lifestyle choices [2,3]. The most effective way to stop the spread of COVID-19 is to employ several vaccines that are both safe and effective. The Food and Drug Administration (FDA) has authorized the use of the vaccine for emergency purposes, and the vaccine-producing companies are anticipated to provide it [4]. Global demand for an efficient vaccine increases as long as the COVID-19 pandemic's disruptions continue [5]. Additionally, vaccines are prioritized for special populations due to concerns over the monopolization of COVID-19 vaccine supply and distribution by a few developed countries as a result of the vaccine's high production costs, which cannot be covered by low- and middle-income countries [6]. Vaccine hesitation; the refusal, delay, or acceptance of vaccination when there are concerns about its efficacy and safety [7]; as a problem that may have arisen due to several circumstances. Poor vaccination quality, doubts about dosage, religious restrictions, and suspicions about the existence of the live virus in the immunizations are a few of these [8]. According to a study done in Egypt, vaccine hesitancy is widespread among health care professionals and is a serious obstacle to

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public vaccination acceptance. This study also suggests the urgent need to launch programs to raise public understanding of the value of vaccinations so that they can be expected [9]. For the COVID-19 vaccine, for instance, health care professional education should be given top attention [10].

Individual preference for various COVID-19 vaccines has also been noted in different countries [11]. These findings can serve to influence the planning and development of future public health measures that could boost the acceptance of a COVID-19 vaccination [12]. Therefore, building long-term public trust demands creating effective and efficient intervention mechanisms. Additionally, groups at risk of refusing vaccinations should be the focus of international awareness initiatives [13,14]. When a COVID-19 vaccine is made available, this may aid vaccination awareness campaigns in addressing vaccine doubt. Public trust in the creation, administration, distribution, and promotion of an efficient COVID-19 vaccination The attitudes' of health care professionals like the efficiency of the vaccine, the place where it was designed, the kind of vaccine, and the timing of the vaccine production process is highly important [15]. Additionally, attitudes and knowledge on the dosage and vaccine safety are among the major factors in determining whether a health care professional will embrace the COVID-19 vaccine [16]. Not only the COVID-19 can have detrimental health consequences, but also the poor vaccine interest among health care professionals may negatively affect the quality of life of the population at large [17]. Furthermore, inadvertent administration of numerous doses of the COVID-19 vaccination has also increased public refusals. Multiple doses of the COVID-19 vaccine were seen to cause both local and systemic responses, according to reports from preliminary investigations [18]. A poor level of knowledge has been implicated in the rapid spread of the infection in health facilities and delay of treatment, and may put patients' lives at risk [19].

In most nations, immunization against COVID-19 is optional, thus it's critical to comprehend the present attitudes of the local people before the vaccine program is implemented. However, no research is currently being done in Ethiopia about the attitudes, knowledge, and barriers that healthcare workers have toward the COVID-19 vaccine. The findings may be helpful in suggesting any corrective actions and further interventions in the research region to enhance awareness, attitude, and barriers among healthcare workers.

Methods

Study design, setting and period: in this multi-institution-based descriptive cross-sectional study, a self-administered questionnaire was disseminated to health care professionals working in government hospitals in South Gondar zone, Northern West Ethiopia. Data were collected for one month (from February 30, 2022 to March 30, 2022).

Eligibility criteria: only the full-time health care professionals who are available during the data collection period and who are ready to take part in the study were included.

Variables: the independent variables were included in the sociodemographic characteristics (age, sex, profession, level of education, and work experience of the health care professionals). The dependent variables were the questions or statements that describe the knowledge, attitude and barrieres of COVID-19 vaccination among the health care professionals.

Sample size and sampling technique: a single population proportion formula was used to calculate the sample size as follows [20].

$$n = \frac{(\frac{z}{2})^2}{d^2} = \frac{(1.96)^2 x\ 0.5(1-0.5)}{0.0485^2} = 409$$

Where n = sample size required; z = standard normal variable at 95% confidence level (1.96); p = population proportion (0.5); d = margin of

error (0.0485). With 10% contingency (409*0.1=40.9); the final sample size for this study was (40.9+409) 450. Simple random sampling techniques were used to select the study subjects after proportional allocation of study subjects to each hospital (Figure 1).

Data resource and measurement

Data collection tool: after reviewing pertinent literatures, we adapted an existing pretested structured questionnaire and produced it. Four components made up the questionnaire, which was created by the researchers and covered sociodemographic variables, knowledge, attitude, and barriers.

Control of data quality: external specialists in the subject evaluated the validity of the questionnaire. Surveys were also employed to examine the internal validity of the inquiries in each section of the questionnaire.

Data analysis: the data were entered and analyzed using SPSS Statistics version 25 after being checked for accuracy. In order to depict knowledge, attitude, and barriers linked to COVID-19 vaccination, frequency and percentage were utilized. Participants' knowledge was further classified as adequate if they properly answered every knowledge question and inadequate if they answered one or more of them wrong [21]. To determine any potential relationships between the dependent and independent variables, binary logistic regression was performed. Statistical significance was defined as a p-value of 0.05 or lower. The attitudes of the respondents were assessed using 5-point Likert-type questions. The percentage of positive responses (PPR) used to gauge response rates and the average attitude score were both computed. Using the t-test and one-way ANOVA, the attitudes of the various responder groups were compared. Calculations were made on the frequency and percentage of responses to each COVID-19 vaccine-related barrier.

Ethical considerations: the ethical review board of the college of health science at Debre Tabor University provided a letter of ethical approval. The Declaration of Helsinki's rules were followed. Before the survey, each survey participant gave their written informed consent. Additionally, no personal information about study participants, such as their names or addresses, was included in the data obtained, and data confidentiality was maintained.

Results

Sociodemographic characteristics: a response rate of 90% was achieved with the return of 450 fully completed and signed questionnaires. The average age of the respondents was 31.4 ± 6.2 years, and 54.00% of them were between the ages of 18 and 28. About half of the respondents (57.33 percent) were followers of the orthodox religion, while more than half (70.44%) of the respondents were men. Physicians made up about a third (34%) of the population, and nearly half (47.33%) had five to ten years of employment experience (Table 1).

Knowledge towards COVID-19 vaccination: almost all the participants (94.44%) claimed to be aware of the COVID-19 vaccination. The majority of participants acknowledged the media as a source of information on the COVID-19 vaccine (Table 2). The majority of respondents had no personal or family history of COVID-19 exposure, while more than half (56.22%) admitted to having previously been involved in COVID-19 care. More over two-thirds of respondents (77.78%) said they have received vaccinations at some point in their lives, and the majority of respondents (86.89%) agreed that COVID-19 vaccination should not be required. The majority of respondents (72.00%) reported that they had experienced vaccine side effects, and they were afraid of the recently discovered COVID-19 vaccine side effects. Meanwhile, 53.33% of participants said the scientific evidence at this time does not sufficiently support the link between COVID-19 vaccines and chronic illnesses. More than 76.67%

of respondents also said that if the community does not receive the COVID-19 vaccine, the incidence of the virus will increase significantly. Nearly all (92.67%) respondents said that everyone in the community should adhere to the COVID-19 preventive protocols and that the COVID-19 pandemic can be eradicated with vaccination. More than two-thirds (79.78%) of participants agreed that people who had recovered from COVID-19 should get the vaccine, and more than half (55.56%) agreed that people with chronic illnesses needed to get the COVID-19 vaccine. Nearly all (96.67%) of the study participants stated that everyone has to receive 2 doses of the COVID-19 vaccine and that the second dosage should be administered 28 days following the first dose (76.67%) (Table 3). Binary logistic analysis was used to find the determinants of the amount of knowledge across participants, after we categorized knowledge based on knowledge score as adequate (right answers for all knowledge questions) or inadequate (at least one inaccurate response). As a result, participants' age, profession, amount of education, and work experience were discovered to be predictive of how much they knew about COVID-19. Compared to pharmacists, nurses, and other professionals, physicians were more likely to have the adequate knowledge (AOR: 1.25 CI: 0.43, 0.72). Additionally, the odd of having adequate knowledge was higher among Master´s Degree holders (AOR 2.43 CI: 0.47, 9.54) compared with respondents having other level of education. The odd of having adequate knowledge was higher in respondents above 40 years of old compared with other age groups (AOR 1.09 CI: 0.26, 4.53). Compared to those who served for 5 years or less, those with five to ten years of service were more likely to have adequate understanding of COVID-19 vaccination (AOR: 2.22; CI 1.21, 3.81 (Table 3).

Attitude towards COVID-19 vaccination: among those surveyed, 84.44% agreed that it is impossible to prevent COVID-19 without vaccination, while 77.10% said they would encourage others to do the same, and 74% said it

is crucial to maintain the population's COVID-19 vaccination coverage in order to prevent the emergence of new epidemics. The majority of respondents, 69.11%, concur that government officials have the authority to require everyone to receive the COVID-19 immunization. Only 7.55% of respondents believed that COVID-19 vaccines are completely effective and have undergone enough safety and effectiveness testing. The overall percentage of positive response to the attitude questions was 48.34% (Table 4). Change in attitude scores across groups of study respondents was assessed by t-test. Consequently, there was significance difference in sex (p<0.05) between female [mean score = 1.48] and male [means score = 2.93] respondents; physician [mean score = 0.98] and pharmacists [means score = 2.99]; nurse [mean score = 3.25] and specialist [mean score = 1.54]; masters [mean score = 0.96] and bachelor [mean score = 2.67]. Likewise, the results from one-way ANOVA showed that there was significant difference (p<0.05) across different classes of age group and working experience.

Barrier related to COVID-19 vaccination: the majority of responders (89.11%) did not think the COVID-19 vaccination would halt the pandemic, and 80.67% said they did not need it because they already practiced all preventive measures. Only 58.44% of respondents said that the COVID-19 vaccination was a conspiracy, which is why the vaccine campaign is hampered. In addition, 75.56% of the respondents claimed that whether their family or acquaintances received the COVID-19 immunization had no bearing on them. 51.11% of respondents said that we could start taking vaccines via a different route of administration than injection (Table 5).

Discussion

According to reports from WHO and Europe, COVID-19 vaccinations have not been associated with any significant safety or effectiveness problems. Therefore, in order to increase vaccination coverage, immunization programs

should be created to eliminate obstacles related to the cost and accessibility of vaccines. Additionally, health education and communication from reliable sources are crucial for allaying public concerns about vaccine safety belief [22]. Therefore, developing strategies to offer evidence-based information on the COVID-19 vaccine, such as creating leaflets and white papers, as well as quality control and quality assurance, and combating fake news, are essential for raising public awareness of the vaccine before it is administered to the public [23]. For instance, those with a history of vaccination have shown to comprehend and value the COVID-19 vaccine [15]. To protect themselves from this disease, the majority of Ethiopians rely on natural immunity, herd immunity, and natural home remedies including garlic, vitamins, steam inhalations, and hot water gargling. Their findings are important for providing the public with reliable health information on a variety of platforms. The most effective way to stop the spread of COVID-19 is to employ several vaccines that are both safe and effective. The creation of a revolutionary COVID-19 vaccine appears to be a daunting task. In order to quickly control the disease's spread, the COVID-19 pandemic has made healthcare organizations implement unprecedented infection prevention and control procedures. The latter is a crucial strategy to stop the COVID-19 epidemic from spreading further, and might well change everything as the globe fights the worst fitness catastrophe of the century. There are now over 100 candidates for the COVID-19 vaccine that are in various phases of clinical testing. Through emergency uses authorization (EUA) from their associated health ministry or branch, many countries accelerated the use of the COVID-19 vaccination to the public.

In order to understand the epidemiological dynamics of disease prevention and to ensure the effectiveness, adherence, and success of the immunization program, healthcare workers' knowledge, attitudes, and barriers regarding the COVID-19 vaccine must be taken into consideration. Even with previously established vaccination programs, vaccine resistance continues to be a major obstacle to comprehensive population immunization. We discovered that nearly half of the responders were between the ages of 18 and 28, and nearly half had sufficient knowledge. According to the study, more than half of the respondents were men and had sufficient understanding about the COVID vaccine. When compared to respondents from other professions, the current study also indicated that more than half of physicians were aware of the COVID-19 vaccination, and more than two-thirds of respondents had master's degrees. According to a cross-sectional survey from Jordan by Tamam *et al*. 66.5% of the respondents agreed or strongly agreed that the vaccination is essential for protecting people against the COVID-19 pandemic [24]. According to a study from the USA by Ada *et al*. the majority of medical professionals have expressed worries about the COVID-19 vaccine, and roughly 66.5% of the respondents plan to delay the vaccination [25]. Moreover, half (57.5%) of healthcare personnel, according to a different research from Maryland, USA, intended to obtain the COVID-19 vaccine [26]. Moreover, there was a statistically significant difference in respondents' sexes, professional statuses, and levels of education, according to a study in Italy that revealed 75% of healthcare professionals wanted to get immunized against COVID-19 [27]. The findings from these reports are consistent with the current investigation.

According to a study conducted in France, Belgium, and portions of Canada that speak French, 79.6 percent of healthcare professionals there would probably advise COVID-19 immunization to their clients and colleagues, and 72.4% of them would unquestionably agree to get it [28]. However, a study carried out in Saudi Arabia by Mazin *et al*. found that female health care professionals under the age of 40 were more likely to have low levels of knowledge and a negative attitude toward the COVID-19 immunization [29]. This finding also supports our

investigation. In addition, a study by Khan Sharun *et al.* found that while 86.3% of respondents from the public planned to receive the COVID-19 immunization, 13.7% expressed hesitancy due to a number of obstacles. However, only 65.8% of participants said they will get vaccinated as soon as feasible whenever the vaccine is available [30]. Another study from Romania by Padureanu *et al.* shown that nurses have a more positive attitude about the COVID-19 vaccination [31]. However, research by Alle and Oumer revealed that 64.7 and 66.7%, respectively, of doctors and pharmacists had a high level of attitude toward the COVID-19 vaccination [32]. Additionally, a paper that combined data from several study regions among medical professionals revealed that more than 50% of respondents had a favorable opinion toward the COVID-19 vaccination [33]. Older age, male gender, and being a physician were predictors of healthcare workers' favorable attitudes of the COVID-19 vaccination [26,34]. According to several studies, the level of education has a considerable impact on the attitudes and knowledge of medical professionals toward the COVID-19 vaccination [7,35,36]. These reports are consistent with our investigation, which examined the aforementioned predictors.

Some health professionals are disappointed because their religious beliefs conflict with the belief that receiving the COVID-19 vaccine will protect them against pandemics, thus they choose not to do so and forego the inoculation [37]. In our study, 56.2% of participants were doctors with sufficient understanding about COVID-19 immunization. A prior survey found that 87.5% of respondents were physicians and thought that finding an effective solution would help to lower the likelihood of the COVID-19 pandemic [38]. Additionally, another study from Israel found that age and occupation were strongly related to tendency to receive the vaccine, supporting the need for health care providers to have enough information [39]. According to findings from a prior research, 56% of the respondents said that they had not had the COVID-19 immunization for one reason or another [40]. Healthcare professionals' reasons for not vaccinating against COVID-19 included worries about vaccine safety, intramuscular injection as the route of delivery, efficacy, and mistrust of the government [34]. Furthermore, a survey conducted by medical professionals in Egypt found that the main obstacles to receiving the COVID-19 vaccine were a lack of knowledge about the vaccine's safety and effectiveness, which accounted for 96.8 and 93.2% of the respondents, respectively [41]. Concerns regarding vaccine availability (55%) future vaccine adverse effects (62%) rapid development (72%) pharmaceutical promotion for profit (2%) and a lack of societal trust are among the other important hurdles to COVID-19 vaccination that have been found by the report [42,43]. Finding from these report collectively support the findings from our report on barrier for healthcare professionals against COVID-19 vaccination.

Conclusion

The present study findings showed that respondents had a high level of knowledge on each individual feature of COVID-19 vaccination, but that only around half of respondents had sufficient understanding. Physicians tended to have a positive perspective about the value of vaccination and a negative attitude about pharmaceutical corporations' marketing-driven promotion of COVID-19 immunization. During the COVID-19 immunization campaign, barriers relating to the vaccines' efficacy, quick development, and lack of social trust had a considerable impact on the medical professionals. Additionally, boosting vaccine knowledge, changing attitudes, and removing barriers among medical professionals could enable them to provide a more effective vaccination program for the public.

What is known about this topic

- *Regional variations in COVID-19 vaccination selection have also been documented by many nations, including Ethiopia. The public's acceptance of vaccination is hampered by the frequent vaccine reluctance expressed by healthcare providers.*

What this study adds

- *The degree of awareness and attitude in Ethiopia has been linked to the rapid spread of the virus in healthcare facilities, the delay in receiving treatment, and may even endanger the lives of patients. Additionally, COVID-19 vaccination barriers such a lack of public awareness, political subterfuge, religious beliefs, and the usage of conventional medicine were to blame for the low level of knowledge and negative attitude among medical professionals regarding the COVID-19 vaccine.*

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. All the authors have read and agreed to the final manuscript.

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Tables and figure

Table 1: socio-demographic characteristics of study participants (n=450)

Table 2: COVID-19 vaccination related knowledge among Health care professionals working at governmental hospitals in South Gondar Zone, Ethiopia

Table 3: predictors of extent of knowledge about COVID-19 vaccination among health care professionals working at governmental hospitals in South Gondar zone hospitals, Ethiopia

Table 4: COVID-19 vaccination related attitude among health care professionals´ working at governmental hospitals in South Gondar Zone, Ethiopia

Table 5: barriers that hinder COVID-19 vaccination among health care professionals working at governmental hospitals in South Gondar Zone, Ethiopia

Figure 1: schematic presentation of the sampling procedure

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Table 1: socio-demographic characteristics of study participants (n=450)

Variables	n (%)
Age (in years)	
18-28	243 (54)
28-40	131 (29.11)
>40	
Gender	76 (16.89)
Male	317 (70.44)
Female	
Religion	133 (29.56)
Orthodox	258 (57.33)
Muslim	145 (32.22)
Protestant	
Profession	47 (10.44)
Physician	153 (34)
Pharmacist	135 (30)
Nurse	98 (21.78)
Others	
Level of education	64 (14.22)
Specialist	67 (14.89)
General practitioner (GP)	86 (19.11)
Masters	75 (16.67)
Bachelor	147 (32.67)
Other	
Working experience	75 (16.67)
< 2 years	87 (19.33)
2-5 years	139 (30.89)
5-10 years	213 (47.33)
>10 years	21(4.67)

Table 2: COVID-19 vaccination related knowledge among Health care professionals working at governmental hospitals in South Gondar Zone, Ethiopia				
Variables	**Response**			
	Yes		No	
	n	(%)	n	(%)
Do you know about the COVID-19 vaccine?	425	94.44	25	5.56
Do you have any involvement in COVID-19 care	253	56.22	197	43.78
Do you have any personal and family history of COVID-19	37	8.22	417	92.67
Do you have co morbidity (any chronic disease)	59	13.11	391	86.89
Do think COVID-19 vaccination should be mandatory	385	85.56	65	14.44
Do you have any immunization history in your life? (Other than COVID-19 vaccine)	350	77.78	20	4.44
Do you afraid of the newly discovered COVID-19 vaccine side effects?	310	68.89	140	31.11
Have you ever experienced any vaccination side effects?	324	72.00	26	5.78
Does the current scientific evidence sufficiently confirms COVID-19 vaccines related with chronic illnesses	210	46.67	240	53.33
Do you think that significant increase in the incidence of SARS-CoV-2, if individuals fail to get COVID-19 vaccine?	345	76.67	105	23.33
Do you think that if everyone in the community maintains the preventive measures, the COVID-19 pandemic can be eradicated without vaccination?	417	92.67	33	7.33
Does after vaccination, everyone needs to follow COVID-19 preventive protocols	423	94.00	27	6.00
Does COVID-19 recovered person need to take the vaccine?	359	79.78	91	20.22
If person is suffering any chronic medical illnesses, can they take vaccine?	250	55.56	200	44.44
Do you know everyone must get 2 doses of vaccine for successful vaccination?	435	96.67	15	3.33
Does the second dose of vaccine need to be taken after 28 days of first dose?	345	76.67	105	23.33
Do you know Ethiopia has a legal obligation for vaccination?	240	53.33	210	46.67

| **Table 3:** predictors of extent of knowledge about COVID-19 vaccination among health care professionals working at governmental hospitals in South Gondar zone hospitals, Ethiopia				
Variables	**Level of knowledge**		COR (95% CI)	AOR (95% CI)
	Adequate	Inadequate		
Age in years				
18-28	152 (48.7)	160 (51.3)	1	1
28-40	49 (57.0)	37 (43.0)	1	1
>40	42(80.8)	10(19.2)	2.44 (1.01, 5.91)	1.09 (0.26, 4.53)
Gender				
Female	64(48.1)	69 (51.9)	1.45 (0.87, 2.40)	0.97 (0.53, 1.76)
Male	171 (53.9)	146(46.1)	0.70 (0.44, 1.10)	1.36 (0.83, 2.24)
Profession				
Physician	86 (56.2)	67 (43.8)	2.32 (0.53, 0.94)	1.25 (0.43, 0.72)
Pharmacist	81(60)	54 (40)	1.92 (0.93, 2.92)	1.09 (0.55, 3.65)
Nurse	54 (55.1)	44 (44.9)	1	1
Others	29 (45.3)	35 (54.7)	1	1
Level of education				
Specialist general practitioner	48 (71.6) 46 (53.5)	19(28.4) 40 (46.5)	3.73(1.42, 10.14) 1	2.51 (0.49, 10.87 1
Masters	51 (68.0)	24 (32.0)	3.15(1.42, 10.14)	2.43 (0.47, 9.54
Bachelor	76 (51.7)	71 (48.3)	1	1
Others	48 (71.6)	19(28.4)	0.73 (0.30, 1.73)	0.60 (0.24, 1.52)
Working experience in years				
< 2	44 (50.6)	43 (49.4)	1	1
2-5	74 (53.2)	65(46.8)	2.31 (1.39, 3.65)	2.10 (1.16, 3.53)
5-10	128 (60.1)	85 (39.9)	2.42 (1.49, 3.95)	2.22 (1.21, 3.81)
> 10	15 (71.4)	6 (28.6)	3.83(1.44, 10.24)	2.52 (0.53, 11.99)

Table 4: COVID-19 vaccination related attitude among health care professionals' working at governmental hospitals in South Gondar Zone, Ethiopia

Variables	SA (%)	A (%)	N (%)	DA (%)	SDA (%)	Mean ± SD	PPR (%)
It is important to keep COVID-19 vaccination coverage of the population in order to avoid the emergence of new epidemics	46.66	27.77	7.78	6.67	11.11	3.96±1.05	74.43
It is not possible to reduce the incidence of COVID-19 without vaccine	57.11	27.33	2.22	3.33	10	4.47±0.73	84.44
Educating clients about COVID-19 vaccines will improve vaccination coverage of the community	47.77	23.33	8.89	10	10	4.22±0.23	71.10
The COVID-19 have already begun to disappear in the community before engaging in vaccination	16.66	5.33	7.78	48.22	22	2.67±0.56	21.99
Government official have the right to impose everyone to take COVID-19 vaccination	41.11	28	17.33	6.89	4.44	3.78±1.54	69.11
There is sufficient evidence that COVID-19 vaccines prevent the occurrence of the diseases.	22.22	32.22	12.22	12.89	20.44	2.34±1.05	54.44
Pharmaceutical companies should promote COVID-19 vaccine only for marketing	3.11	3.55	27.78	36.67	26.67	2.31±0.17	6.66
I would like to get involved in COVID-19 vaccination during immunization campaign	43.77	29.77	17.56	2.89	3.78	4.36±0.47	73.4
I did not influenced by my colleagues I work with	46.66	20	12.22	11.11	10	4.42±1.03	66.66
I will encourage others to get vaccinated	49.77	27.33	11.78	7.56	3.56	4.56±0.13	77.10
I think COVID-19 vaccines are 100% efficient and are tested long enough for safety and efficacy	2.22	5.33	25.78	34.89	31.78	2.64±0.34	7.55
Giving 2 doses of the vaccine at the same time can overload the immune system	5.55	7.11	23.78	16.89	46.67	2.53±0.27	12.66
I will not prefer to go traditional healer than get involved in COVID-19 vaccination	2.88	6	27.33	41.56	22.22	2.11±1.18	8.88
Abbreviations: A, agree; N, neutral; DA, disagree; SA, strongly agree; SDA, strongly disagree; PPR, percent positive response; SD, standard deviation							

Table 5: barriers that hinder COVID-19 vaccination among health care professionals working at governmental hospitals in South Gondar Zone, Ethiopia

Variables	Response	
	Yes	No
	n (%)	n (%)
I am troubled with the vaccine's side effects	185 (41.11)	265 (58.89)
I don't believe that the vaccine will stop the COVID-19 pandemic	49 (10.89)	401 (89.11)
I don't need the vaccine because I do all preventive approaches	87 (19.33)	363 (80.67)
COVID-19 vaccination is a conspiracy therefore it hinders vaccine campaign	187 (41.56)	263 (58.44)
I don't need the vaccine because I'm health at all	134 (29.78)	316 (70.22)
In my life I don't want to see sharp materials like needles	174 (38.67)	276 (61.33)
If my physician recommended it to me to take	267 (59.33)	183 (40.67)
If I know that more studies showed that the vaccine is safe and effective	319 (70.89)	131 (29.11)
If it was compulsory by the government (Ministry of health)	120 (26.67)	330 (73.33)
If it was mandatory by my job	137 (30.4)	313 (69.56)
If my family or friends got vaccinated	110 (24.44)	340 (75.56)
If there is a way other than injection	230 (51.11)	220 (48.89)
I would not take it in anyway	113 (25.11)	337 (74.89)
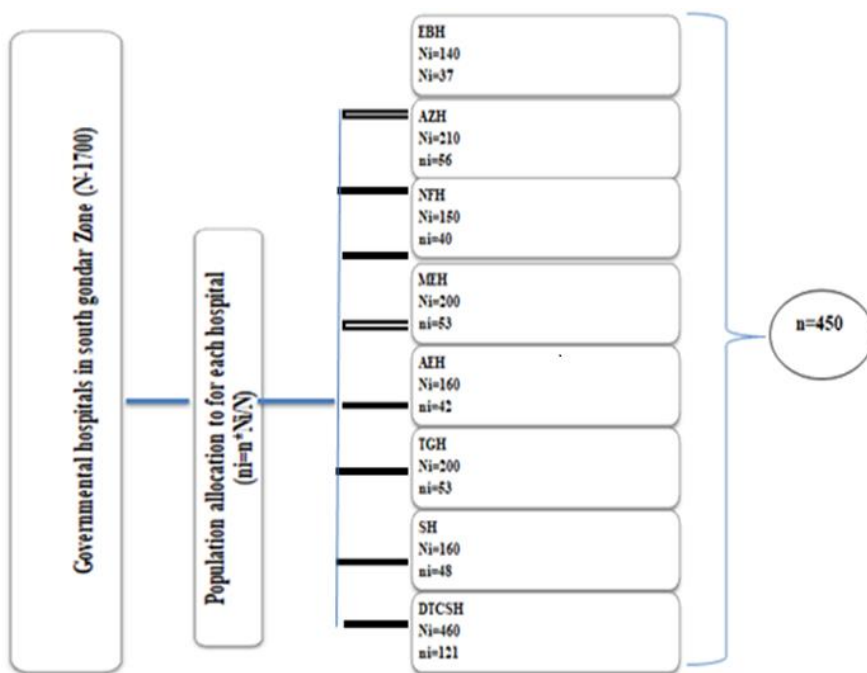
MEH=MekaneEyesus Hospital; AZH=Addis Zemen Hospital; EBH=Ebinat Hospital; NFH=Nefas Mewucha Hospital; AEH= Andabet Hospital; TGH=Tachi-Gainynt Hospital; SH=Simada hospital; DTCSH= Debre Tabor comprehensive specialized hospital

Figure 1: schematic presentation of the sampling procedure