Healthcare workers' knowledge and attitudes towards COVID-19 prevention and control in Tigray, Ethiopia, 2020

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ABSTRACT

Introduction: Globally, healthcare workers (HCWs) are at the frontline of Coronavirus Disease 19 (COVID-19) pandemic prevention and response measures. However, fear and hesitation, knowledge gaps, and lack of positive attitude among healthcare workers can compromise COVID-19 prevention and control measures. This study assessed the knowledge and attitudes of HCWs towards COVID-19 prevention and control in the Tigray region, Ethiopia. **Methods:** A cross-sectional study design was used. A total of 475 HCWs were recruited using a systematic random sampling method from twelve health facilities in the Tigray region. A pre-tested structured and interviewer-administered questionnaire was used to assess the knowledge and attitudes on COVID-19 measured using 19 and 12 question items, respectively. **Results:** The median age of the study participants was 30 years (IQR= 27-35). Out of the 475 study subjects, 244 (51.4%) of the respondents had adequate knowledge of COVID-19 prevention and control and more than half (58%) had a positive attitude. Results indicated that HCWs working in health centers had 2.8 times higher odds of inadequate knowledge (Adjusted Odds Ratio [AOR], 95% Confidence interval: 1.34-5.95) when compared to those who were working in tertiary hospitals. Similarly, females, nurses and midwives, and pharmacists had significantly higher odds of having poor knowledge. Moreover, females had higher odds of negative attitudes. **Conclusion:** A high proportion of the HCWs had inadequate knowledge and negative attitudes on COVID-19 prevention and control measures, this was statistically significantly higher among female health workers.

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Introduction

Globally, healthcare workers (HCWs) are at the frontline of COVID-19 pandemic prevention and response measures [1,2]. However, the fear and hesitation due to the occupational risk and highly contagious nature of the disease coupled with knowledge gaps, cultural beliefs, or behavioral patterns may create problems in COVID-19 prevention and control efforts. Different studies indicated that HCWs experienced psychological concerns such as anxiety, stress, insomnia, depression, and emotional exhaustion [3,4] that might have a negative psychological and social impact [5]. Moreover, their attitude toward pandemic control is believed to have a close association with the perceived risk of infection that affects their willingness to take care of patients. Furthermore, the perceived higher risk of infection among health workers and their families has caused their hesitation and refusal to provide care to patients during the outbreak of SARS [6], the early years of HIV and other catastrophic disasters [7]. Unwillingness to take care of patients may have serious implications for the response capacity of a country and may undermine containment efforts [8].

Understanding the knowledge and attitude gaps of HCWs on COVID-19 prevention and control is the stepping stone of preparedness and response measures and also significantly contributes to triggering precautionary action, enhancing engagement in preventive health behaviors, and making informed decisions about health risks [8,9]. Several studies in Africa showed that healthcare workers adherence to control measures is affected by their level of knowledge, attitudes, and practices towards COVID-19 [10-14].

On the other hand, providing thorough, precise, and timely information can facilitate a clear understanding of HCWs mission and relieve anxiety [15]. However, there is inadequate information on the knowledge and attitude among HCWs regarding the COVID-19 pandemic prevention and control measures, particularly in African healthcare systems. Therefore, the purpose of this study was to assess the knowledge and attitude of HCWs towards the prevention and control of COVID-19 and associated factors in Tigray region of Ethiopia.

Methods

Study area

The study was carried out in Mekelle, Adigrat, and Axum cities, in the Tigray region of Ethiopia, at two tertiary referral hospitals, three general hospitals, and seven health centers. The health system in Tigray is divided into three levels: primary healthcare, which consists of health centers, health posts, and primary hospitals; secondary care, which is supplied by general hospitals; and tertiary care, which is provided by specialized referral hospitals. In the region, there were 233 health centers, 712 health posts, 16 general hospitals, 29 primary hospitals, and 2 specialized hospitals [16, 17].

During the pandemic, Tigray has established six COVID-19 isolation and treatment facilities in Mekelle, Maichew, Axum, Adigrat, Shire, and Humera. All laboratory-confirmed COVID-19 positive cases were admitted to the centers for isolation, care, and support. These centers were assigned the task of managing these cases. To improve the detection of COVID-19 cases, the Tigray Regional Health Bureau conducted mass screenings of all visitors entering the region, people who had contact with confirmed cases of COVID-19, and people from high-risk environments. Polymerase Chain Reaction (PCR) was used in the treatment facilities to confirm cases. Within 24 hours of laboratory confirmation, all patients with SARS-CoV-2 infection were admitted to the isolation and treatment centers, regardless of the onset of signs and/or symptoms [18].

Study design and period

An institution-based cross-sectional study design was conducted to assess the knowledge and attitude of HCWs on COVID-19 prevention and control measures from April to May 2020.

Study population

The source populations were all HCWs serving in all government health facilities in Tigray region. The study population was HCWs including nurses, midwives, health officers, medical doctors, pharmacists, laboratory technologists and biomedical professionals working in the selected health facilities during the study period. The HCWs who were older than 18 years, permanent employee

of the selected facilities, and who were on duty during the study period were included for the study. On the other hand, HCWs who were unwilling to participate and unable to make effective communication were excluded from the study.

Sample size and sampling procedure

The sample size was calculated by using a single population proportion formula [19], with 95% confidence level and a 50% proportion of knowledge and attitude of healthcare workers considering the lack of previous study done in the same population, with a relative precision to be 5%, and 10% nonresponse rate. Accordingly, the total minimum sample size was determined as 423. Practically, our study sampled 475 healthcare workers, of whom 175 were from tertiary hospitals, 207 from general hospitals, and 93 from health centers.

The Tigray Regional Health Bureau emergency operation center selected the tertiary and general hospitals in Mekelle, Adigrat, and Axum cities at the beginning of the pandemic as the region´s COVID-19 diagnostic, treatment, and quarantine centers. We chose the same health facilities for our study purposely since the healthcare workers assigned to these health facilities will be interacting directly with COVID-19 patients during diagnosis, treatment, and quarantine procedures.

During the study period, a total of 2117 healthcare personnel were on duty: 823 in tertiary hospitals, 865 in general hospitals, and 429 in health centers. The 423 minimum sample size was proportionally allocated among the types of health facilities as follows: 165 (39%) HCWs from tertiary, 173 (41%) from general hospitals, and 85 (20%) from health centers. For a systematic random selection of study participants, we requested an alphabetical list containing the names of all employees working in each health facility. We computed the sampling fraction by dividing the total number of healthcare professionals by the sample size, which was 5 (2117/423). We then randomly selected the first nth number from 1 to 5 using a lottery method. Subsequently, we selected samples by adding 5 to the n^{th} number until the required sample size was reached. We started with the n^{th}number as the initial sample.

Data collection tools and methods

The structured questionnaire, used in this study, was developed by reviewing different studies and websites of the World Health Organization (WHO) [20] and Centers for Disease Control and Prevention (CDC) [21]. The structured questionnaire was comprised of three main parts: 1) Socio-demographics information including age, gender, educational status, occupation, service years, and household income; 2) knowledge about COVID-19; and 3) attitudes toward COVID-19 (appendix 1). The data was collected through an interviewer-administered questionnaire by four public health professionals.

Knowledge about COVID-19 was measured through 19 question items. It was necessary to provide a weighted score for all questions in the questionnaire. Accordingly, for each correct answer to the knowledge question, a weighted score varying from 1-3 points was given by three experts by assessing the difficulty of the question, while an incorrect answer or don't know response was assigned 0 points.

The total knowledge score for the HCWs varied between 0 (with no correct answer) and 38 (for all correct answers), and a median cut off level of <19 was considered as inadequate knowledge, and >19 indicated adequate knowledge. The knowledge question items included the participant knowledge about the etiology, mode of transmission, clinical presentations, severity, complications and prognosis and infection prevention measures on COVID-19.

To measure attitudes towards COVID-19, response to 12 question items were assessed through 5 points Likert scale. For each question item, study participants were asked to express their level of agreement as: strongly disagree, disagree, undecided, agree and strongly agree each weighing 1-2 score for each positive statement. Out of the 0 to 18 total score, a median score of >11 (answering strongly agree or agree) was evaluated as a positive attitude and a score of <11 was considered as a negative attitude (answering strongly disagree or disagree or undecided). The questions asked were about the level of knowledge, training and incentive mechanisms provided, readiness of HCWs to fight the disease; use of personal protective equipment and pre-triage screening for prevention of COVID-19; and their confidence towards the measures taken

by concerned agency and ability to win the battle against COVID-19.

Data quality control

The developed structured questionnaire was translated into Tigrigna local language and back to English to ensure content validity. The questionnaire was pre-tested among 5% of the sample size in non-selected health facilities and then amended as required. One-day training was also given to data collectors on the objective, content and method of administration of the questionnaire. The investigators closely monitored and supervised the data collection process. The data was checked for its completeness and consistency on regular basis.

Data analysis

The collected data were entered into Epi data software and then it was cleaned, coded and then transferred to SPSS (version 23; IBM, Armonk, NY, USA) for analysis. Descriptive analysis was applied to calculate the frequencies, percentages, mean and median. Binary logistic regression was computed to examine the level of association among variables. Socio-demographic variables including age, sex, educational status, occupation, family size, marital status, religion and service years were used as predictor variables while having adequate knowledge/inadequate knowledge and having positive or negative attitude/perception were used as outcome (dependent) variables. Variables having p-value < 0.25 were subjected to multivariable analysis. Statistical significance was determined using a P-value of less than 0.05 and Adjusted Odds Ratio (AOR) and their corresponding 95% confidence interval.

Availability of supporting data

The datasets associated with this manuscript belong to Mekelle University. For confidentiality reasons the datasets are not publicly available. However, the data sets can be availed upon reasonable request from the corresponding author.

Ethical Considerations

This study was approved by the Institutional Review Board (IRB) of Mekelle University, College of Health Sciences (ERC 1705/2020) and a support letter was obtained from the Tigray Region Health Bureau. Written informed consent was obtained from study participants after providing adequate information on the study objectives and procedures. This study was funded by Mekelle University.

Results

Socio-demographic characteristics of study participants

Data were collected from 475 healthcare workers (100%) and the non-response rate was nil. The median age, service year and income of the study participants were 30 years (IQR= 27-35 years), 3 years (IQR=1-4 years) and 6000.00 Birr (4446.00-7111.00), respectively. Among the 475 subjects enrolled in the study, 270 (56.8%) were females and 205 (43.2%) males. This study revealed that 56% of the study participants had a Bachelor of Science degree, 25.9% had a diploma and 13.3% had MD degree. Occupationally, more than one-third (35.4%) of the respondents were nurses, 17.9% were laboratory technologists, 14.7% were physicians, and 14.5% were pharmacists **Table 1**.

COVID-19 knowledge and attitude among HCWs

All study participants had heard about COVID-19 and their primary source of information was mass media 64.8% (308/475), social media 23.2% (110/475), health-related institutions websites 8.2% (39/475), and friends 3.8% (18/475). A total of 244 (51.4%) of the respondents had adequate knowledge about COVID-19. Similarly, 58.1% of the respondents had a positive attitude towards COVID-19 prevention and control measures **Figure 1**.

Factors associated with inadequate knowledge of COVID-19 among HCWs

Bivariate and multivariable logistic regression analyses were carried out on various factors including type of health facility, age, sex, family size, marital status educational status, occupation, services years and income of the HCWs. The variable was included in the multivariable analysis if its p value in the bivariate analysis was less than 0.25. In the bivariate and multivariable logistic regression model, type of health facility, sex, education, and occupation were statistically significantly associated

with inadequate knowledge status. In the bivariate analysis, income was significant; however, in the multivariable regression analysis, it became insignificant. The multivariable logistic regression analysis results indicated that healthcare workers working in health centers (AOR = 2.82, 95% CI: 1.34-5.95) had higher odds of inadequate knowledge when compared to those working in tertiary hospitals. Similarly, females, nurses, midwives and pharmacists had significantly higher odds of inadequate knowledge compared to males and biomedical professionals, respectively **Table 2**. Study participants with MD degree had higher odds (AOR = 5.52, 95% CI: 1.15-26.38) of inadequate knowledge but the 95 % CI of the AOR was wide.

Factors associated with a negative attitude on COVID-19 among HCWs

To assess the association of independent variables with negative attitudes, the same previous factors were subjected to bivariate analysis. Those variables that had <0.25 p-value (sex, income, service year and occupation) were fitted into the multivariable analyses. The analysis results showed that females (AOR = 1.87, 95% CI: 1.25-2.79) had nearly two times higher odds of a negative attitude when compared with males. **Table 3**.

Discussion

This study examined health care workers´ knowledge and attitude on prevention and control of COVID-19. It further investigated the association of selected variables with poor knowledge and negative attitude. Accordingly, more than half (51.4%) of the respondents had adequate knowledge towards COVID-19 prevention and control and nearly six of ten (58%) had a positive attitude. HCWs working in health centers had higher odds of inadequate knowledge when compared to those working in tertiary hospitals. Similarly, being female, nurse and midwives and pharmacists were significantly associated with inadequate knowledge compared with their counterparts.

The current finding of knowledge level among HCWs was comparable with the findings of 56.5% from Iran [22]. Clear discrepancies were observed between our findings and other studies conducted elsewhere. A global websites-based survey found that 61.0% of the HCWs had poor knowledge of transmission and 63.6% of onset of symptoms [23]. Several other studies documented higher percentages of good knowledge of COVID-19. A study from Nepal reported that 69.2% of the participants had a good awareness of the disease [24]. In Uganda, a study found that 69% [25] of the respondents had sufficient knowledge. A study from Malaysia, documented that study subjects had an overall 80.5% good knowledge [26]. A study recorded that 88.4% of the HCWs [27] had sufficient knowledge in Ho Chi Minh City, China. Moreover, another study showed that more than 93.2% of the HCWs in Pakistan had good knowledge [28].

Meaningful comparisons of knowledge levels across these studies were generally hampered by the disparities in the measurement and scoring systems employed in the various studies [29]. The makeup, breadth, and depth of the knowledge questions employed, as well as the variations in measurement and scoring methodology, may be responsible for the observed variations. Health centers were also included in our study; healthcare workers employed in health centers may have fewer training hours and engage in less active information searching. Higher degree holders were said to be able to actively learn about such infectious diseases through a variety of information sources [21]. It has been documented that the sampled health facilities' efforts to raise awareness and educate the public were few and insufficient. The sampled health facilities' efforts to raise awareness and educate the public were few and insufficient. Low level of knowledge is said to be a sign of restricted access to timely and reliable information about the virus [26]. Other potential sources of variation could be the status of the epidemic in the various countries and differences in survey techniques (personal interview versus telephone/internet interview).

It is important to remember that having solid COVID-19 knowledge is linked to increased self-assurance, optimistic outlooks, and appropriate COVID-19 practices [21, 26]. Positive attitudes were linked to government initiatives for disease prevention and control in reducing the spread of disease [26]. HCWs' inadequate knowledge and unfavourable attitudes have a detrimental impact on their ability to treat infected patients with the lowest possible risk [28]. Insufficient understanding may have negative effects on both the dynamics of

prospective COVID-19 outbreaks and patient care. Furthermore, the apparent ignorance of this matter may cause delays in the adoption of essential restraint protocols and personal protective equipment, thereby exacerbating the COVID-19 pandemic [23]. Therefore, it is critical to implement health education initiatives targeted at enhancing COVID-19. These findings imply that policymakers and program managers need to give more focus on educating female and medium-level professionals as they were found less knowledgeable about COVID-19.

In our study, knowledge and attitude of COVID-19 varied across different categories of HCWs. Accordingly, a lower level of knowledge was reported among HCWs working in health centers and among females, nurses and midwives and pharmacists. Similarly, females and study participants with higher average incomes had higher odds of negative attitudes. Our observation was consistent with a study [22] which reported that HCWs knowledge is significantly associated with the profession. According to a study finding [23], age and profession were associated with inadequate knowledge and a poor perception of COVID-19. Unlike our findings, one study demonstrated that knowledge was significantly lower among older, less educated, lower-income participants, and rural residents [29]. Another study found that the factors associated with knowledge were age >40 years and news media [24].

The correlation between inadequate knowledge and being women, nurses, midwives, and pharmacists may stem from variations in their educational background, occupation, financial status, attitude towards risk, and approach to obtaining information. Research has shown that different behavior manifestations can be attributed to different information sources, media exposure frequency, knowledge, trust in public health agencies, information-seeking behaviors, and outbreak-related anxiety [29].

On the other hand, different figures have been reported in different countries on the attitude of healthcare workers towards COVID-19 prevention and control measures. The perception levels in Uganda were found to be lower (21%) than in our study [24]. Other research, however, indicated a greater degree of optimistic outlook and attitude. According to a global survey, more than 78% of HCWs had a favourable opinion of COVID-19 [23]. According to one study, 83.1% [26] of the HCWs had positive attitudes regarding COVID-19's successful containment in Malaysia and another study in China found that over 90.0% of the participants had positive attitude to COVID-19.

Surprisingly study participants with a medical degree (MD) had higher odds of inadequate knowledge but the 95 % CI of the AOR was wide. As there were only 17 study participants with MD degrees, the 95% confidence interval was extremely broad, so we were unable to draw the conclusion that their knowledge was insufficient.

This study has made it possible to pinpoint knowledge and attitude gaps that healthcare professionals have in COVID-19 prevention and control, gaps that should be filled before implementing an intervention. To ensure that the study could be applied to the source population, participants were chosen from a wide range of health facilities and professions. An expert panel assessed the study's instruments for clarity and applicability to increase content validity. Analysis of multivariate logistic regression was done to control for confounding variables.

Limitations

The study design used in this study could not definitely establish causal association. This study may not rule out the possible the occurrence of bias due to self-report. Moreover, using median score cutoff value to determine poor vs good and positive vs negative attitude may not be accepted as standard procedure by all academia.

Conclusion

In this study, five of ten HCWs had adequate knowledge regarding COVID-19 and almost six of ten health workers showed a positive attitude regarding their readiness to tackle the disease. Type of health facility, sex and occupation were statistically significantly associated with having inadequate knowledge of COVID-19. Healthcare workers working in referral and general hospitals were more knowledgeable compared to those working in health centers. Furthermore, nurses,

midwives and pharmacy professionals had inadequate knowledge towards the prevention and control of COVID-19 pandemic compared to biomedical professionals. Female health workers were statistically significantly more likely to have inadequate knowledge and a negative attitude towards COVID-19 compared to their male counterparts.

To improve the readiness and preparedness of the healthcare workforce, considerable efforts of training and supportive supervision are needed by concerned officials. Higher learning institutions, implementing agencies such as the Tigray Regional Health Bureau and concerned stakeholders need to work in collaboration to address the existing knowledge and attitude gaps among healthcare workers. Interventions should prioritize female health workers.

What is known about this topic

- Coronavirus disease 2019 (COVID-19), the disease caused by the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), has spread rapidly worldwide affecting more than 216 countries and territories
- The pandemic originated in Wuhan, China, was declared as global public health emergency by World Health Organization (WHO) on 30 January 2020
- Globally, healthcare workers (HCWs) are at the frontline of COVID-19 pandemic prevention and response measures

What this study adds

- The study showed that there is inadequate knowledge and attitude among HCWs regarding the COVID-19 pandemic prevention and control measures
- Policymakers and program managers need to develop effective context-specific prevention and control interventions to guide them in to fight against COVID-19.
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Competing interests

The authors declare no competing interests.

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Authors' contributions

GB conceived the study idea, designed the study, and developed the tools for the study, supervised data collection, conducted analyses and wrote the drafted version of the manuscript. TG, contributed in design and tool development, supervised data collection, reviewed the manuscript. KG contributed in study design, tool development, data collection, supervision and edition of the manuscript. DZ contributed in data collection, supervision and edition of the manuscript. GG contributed in design, tool development and review of the manuscript. All authors have read and approved the final manuscript.

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Tables and figures

Table 1: Socio-demographic characteristics of study participants in Tigray region, 2020

Table 2: Factors associated with inadequate knowledge on COVID-19 among Health care workers in Tigray region, Ethiopia, 2020

Table 3: Factors associated with negative attitude towards COVID-19 among HCWs in Tigray region, Ethiopia, 2020

Figure 1: Level of knowledge and attitude on COVID-19 among HCWs in Tigray region, Ethiopia, 2020

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Table 1: Socio-demographic characteristics of study participants in Tigray region, 2020			
Variables	**Category**	**Frequency (n=475)**	**Percent**
Health facility type			
	Tertiary Hospital	175	36.8
	General Hospital	207	43.6
	Health Center	93	19.6
Age in years			
	15-24	34	7.2
	25-34	308	64.8
	35-44	72	15.2
	45-54	53	11.2
	≥ 55	8	1.7
Sex			
	Male	205	43.2
	Female	270	56.8
Family size			
	1 ≤ 6	242	50.9
	> 6	233	49.1
Marital status			
	Single	219	46.1
	Married	252	53.1
	Divorced	3	0.6
	Widowed	1	0.2
Religion			
	Orthodox	448	94.3
	Catholic	13	2.7
	Muslim	10	2.1
	Protestant	4	0.8
Educational status			
	Diploma	123	25.9
	BSc Degree	267	56.2
	Master Degree	22	4.6
	MD Degree	63	13.3
Occupation			
	Biomedical professionals	106	22.3
	Nurses and Midwives	207	43.6
	Pharmacists	71	14.9
	Doctors and Health Officers	91	19.2
Service years			
	1 ≤ 5	240	50.5
	> 5	235	49.5

Table 2: Factors associated with inadequate knowledge on COVID-19 among Health care workers in Tigray region, Ethiopia, 2020

Variables with categories	n=475	Knowledge		Crude OR (95% CI)	p value	Adjusted OR (95% CI)
		Poor (%)	Good (%)			
Health facility type						
Tertiary Hospital	175	63 (36.0)	112 (64.0)	1		1
General hospitals	207	81 (39.1)	126 (60.9)	1.14 (0.75-1.73)	0.529	1.25 (0.78-1.99)
Health Centers	93	38 (40.9)	55 (59.1)	2.57 (1.54-4.31)	<0.001	2.82 (1.34-595)
Age in years						
15-24	34	15 (44.1)	19 (55.9)	1		1
25-34	308	188 (61.0)	120 (39.0)	0.50 (0.25-1.03)	0.060	0.61 (0.27-1.40)
35-44	72	46 (63.9)	26 (36.1)	0.45 (0.19-1.023)	0.057	0.51 (0.19-1.37)
45-54	53	24 (45.3)	29 (54.7)	0.95 (0.40-2.27)	0.915	0.62 (0.21-1.79)
≥ 55	8	3 (37.5)	5 (62.5)	1.32 (0.27-6.41)	0.734	0.59 (0.09-3.63)
Sex						
Male	205	150 (73.2)	55 (26.8)	1		1
Female	270	126 (46.7)	144 (53.3)	3.12 (2.11-4.61)	<0.001	2.29 (1.45-3.63)
Family size						
1 ≤ 6	289	175 (60.6)	114 (39.4	1		1
> 6	186	101 (54.3)	85 (45.7)	1.29 (0.89-1.88)	0.178	1.17 (0.74-1.85)
Marital status						
Single	219	92 (42.0)	127 (58.0)	1		
Married	252	104 (41.3)	148 (58.7)	0.97 (0.67-1.40)	0.871	
Educational status						
Diploma	123	68 (55.3)	55 (44.7)	1		1
BSc Degree	267	108 (40.4)	159 (59.6)	0.56 (0.36-0.85)	0.006	0.97 (0.52-1.81)
Master's Degree	22	6 (27.3)	16 (72.7)	0.30 (0.11-0.83)	0.020	1.14 (0.33-3.94)
MD Degree	63	17 (26.9)	46 (73.0)	0.29 (0.15-0.58)	<0.001	5.52 (1.15-26.38)
Occupation						
Biomedical professionals	106	78 (73.6)	28 (26.4)	1		1
Nurses and Midwives	207	104 (50.2)	103 (49.8)	2.76 (1.66-4.59)	<0.001	2.34 (1.29-4.22)
Pharmacists	71	25 (35.2)	46 (64.8)	5.12 (2.67-9.83)	<0.001	5.35 (2.65-10.78)
Doctors & Health Officers	91	69 (75.8)	22 (24.2)	0.89 (0.47-1.69)	0.719	0.34 (0.09-1.18)
Service years						
1 ≤ 5	240	138 (57.5)	102 (42.5)	1		
> 5	235	138 (58.7)	97 (45.7)	0.95 (0.66-1.37)	0.787	
Income in Birr						
2000.00-6000.00	242	119 (49.2)	123 (50.8)	1		1
6001.00-20000.00	233	157 (67.4)	76 (32.6)	0.47 (0.32-0.68)	<0.001	0.76 (0.45-1.29)

Table 3: Factors associated with negative attitude towards COVID-19 among HCWs in Tigray region, Ethiopia, 2020

Variables with Category	N	Attitude		Negative Attitude		
		Negative (%)	Positive (%)	COR (95% CI)	p value	AOR (95% CI)
Health facility type						
Tertiary Hospital	175	86 (49.1)	89 (50.9)	1		
General hospitals	207	97 (46.9)	110 (53.1)	0.91 (0.61-1.37)	0.656	
Health Centers	93	48 (51.6)	45 (48.4)	1.10 (0.68-1.83)	0.700	
Age (in years)						
15-24	34	14 (41.2)	20 (58.8)	1		
25-34	308	150 (48.7)	158 (51.3)	1.36 (0.66-2.78)	0.406	
35-44	72	35 (48.6)	37 (51.4)	1.35 (0.59-3.08)	0.474	
45-54	53	28 (52.8)	25 (47.2)	1.60 (0.0.67-3.82)	0.290	
≥ 55	8	4 (50)	4 (50)	1.43 (0.31-6.69)	0.651	
Sex						
Male	205	82 (40.0)	123 (60%)	1		1
Female	270	149 (55.2)	121 (44.8)	1.85 (1.28-2.67)	0.001	1.87 (1.25-2.79)
Family size						
1 ≤ 6	289	140 (48.4)	149 (51.6)	1		
> 6	186	91 (48.9)	95 (51.1)	1.02 (0.70-1.47)	0.918	
Marital status						
Single	219	103 (47.0)	116 (53)	1		
Married	252	127 (50.4)	125 (49.6)	1.14 (0.79-1.64)	0.466	
Educational status						
Diploma	123	57 (46.3)	66 (53.7)	1		
BSc Degree	267	133 (49.8)	134 (50.2)	1.15 (0.75-1.76)	0.524	
Master Degree	22	11 (50%)	11 (50)	1.16 (0.47-2.87)	0.752	
MD Degree	63	30 (47.6)	33 (52.4)	1.05 (0.57-1.93)	0.869	
Occupation						
Biomedical professionals	106	28 (26.4)	78 (73.6)	1		1
Nurses and Midwives	207	103 (49.8)	104 (50.2)	1.54 (0.96-2.46)	0.073	1.54 (0.66-2.78)
Pharmacists	71	46 (64.8)	25 (32.5)	0.77 (0.42-1.42)	0.404	0.77 (0.42-1.42)
Doctors & Health Officers	91	22 (24.2(	69 (75.8)	1.13 (0.64-1.97)	0.240	1.13 (0.64-1.97)
Service years						
0 ≤ 5	240	106 (44.2)	134 (55.8)	1		1
> 5	235	125 (53.2)	110 (46.8)	1.44 (1.00-2.06)	0.049	1.33 (0.91-1.96)
Income (in Birr)						
2000.00-6000.00	242	109 (45.0)	133 (55)	1		1
6001.00-20000.00	233	122 (52.4)	111 (47.6	1.34 (0.94-1.92)	0.111	1.51 (1.00-2.27)

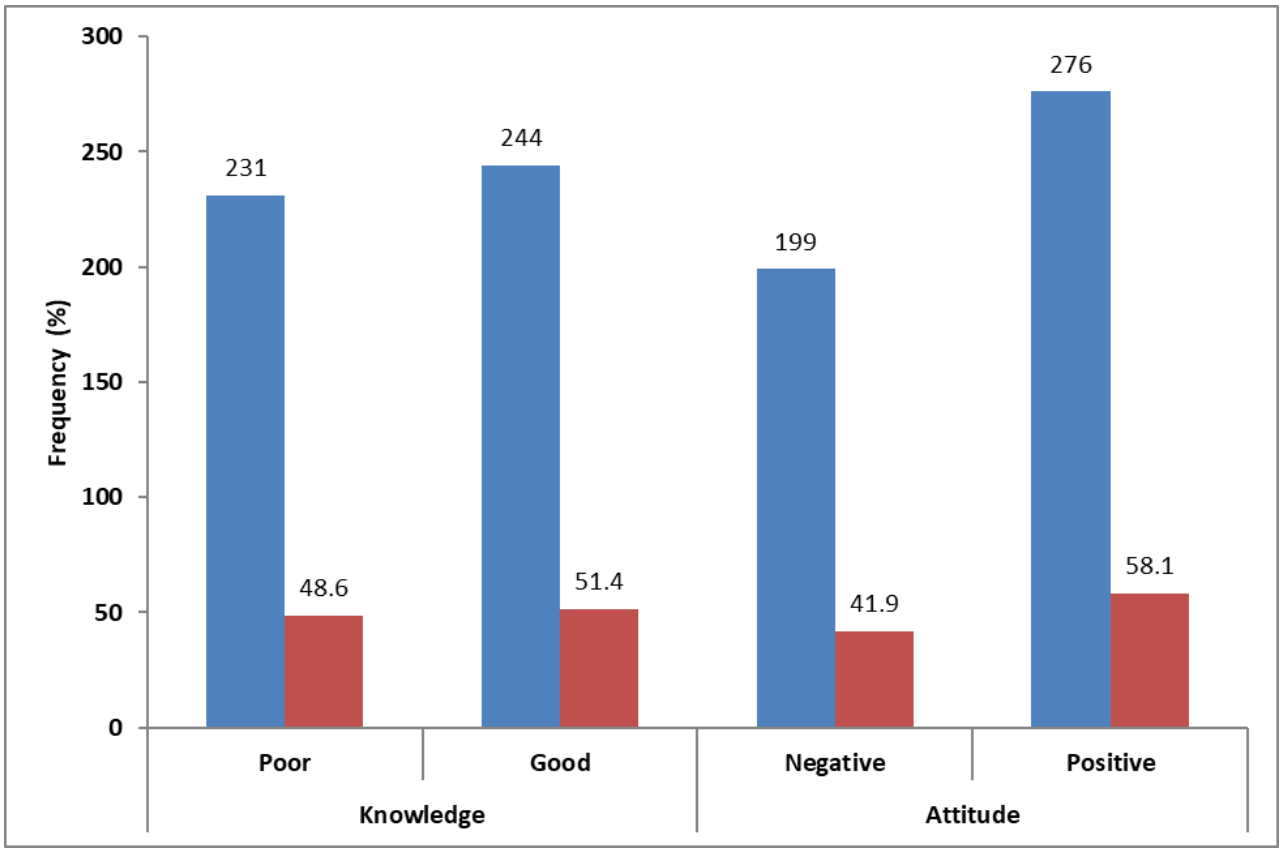

Figure 1: Level of knowledge and attitude on COVID-19 among HCWs in Tigray region, Ethiopia, 2020