Knowledge, attitude and practice towards COVID-19 among healthcare workers in public health facilities, Eastern Ethiopia

Alinoor Mohamed Farah, Tahir Yousuf Nour, Muse Obsiye, Mowlid Akil Aden, Omar Moeline Ali, Muktar Arab Hussein, Abdullahi Bedel Budul, Muktar Omer, Fentabil Getnet

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Table of Contents

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Abstract

Background: On 13 March 2020, Ethiopia reported the first confirmed case of COVID-19 in Addis Ababa. COVID-19 is likely to overwhelm an already fragile health- care delivery system and reduce the availability of services for endemic health concerns such as malaria and diarrheal diseases. This analysis of data from Somali region of Eastern Ethiopia on health workers knowledge, attitude and practice towards the prevention and control of COVID-19 may be used in planning health education programs about the emerging viral disease.

Objective: This study is aimed to investigate the knowledge, attitude and practice of health workers towards COVID-19 infection

Methods: Cross sectional study was conducted on health care workers in three public health facilities in Somali region, Eastern Ethiopia. A questionnaire with 43 questions was shared to the all health workers working at the public health facilities. Knowledge and practice questions were scored as 1 or 0 for correct and incorrect responses, respectively. Whereas, attitude responses were provided with 1, 2, 3, 4 or 5 for “Strongly Agree, “Agree”, “Neutral”, “Disagree” and “Strongly Disagree”, respectively. Mean scores were calculated and used as a cut point to dichotomize the outcome variables. T-test and ANOVA were used to analyze the relationship between the dependent, and independent variables. Spearman’s correlation was used to assess the relationship between mean knowledge and attitude scores.

Results: Of the 686 HCWs approached, total of 434 HCWs responded (response rate = 63%). A vast majority of the participants were male (n = 293, 67.5%), with a mean age of 27.6 (SD: 5.3) years. The mean knowledge score was 13.7 (SD: 2.6). Almost ninety percent (n = 381) of the participants scored 12 or more and were considered to have su?cient knowledge. The mean attitude score 10.5 (SD: 4.1). Overall, there was poor attitude among HCWs toward COVID-19. Only 45.2 % (n = 196) of the participants had a good attitude toward COVID-19. There was a negative correlation between knowledge scores, attitude scores (r=-0.295, P<0.001) and practice (r=-0.298, P<0.001).

Conclusions: The overall level of knowledge was good. However, the attitude and practice were relatively low. We recommend strategies for enhancing the capacity of healthcare workers to develop positive attitude and practice.

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Knowledge, attitude and practice towards COVID-19 among healthcare workers in public health facilities, Eastern Ethiopia

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Abstract

Background: On 13 March 2020, Ethiopia reported the first confirmed case of COVID-19 in Addis Ababa. COVID-19 is likely to overwhelm an already fragile health-care delivery system and reduce the availability of essential health services. This analysis of data from Somali region of Eastern Ethiopia on health workers knowledge, attitude and practice towards the prevention and control of COVID-19 may be used in planning health education programs about the emerging viral disease.

Objective: This study is aimed to investigate the knowledge, attitude and practice of health workers towards COVID-19 infection

Methods: Cross-sectional study was conducted among healthcare workers in three public health facilities in Somali region, Eastern Ethiopia. A self-administered questionnaire was shared to the all-health workers working at the public health facilities. Multiple questions with nominal scale were used to assess Knowledge (15 questions) and practice (6 questions); whereas attitude was assessed using 14 Likert 5-scale questions in negative dimension. Mean scores were calculated and used as a cut point to dichotomize the outcome variables (good knowledge >13.7; good practice <18.8 and favorable attitude <10.5). T-test and ANOVA were used to analyze the mean score differences of knowledge, attitude and practice between the independent variables. Spearman's correlation was used to assess the relationship between mean knowledge and attitude scores.

Result: Of the 686 HCWs approached, a total of 434 HCWs responded (response rate = 63%). Mean age of participants was 27.6±5.3 years, and majorities (67.5%) of them were

male. The mean knowledge score was 13.7± 2.6 and 73% of participants had sufficient knowledge. The mean attitude score was 10.5±4.1 and 55% of the participants) had a good attitude toward COVID-19. The mean practice score was 18.8± 5.8 and 62% of the participants better practiced COVID-19 precautionary measures. There was a negative correlation between knowledge scores, attitude scores (r=-0.295, P<0.001) and practice (r=-0.298, P<0.001).

Conclusion: The overall level of knowledge and practice was relatively better than the attitude. This highlights the need to implement strategies that enhance the positive attitude and safe practice of the healthcare workers for better containment of the pandemic and essential healthcare services.

Key words: covid-19, knowledge, attitude, practice, healthcare workers, Eastern Ethiopia

Background

COVID-19 is an emerging, rapidly changing global health challenge affecting all sectors including health sector [1]. In Ethiopia and in Somali region in particular there is already a limited number of health workers in the health sector putting extreme strain on capacity to serve patients, especially for non-emergency care [2]. Thus, COVID-19 is likely to overwhelm an already fragile health- care delivery system and reduce the availability of services for endemic health concerns such as malaria and diarrheal diseases including cholera[3]. Ethiopia’s safe water supply is 30 per cent, serving as the leading cause of communicable diseases in the country. As a result, pre-existing inadequate hygiene practices, insufficient coverage in water and sanitation services, and overcrowding living situations all contribute to the virus's occurrence and transmission.

The pandemic is also adding to the burden of endemic infectious diseases that prevail in many countries with an ongoing humanitarian response, such as cholera, measles, malaria, HIV and tuberculosis.

To date, no specific antiviral treatment has been confirmed to be effective against COVID-19 [4]. Regarding infected patients with COVID-19, it has been recommended to apply appropriate symptomatic treatment and supportive care [5, 6]. Therefore, applying preventive measures to reduce the spread of disease is of utmost importance.

In this regard, airborne precautions and other protective measures have been discussed and proposed for prevention. Recommended preventive measures include regular hand washing with soap, social/physical distancing, and respiratory hygiene (covering mouth and nose while coughing or sneezing) [5, 7].

The WHO also issued guidelines on the use of face masks in different settings including in the community, home based care, and in the health care settings of COVID-19[8]. In this guideline, health care workers are recommended to use facemask such as those certified N95 when performing aerosol-generating procedures and to use medical masks when providing care to suspected or confirmed COVID-19 cases. However, these effective prevention and control practices depend on awareness and compliance among health workers at all levels.

A poor level of knowledge has been implicated in the rapid spread of the infection in health facilities [9, 10] and delay of treatment[11], and may put patients' lives at risk. On the other hand, health care workers (HCWs) are not only at the forefront of the fight against this highly contagious infectious disease but are also directly or indirectly affected by it and the likelihood of acquiring this disease is higher among HCWs compared to the general population [12]. It is therefore crucial that HCWs across the across Ethiopia and in Somali region have adequate knowledge about all aspects of the disease from clinical manifestation, diagnosis, proposed treatment, and established prevention strategies.

Thus, the current work is aimed to investigate the knowledge, attitude and practice of health workers towards COVID-19 infection. The findings may be useful in recommending any remedial measures and additional interventions in the study area to improve awareness, attitude and practice among health care workers.

Method and materials

Study design, setting and period

An institution based cross-sectional study was conducted from June to August 2020 at Jigjiga University Teaching hospital and two health centers in Jigjiga town, Somali Region State of Ethiopia. There are two hospitals in the town; one is a multidisciplinary specialized teaching hospital with 351 inpatient beds and the other one is a general hospital with 193 inpatient beds. Currently, they provide health services to more than one million inhabitants

in the catchment area. During data collection, the general hospital (Karamara) was turned into covid-19 treatment center and was not accessible for the study. Most of its staff were reassigned to other health facilities to support the provision of basic health services.

Sample size determination and Sampling

Employees that were invited to participate in this study were all healthcare workers employed by the public health facilities in Jigjiga city. We included healthcare workers who are believed to have patient care or specimen contact such as physicians, nurses, midwives, health officers, laboratory professionals, x-ray professionals, pharmacists/druggists, anesthetists and biomedical professionals.

All public health facilities in the town except the one fully dedicated for COVID-19 were included. We contacted the human resource units to receive the list of healthcare workers who have direct patient and specimen contact in the respective facilities. Finally, we came up with a total of 686 healthcare workers which was taken as a final sample size.

Eligibility criteria

Only full-time employee (healthcare workers) who are potentially at high-risk (physicians, medical laboratory technologists, nurses, and midwives), available during the data collection period and who were ready to take part in the study were included.

Data collection and quality control

A structured self-administered questionnaire was used to collect the data. The questionnaire was designed in reference with the Ahmed M. Asaad' study towards the Middle East Respiratory Syndrome Coronavirus (MERs CoV) and adapted from the current interim guidance and information for healthcare workers published by the CDC [13, 14]. The questionnaire consists of six socio-demographic questions, and 35 questions on knowledge, attitude and infection control practices related to COVID-19 disease in the healthcare setting. A pre-test was done in 5% of the study participants to estimate the duration required to complete the survey, ensure clarity of the questions, avoid potential bias, and validate the internal consistency of the items in attitude measurement. The Cronbach's alpha value was 0.72 which was acceptable. The questionnaire has a satisfactory level of construct validity and internal consistency, according to the result.

The questionnaires were collected daily, checked for completeness and if any incomplete questionnaire, the respondent was contacted for completion. In addition, timely supervision of the data collection process was done by the investigators. During collection of the questionaries precautionary measures such as wearing of masks, physical distancing was observed. Data quality assurance was ensured during data collection, regular supervision

and follow up were made.

Measurements of Knowledge, Attitude and Practice

Knowledge and practice questions were scored as 1 or 0 for correct and incorrect responses, respectively. The total knowledge score varied between 0 (with no correct answer) and 15 (for all correct answers), and a mean score of ≤13.7 was considered as poor knowledge, and >13.7 indicated good knowledge. The question regarding the practice was fourteen (with minimum score 14 and maximum score 42). The score of the practice based on 3 points, in which the score of 1 to 3 was given from always to never. A mean score >18.8 (answering for never or occasionally) was considered as having poor practice and a score of ≤18.5 indicated a good practice (answering always). Thus, the lower the practice scores were, the higher the probability of good practice and the vice versa.

Whereas, attitude responses were provided with 1, 2, 3, 4 or 5 for “Strongly Agree, “Agree”, “Neutral”, “Disagree” and “Strongly Disagree”, respectively. The question regarding the attitude was six (with minimum score of 6 and maximum score of 30). The score of the attitude was based on 5 points Likert scale, in which the score of 1 to 5 was given from strongly disagree to strongly agree. A mean score >10.5 (answering for disagree or strongly disagree or neutral) was considered as a negative attitude and a score of ≤10.5 was considered positive attitude (answering strongly agree or agree). Therefore, the lower the attitude scores were, the higher the probability of positive attitudes and the reverse applied for a high score.

Data analysis

Data was coded and entered into Epi info version 3.5.1 software and exported into STATA version 14.1 for analysis.

Summary statistics such as frequencies and proportions were computed as appropriate. T-test and ANOVA were used to analyze the relationship between the dependent (knowledge, attitude and practice), and independent variables (demographic characteristics of the participants). Spearman’s correlation was used to assess the relationship between mean knowledge and attitude scores. All the differences of estimated variables were considered statistically significant if $P<0.05$.

Ethical considerations

Ethical clearance and support letters were obtained from the Ethical Review Committee (ERC) of the College of Medicine and Health Sciences, Jigjiga University. The support letter then submitted to the public health facilities. Then, permission was obtained from the

health facilities director and department/section heads. Study participants were informed about the purpose and importance of the study through written informed consent before the data collection process. In addition, participants who are unwilling to take part in the study and those who need to quit their participation at any stage were informed to do so without any restriction.

Result

Socio-demographic characteristics

Of the 686 HCWs approached, total of 434 HCWs responded (response rate = 63%). The mean age of participants was 27.6 ±5.3 years, and majorities of the participants were male (67.5%) and below 40 years of age (97.5%). Majorities of the participants were working in the Referral Hospital (79.5%), nurses in profession (74.2%) and had more than 5 years' experience (70.7%). The main sources of information about COVID-19 were WHO followed by government health authorities and media (See Table 1).

Table 1: Sociodemographic characteristics of the healthcare workers in Jigjiga town,

Variable	Frequenc y (n)	%
Sex		
Male	293	67.5
Female	141	32.5
Age (Mean, SD)	27.6	5.3
18-39	423	97.5
>40	11	2.5
Qualification		
Nurse (including midwives)	322	74.2
Physician	36	8.3
Pharmacist	26	6.0
Dentist	7	1.6
Laboratory technologist	31	7.1
X-ray physician	12	2.8
Place of work		
Referral hospital	345	79.5
Karamara hospital	33	7.6
Ablele HC	44	10.1
Ayrdage HC	12	2.8
Work experience (Mean, SD)	8.3	9.1
0-4 years	127	29.3
>5 years	307	70.7

Source of information on covid-19		
WHO	241	55.5
Government site and media	105	24.2
Social media	52	12.0
Other news media	30	6.9
Others	6	1.4

Key: social media include WhatsApp, Facebook and telegram

Knowledge

Table 2 shows the details of the responses given by the health professionals for each knowledge question dealing with COVID-19 signs and symptoms, potential admission criteria required to identify patients at risk, approaches to prevent the transmission in hospitals and possible supportive treatment for COVID-19 patients.

Of the total of healthcare providers participated in the study, 73% had sufficient knowledge (Figure 1). Almost all HCWs were able to correctly identify COVID-19 key symptoms. Data from current study revealed that 94.4% of respondents fully understood the common sign and symptoms of COVID-19. Almost 90% were also aware of factors likely to be associated with severity of the disease.

Majority of the respondents understood dynamics of COVID-19 infectiousness: 91.5% respondents were aware of possibilities to infect before the onset of symptoms; 90.8% of HCWs responded true on droplets as a major transmission route. Considerable proportions of respondents (93.1%) were informed that the incubation period is not constant and could vary from 2-14 days.

With respect to prevention of transmission from known or suspected patients, health professionals knew most of the preventive measures. The majority of health professionals (92.2%) responded that isolation could be the possible ways to prevent

COVID-19. The majority (91%) of them responded that standard precautions should be followed by health care providers when dealing with suspected, probable and confirmed cases of COVID-19 infection (See Table 2).

Table 2: Knowledge of HCWs toward the COVID-19, 2020

uestions	**Response (N**	
nowledge	**True (n, %)**	**False (n, %)**
he common symptoms of COVID-19 are fever fatigue and dry cough	414(95.4)	13(3.0)
he causative agent of COVID-19 is corona virus	410(94.4)	12(2.8)

he incubation period of COVID-19 is 2-14 days	404(93.1)	21(4.8)
ot all persons with COVID-2019 will develop to severe cases. Only those who are elderly,	390(89.9)	33(7.6)
ave chronic illnesses are more likely to be severe cases.		
OVID-19 can be transmitted through direct contact of respiratory droplets when infected	394(90.8)	28(6.4)
ersons coughs or sneezes.		
he disease can be transmitted from asymptomatic patient	397(91.5)	26(6.0)
raining and observation of standard precautionary measures are required by care-giving	392(90.3)	30(6.9)
ersonnel in suspected and probable cases of COVID-19 infection		
isitors to patients with suspected, probable and confirmed cases of COVID-19 infection	406(93.6)	22(5.1)
hould be limited both in hospital and at home		
he disease can be spread by touching a surface or object that has the virus on it and then	401(92.4)	22(5.1)
uching their own mouth, nose, or possibly their eyes.		
olation and treatment of people who are infected with the COVID-19 virus are effective	404(93.1)	23(5.3)
ays to reduce the spread of the virus.		
eople who have contact with someone infected with the COVID-19 virus should be	400(92.2)	24(5.5)
mmediately isolated in a proper place. In general, the observation period is 14 days.		
person with mild symptoms of COVID-19 must remain at home until resolution of	398(91.7)	30(6.9)
inical symptoms		
tandard precautions should be followed by health care providers in dealing with suspected,	395(91.0)	29(6.7)
robable and confirmed cases of COVID-19 infection		
xygen therapy should be given to all cases of severe COVID-19 with acute respiratory	369(85.0)	54(12.5)
fection		
entilation with an endotracheal tube must be carried out in patient with confirmed and or	379(87.3)	40(9.2)
uspected COVID-19 with clinical manifestations of acute respiratory distress symptoms.		

Attitude

Of the total of healthcare providers participated in the study, 55% had positive attitude (Figure 1). Only 48.8% (n = 212) were confident that COVID-19 can be controlled by public health institute. More than half of the HCW (52.1%) agreed that this disease can be prevented and less than half of HCWs (49.3%) agreed it is imperative to use surgical mask when working with patient with COVID-

19 but unfortunately 52.1% of the HCWs were not confident in dealing with COVID-19 patients (See Table 3).

Table 3: Attitude of HCWs toward the COVID-19, 2020

Questions	Response (N=434)				
Attitude	**SA**	**A**	**N**	**D**	**SD**
Caring for patients with COVID-19 infection may be a threat to health care personnel	226(52.1)	147(33.9)	28(6.4)	24(5.5)	9(2.1)
Public health agencies like EPHI can control Outbreak of COVID-19	212(48.8)	121(27.9)	42(9.7)	50(11.5)	9(2.1)
COVID-19 can have a negative effect on the economies of the countries involved	231(53.2)	135(31.1)	24(5.5)	36(8.3)	8(1.9)
It is important to report suspected cases to health authorities	301(69.3)	104(24.0)	11(2.5)	13(3.0)	5(1.2)
COVID-19 is preventable	226(52.1)	136(31.3)	33(7.6)	23(5.3)	16(3.7)
It is imperative to use surgical mask when working with patient with COVID-19	214(49.3)	136(31.3)	23(5.3)	26(6.0)	35(8.1)

Key: SA (Strongly Agree); A(Agree); N(Neutral); D(Disagree); SD (Strongly Disagree)

Practice

Of the total of healthcare providers participated in the study, 62% practiced precautionary measures to prevent COVID-19 (Figure 1). About practical measures put in place by HCWs in order to protect themselves and their families are presented in table 4. A total of 72% of health care workers reported to always wore personal protective equipment when coming into contact with the patients and up to 67.5% washed their hands before and after touching each patient. Other measures observed included: 72.8% always avoided going to crowded places 71.4% always avoided shaking hands, hugging or kissing. In addition, 71.7% of the participants always keep safe distance and 71% of HCWs cover their mouths when sneezing or coughing. Unfortunately, as high as 72.6% (n = 315) of the participants had avoided patients with symptoms suggestive to those of COVID-19.

Table 4: Practice of HCWs toward the COVID-19, 2020

Questions	Response (N=434)		
Practice	**Always (n, %)**	**Occasional (n, %)**	**Never (n, %)**
I always wear the personal protective equipment when handling a patient	314(72.3)	101(23.3)	19(4.4)
I wash my hands with water and soap before putting on the gloves	302(69.6)	105(24.2)	27(6.2)
For residual protection, I use hand sanitizer after washing hands with soap and water	303(69.8)	103(23.7)	26(6.5)
I wash hand between patients (before and after examining)	293(67.5)	105(24.2)	36(8.3)
I wash my hands whenever they are soiled	298(68.7)	113(26.0)	23(5.3)
I wash my hands after blowing nose or covering a sneeze	289(66.6)	114(26.3)	31(7.1)
I wash my hands with soap and water and apply with hand sanitizer when leaving the health facility	208(71.0)	107(24.6)	19(4.4)
When I sneezing or coughing, I cover my noise or mouth with a tissue/clean cloth or in to my elbow	308(71.0)	106(24.4)	20(4.6)
I keep at list one miter distance from a sick person	311(71.7)	108(24.9)	15(3.4)
I avoid shaking hands, hugging or kissing with colleagues/patients	310(71.4)	110(25.4)	14(3.2)
I avoid touching my mouth, noise and eyes with my hand if I have not washed them with water and soap	307(70.7)	117(27.0)	10(2.3)
I avoid going to crowded places	316(72.8)	107(24.7)	11(2.5)
I safely dispose the used PPE items when I finish the service	315(72.6)	100(23.0)	19(4.4)
I avoid patients with signs and symptoms suggestive of COVID-19.	315(72.6)	91(21.0)	28(6.4)

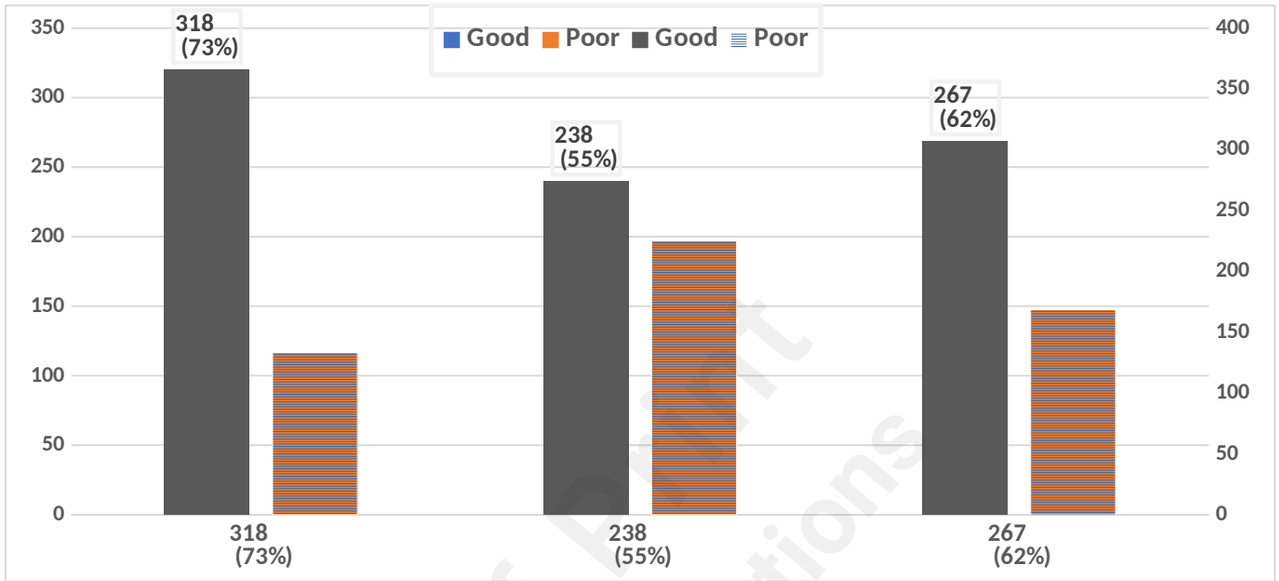

Figure 1: KAP levels among health care workers

Distribution of KAP

The relation between the socio-demographic characteristics and knowledge, attitude and practice towards COVID-19 is demonstrated in Table 5. The mean knowledge, attitude and practice score was 13.7± 2.6, 10.5± 4.1and 18.8 ± 5.8 respectively. Male had higher knowledge mean scores than female participants (13.9 ± 2.3 and 13.3± 3.1, respectively) (p=0.013). Nurses then pharmacists had the highest knowledge score than other professions (p=0.04). No difference in knowledge according to the age groups and work experience was noted. The knowledge mean scores were significantly related to the place of work as well as to the source of knowledge. Participants from Referral hospital had significantly higher knowledge mean scores compared to those working in other health facilities (<0.001). Additionally, significantly increased knowledge score was observed in those getting information from WHO websites followed by government media (p < 0.01).

Similarly, Male had positive attitude than female participants (10.3 ± 4.1 and 10.8 ± 4.1, respectively) with no statistically significant difference. No difference in attitude according to the qualification, work experience and age groups was noted. Positive attitude was significantly related to the place of work as well as to the source of knowledge. Participants from Referral hospital had significantly lower attitude mean scores compared to those working in other health facilities (<0.01). Additionally, significantly decreased attitude score was detected in those getting information from social media and followed by WHO websites (p =0.02).

Likewise, male tend to practice precautionary measures than female participants (18.6 ± 5.8 and 19.3 ± 6.3, respectively) with no statistically significant difference. No difference in practice according to the qualification and work experience was noted. Good practice was significantly related to the age group, place of work as well as to the source of knowledge. Older participants (>40 years) tend to practice precautionary measured compared to the younger age groups (p=0.04). Additionally, significantly better practice

was observed those participants working at Ayardage HC (p=0.01) and those getting information from government sites and media (p =0.02).

Variables	Knowledge (Max=15)	*t-value*	*F-value*	*P-value*	Attitude (Max=30)	*t-value*	*F-value*	*P-value*	Practice (Max=42)	*t-value*
	Mean ± SD				Mean ± SD				Mean ± SD	
Overall	13.7 ± 2.6				10.5 ± 4.1				18.8 ± 5.8	
Sex										
Male	13.9 ± 2.3	2.49	-	0.013*	10.3 ± 4.1	-1.02	-	0.31	18.6 ± 5.8	-1.18
Female	13.3 ± 3.1				10.8 ± 4.1				19.3 ± 6.3	
Age										
18-39	13.7 ± 2.6	0.014	-	0.99	10.5 ± 4.1	0.24	-	0.81	18.9 ± 6.0	2.01
>40	13.7 ± 1.8				10.2 ± 2.9				15.3 ± 2.7	
Qualification										
Nurse (including midwives)	13.9 ± 2.2	-	2.39	0.04*	10.3 ± 3.8	-	1.45	0.21	19.2 ± 6.1	-
Physician	12.9 ± 3.9				11.0 ± 4.4				19.3 ± 5.9	
Pharmacist	13.2 ± 2.4				10.7 ± 3.8				16.5 ± 3.5	
Dentist	12.2 ± 3.5				9.9 ± 2.3				18.3 ± 4.5	
Laboratory technologist	13.0 ± 3.5				10.9 ± 5.6				17.3 ± 5.9	
X-ray physician	13.6 ± 3.1				13.2 ± 6.7				17.4 ± 4.4	
Place of work										
Referral hospital	14.3 ± 1.8	-	40.5	<0.001**	10.1 ± 4.1	-	5.93	<0.01*	18.8 ± 6.0	-

Table 5: Distribution of knowledge and attitude scores among healthcare workers, 2020

Data were expressed as mean ± SD. t-test and ANOVA to compare the score between KAP between demographic characteristics of HCWs. * $p<0.05$, **$P<0.01$

Correlation between knowledge, attitude and practice

Table 6 presents the correlation coefficient between whole grains knowledge, attitude and practice. It was found that attitude and practice domain were inversely associated knowledge score (r=-0.295, p <0.01) and (r=-0.298, p <0.01) for attitude and practice respectively. Significant positive correlations were found between attitude and practice (r=0.173, p<0.0003). The lower the attitude and practice scores were, the higher the probability of positive attitudes and good practice; while the higher the knowledge scores were, the higher the probability of good knowledge. Therefore, a good knowledge COVID-19 was directly associated with a positive attitude and good practice. Similarly, positive attitude was directly associated with good practice.

Table 6: Correlation between knowledge, attituded and practice

	Knowledge	Attitude	Practice
Knowledge	-		
Attitude	-0.295**		
Practice	-0.298**	0.173*	

*** Significant at level of <0.001, ** significant at level <0.05

Discussion

The current work assessed the knowledge, attitude, and practice of the COVID–19 among HCWs working at public health facilities. In this study, the socio-demographic, knowledge level, attitude, and infection prevention practical level responses of 434 HCWs were analyzed. We found the majority of HCWs had better knowledge and that over half of them had a positive attitude and better practice towards COVID-19.

Our study found that most of the HCWs were well informed about COVID-

19 related knowledge during the outbreak. Among these HCWs, the level of knowledge about COVID-19 was higher among male participants and nurses. From our study, 73% of HCW had sufficient knowledge about COVID-19, which is almost the same as values reported by studies conducted in Uganda and Northern Ethiopia [15, 16] where 69% and 74% of HCWs had sufficient knowledge. The proportion of HCW with sufficient knowledge in the current study is lower than those studies conducted in Vietnam and China[17, 18].

This study explored the overall mean knowledge score, which was 13.7±2.6. These results were higher compared to a study from Vietnam that reported a mean score of knowledge of 8.17±1.3. Their findings showed that HCWs had a high level of knowledge and a positive attitude towards the COVID-19 outbreak[17]. In contrary, our results were lower than studies conducted in Egypt[19].

In general, having sufficient knowledge may reflect the successful dissemination of information about COVID-19 by different media. In this regard, the current study, most of the participants used information from international and governmental media (websites and verified social media pages). Our study suggests that majority of HCWs used WHO websites as source of information for COVID-19. This could be explained by the fact that WHO website is regularly updated by authentic facts. This suggests that such media should be frequently used to disseminate information on COVID-19 by the stakeholders involved in COVID-19 response.

About 52% of HCWs believed that caring for COVID-19 patients may be a threat to heath care workers which is similar to findings by study conducted in China[18] which showed around 85% of the surveyed HCWs were afraid of getting infected while caring for their patients. HCWs help patients during their routine tasks such as patient consultation, infusion, dressing changes and surgery. They must also deal with many other emergency situations, and they may become infected with the virus if they are not cautious. Similarly, about 14% of HCWs believed that wearing general medical masks may not protect the spread COVID-19 contrary to findings by Ng et al. which showed

adequate protection [20].

Our study reveals that more than two fifth of HCWs had negative attitude toward COVID-19 which is in congruence with a KAPs study on COVID in Uganda among HCWs[16] but in contrast to study in China on COVID-19 and Ethiopia [18, 21]. This study also explored the overall mean attitude score, which was 10.5±4.1. These results were lower compared to a study from Egypt that reported a mean score of knowledge of 13.3±2.1[19].

However, Spearman's analysis found that a significant negative correlation between the mean knowledge and attitude scores of HCWs about COVID-19 ($r=-0.295$, $P<0.001$) which is in consistent with a study conducted in Vietnam and Egypt[17, 19]. In other words, the lower the attitude scores were, the higher the probability of positive attitudes; while the higher the knowledge scores were, the higher the probability of good knowledge and practice. Therefore, a good knowledge COVID-19 was directly associated with a positive attitude and practice. Similarly, good attitude was positively associated with good practice.

Our study shows that majority of HCWs had good COVID-19 prevention practices which is in line with findings by other studies on coronaviruses[15, 16, 18]. Majority of the HCWs were following key infection prevention and control practices recommended by the Ministry of Health Ethiopia and WHO. These include regular hand hygiene, social distancing and wearing personal protective equipment when in high-risk situations. Seventy two percent and 67.5% of HCWs reported wearing personal protective equipment when in contact with patients and washing hands before/after handling patients. These are very vital practices to prevent transfer of COVID-19 from patients to patients and to the HCWs themselves. This findings is in line with a study conducted in Ethiopia[21] but lower than many others studies [22-24]. However, up to 73% of HCWs admitted having avoided patients with symptoms suggestive of COVID-19. This can be attributed to shortage of personal protective equipment globally [25, 26].

It was also observed that occupation was significantly associated with

knowledge. Nurses and pharmacists showed relatively better knowledge. This finding is in line with a study conducted in Vietnam that showed pharmacists had better knowledge than other health professionals [17]. Similarly, significant increase in knowledge score was detected in those getting information from WHO websites followed by government media. This finding corroborates a report from Egypt that found HCWs who gained information about the disease from the internet either through social media or WHO web site had better knowledge scores[19]. This could be explained by the fact that younger highly educated persons tend to use the internet than older less educated persons. In contrary, a study conducted in Uganda showed that HCWs who gained information from the traditional news media like TV, radio, and the newspapers had more knowledge [16].

Our results also found that good knowledge was significantly associated with this positive attitude. This is in line with several studies that found an association between the knowledge level of HCWs about COVID-19 and their attitude[17, 22]. Knowledge of HCWs is a very important prerequisite for positive attitudes, and to promote positive practices. The attitude towards COVID-19 as a was also better among HCWs who get information from social media and followed by WHO websites. This is in line with a study that showed that social media exposure to COVID-19 information influences the adoption of preventive attitudes and behaviors through shaping risk perception[27].Thus, understanding the role of social media during the pandemic could help policymakers and communicators to develop better communication strategies that enable the HCWs to adopt appropriate attitudes and behaviors.

We also observed that that older participants tend to practice precautionary than the younger participants and our findings supports a report from Bangladesh exhibited notable proportion of the young adults did not have good preventive practices to COVID-19[28]. This could be explained by the fact that younger participants considered themselves less risky compared to the older participants.

Limitation

Our study has some limitations. Firstly, no standardized tool for assessing KAPs on COVID-19 has been previously validated. We have adapted and modified a previously published tool for assessment of KAP toward prevention of respiratory tract infections. Secondly, only HCWs in public health facilities in parts of Somali region were surveyed and the results of this study may not reflect the KAPs of HCWs in the private sectors. A similar study may be extended to the community.

Conclusion

This study highlights that more than 73% of healthcare workers have sufficient knowledge on the transmission, diagnosis and prevention; more than half had positive attitude towards COVID-19, and two-third had good practices toward COVID-19 precautionary measures. There was statistically significant difference in the level of knowledge about COVID19 among healthcare workers. In nutshell, the overall level of knowledge and practice was better compared to the attitude. Hence, efforts to enhancing the capacity of healthcare workers can be very helpful for the containment of the pandemic through improving positive attitude and good practice.

List of abbreviation

CDC: Centre of Disease Control
CI: Confidence Interval
EOC: Emergency Operating Centre
EPHI: Ethiopia Public Health Institute
ERC: Ethical Review Committee
HCW: Health Care Worker
IPC: Infection Prevention Control
PPE: Personal Protective Equipment
WHO: World Health Organization

Declarations

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Availability of data and materials

The dataset for this study is available from the corresponding author on reasonable request**.**

Ethical approval

Ethical clearance and support letters were obtained from the Ethical Review Committee (ERC) of the College of Medicine and Health Sciences, Jigjiga University. The support letter then submitted to the five public health facilities. Then, permission obtained from the health facilities director and department/section heads. Study participants were informed about the purpose and importance of the study through written informed consent before the data collection process. In addition, participants who are unwilling to take part in the study and those who need to quit their participation at any stage were informed to do so without any restriction.

Consent for publication

Not applicable

Conflict of interest:

The authors declare that they have no competing of interest.

Authorship:

AM conceived the study, prepared the proposal, analyzed the data, interpreted the findings and wrote the manuscript. TY, MO, MA, OM, MA,

AB, MO and FG were involved in developing the study proposal, data analysis and reviewing the manuscript.

References

1. Kassema, J.J., *COVID-19 outbreak: is it a health crisis or economic crisis or both? Case of african counties.* Case of African Counties (March 23, 2020), 2020.
2. EPHI, *Notification Note on COVID-19 Situational Update*. 2020: Addis Ababa.
3. Poole, D.N., et al., *Responding to the COVID-19 pandemic in complex humanitarian crises.* International Journal for Equity in Health, 2020. **19**(1): p. 1-2.
4. Cascella, M., et al., *Features, evaluation and treatment coronavirus (COVID-19)*, in *StatPearls [Internet]*. 2020, StatPearls Publishing.
5. Control, C.f.D. and Prevention, *Novel coronavirus, Wuhan.* China. Information for Healthcare Professionals. https://www. cdc. gov/coronavirus/2019-nCoV/hcp/index. html (Accessed on October 14, 2020),

2019.
6. Huang, C., et al., *Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China.* The Lancet, 2020. **395**(10223): p. 497-506.
7. Organization, W.H., *Infection prevention and control during health care when novel coronavirus (nCoV) infection is suspected: interim guidance, 25 January 2020.* 2020.
8. Organization, W.H., *Advice on the use of masks in the community, during home care and in healthcare settings in the context of the novel coronavirus (2019-nCoV) outbreak: interim guidance, 29 January 2020*. 2020, World Health Organization.
9. Selvaraj, S.A., et al., *Infection rates and risk factors for infection among health workers during Ebola and Marburg virus outbreaks: a systematic review.* The Journal of infectious diseases, 2018. **218**(suppl_5): p. S679-S689.
10. McCloskey, B. and D.L. Heymann, *SARS to novel coronavirus–old lessons and new lessons.* Epidemiology & Infection, 2020. **148**.
11. Hoffman, S.J. and S.L. Silverberg, *Delays in global disease outbreak responses: lessons from H1N1, Ebola, and Zika.* American journal of public health, 2018. **108**(3): p. 329-333.
12. Ehrlich, H., M. McKenney, and A. Elkbuli, *Protecting our healthcare workers during the COVID-19 pandemic.* The American journal of emergency medicine, 2020. **38**(7): p. 1527-1528.
13. Giao, H., et al., *Knowledge and attitude toward COVID-19 among healthcare workers at District 2 Hospital, Ho Chi Minh City.* Asian Pacific Journal of Tropical Medicine, 2020: p. 13.
14. CDC. *Information for health care professionals* 2020 [cited 2020 October 15, 2020]; Available from: https://www.cdc.gov/coronavirus/2019-ncov/hcp/index.html.
15. Tadesse, D.B., G.T. Gebrewahd, and G.T. Demoz, *Knowledge, Attitude, Practice and Psychological response toward COVID-19 among Nurses during the COVID-19 outbreak in Northern Ethiopia, 2020.* 2020.
16. Olum, R., et al., *Coronavirus Disease-2019: Knowledge, Attitude, and Practices of Health Care Workers at Makerere University Teaching Hospitals, Uganda.* Frontiers in Public Health, 2020. **8**: p. 181.
17. Huynh, G., et al., *Knowledge and attitude toward COVID-19 among healthcare workers at District 2 Hospital, Ho Chi Minh City.* Asian Pacific Journal of Tropical Medicine, 2020. **13**(6): p. 260.
18. Zhou, M., et al., *Knowledge, attitude and practice regarding COVID-19 among health care workers in Henan, China.* Journal of Hospital Infection, 2020.
19. Wahed, W.Y.A., et al., *Assessment of knowledge, attitudes, and perception of health care workers regarding COVID-19, a cross-sectional study from Egypt.* Journal of community health, 2020. **45**(6): p. 1242-1251.
20. Ng, K., et al., *COVID-19 and the risk to health care workers: a case report.* Annals of internal medicine, 2020.
21. Jemal, B., et al., *Knowledge, attitude and practice of healthcare workers towards COVID-19 and its prevention in Ethiopia: a multicenter study.* 2020.

22. Zhang, M., et al., *Knowledge, attitude, and practice regarding COVID-19 among healthcare workers in Henan, China.* Journal of Hospital Infection, 2020. **105**(2): p. 183-187.
23. Zhong, B.-L., et al., *Knowledge, attitudes, and practices towards COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak: a quick online cross-sectional survey.* International journal of biological sciences, 2020. **16**(10): p. 1745.
24. Kumar, J., et al., *Knowledge, attitude, and practices of healthcare workers regarding the use of face mask to limit the spread of the new coronavirus disease (COVID-19).* cureus, 2020. **12**(4).
25. Bauchner, H., P.B. Fontanarosa, and E.H. Livingston, *Conserving supply of personal protective equipment—a call for ideas.* Jama, 2020. **323**(19): p. 1911-1911.
26. Ranney, M.L., V. Griffeth, and A.K. Jha, *Critical supply shortages—the need for ventilators and personal protective equipment during the Covid-19 pandemic.* New England Journal of Medicine, 2020. **382**(18): p. e41.
27. Zeballos Rivas, D.R., et al., *Social media exposure, risk perception, preventive behaviors and attitudes during the COVID-19 epidemic in La Paz, Bolivia: A cross sectional study.* PloS one, 2021. **16**(1): p. e0245859.
28. Banik, R., et al., *Investigating knowledge, attitudes, and practices related to COVID-19 outbreak among Bangladeshi young adults: a web-based cross-sectional analysis.* 2020.

Supplementary Files

Untitled.
URL: http://asset.jmir.pub/assets/2646512fc9db7f9e64daf3780ded91bc.docx

Figures

KAP levels among health care workers.