Knowledge, attitude and practice of healthcare workers towards COVID-19 and its prevention in Ethiopia: a multicenter study

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Abstract

Background: An emerging respiratory disease was abbreviated as COVID 19, after it has been first reported in December 2019 in Wuhan city of China. The virus is zoonotic which has a tendency to be transmitted between animal to human and human to human. The major route of transmission of COVID-19 is droplet and close contact. Ethiopian ministry of health has initiated training for health care workers at a different level. WHO and CDC also initiated a multidisciplinary approach to tackle COVID-19 of which awareness creation is the main. Thus, the main objective of this study is to assess knowledge, attitude, and practices of health workers in Ethiopia towards COVID-19 and its prevention techniques.

Method: an institutional-based multicenter cross-sectional study was conducted in each of eight teaching and referral hospitals. A total of 422 Ethiopian healthcare workers were selected for the assessment of knowledge, attitude, and practice towards COVID-19. Socio-demographic characteristics and data related to the KAP of the participants were collected using a structured questionnaire Logistic regression model was used to identify factors associated with the attitude and knowledge of healthcare workers towards COVID-19 at a significance level of $p < 0.05$.

Result: Three hundred ninety-seven healthcare workers participated in the study with a response rate of 94%. Among these, 88.2% and 94.7% of respondents had good knowledge and positive attitude respectively. A respondent with history of chronic medical illness (OR: 0.193, 95% CI: 0.063-0.593), social media, telecommunication, and television/radio as a source of information were significantly associated with knowledge (OR: 3.4, 95% CI: 1.5-7.4, OR: 4.3, 95% CI: 1.3-14.3 and OR: 3.2, 95% CI: 1.4-7.2). Additionally respondent with history of chronic medical illness was significantly associated with negative attitude towards COVID-19.

Conclusion: The overall level of knowledge and attitude was good. However, the practice was relatively low. Source of information like social media, telecommunication, and television/radio were positively associated with healthcare workers' knowledge about COVID-19. Strategies for enhancing the capacity of healthcare workers to develop practice are needed.

Keyword: COVID-19, Knowledge, Attitude, Practice, Healthcare worker, Ethiopia

Background

An emerging respiratory disease was abbreviated as COVID 19, after it has been first reported in December 2019 in Wuhan city of China(1). The virus causing COVID-19 is a SARS-like coronavirus that had previously been reported in bats in China(2). The virus is a zoonotic which has a tendency to be transmitted between animal to human and human to human.

The major route of transmission of COVID-19 is droplet and close contact (3, 4). This viral infection causes several diseases; respiratory, enteric, hepatic, neurologic, and vascular system (5, 6). It has been characterized by a wide clinical future ranging from no symptoms to a severe form of respiratory illness,

like ARDS (7). The main symptoms of COVID-19 included fever, fatigue, and cough, which are similar to that of SARS-CoV and MERS-CoV infected cases. Less commonly symptoms like sputum production, headache, hemoptysis, and diarrhea were reported (8-10).

A report from seven COVID-19 patients shows 79.5% genome sequence identity to SARS-CoV with a reported biological and epidemiological difference from SARS-COV (2, 11). The virus has been declared as a pandemic on March 11, 2020, by WHO after 11 days of being declared as a public health emergency (5, 12). With a global rise in a number of confirmed cases and death across the world, little is known about the epidemiology, pathophysiology, prevention, and treatments of COVID-19.

The global community and Research and Development Blueprint Scientific Advisory Group acknowledged the research gaps in COVID-19. Awareness creation and changing attitude were among the public health intervention recommended by WHO. Various literature has shown Demographic, Social and technological factors were known to affect the level of knowledge, attitude, and practice toward disease and its prevention (13). Health care professionals are expected to be high risk for COVID-19 because of contact with confirmed and suspected cases at a frontline.

Ethiopian ministry of health has initiated training for health care workers at different levels though an effort to cover a wider range is poor. WHO and CDC also initiated a multidisciplinary approach to tackle COVID-19 of which awareness creation is the main. Knowledge, practice and attitude of health workers toward COVID-19 and its prevention techniques have a pivotal impact in fighting against the disease. Thus this study aims at assessing the knowledge, practice, and attitude of Ethiopian health workers toward COVID-19 and its prevention techniques.

Methods

Study settings and design

This multicenter institution-based cross-sectional study design was employed in Ethiopia. Ethiopia is located in the horn of Africa; and bordered by Eritria to the north, Djibouti, and Somalia to the east, Sudan and South Sudan to the west, and Kenya to the south. Ethiopia has a high central plateau that varies from 1,290 to 3,000 m (4,232 to 9,843 ft) above sea level. This country's population is highly diverse, comprising over 80 different ethnic groups. The population exceeds 110,000,000, who live on an area of 1,127,127 km². Our study included 422 healthcare workers from eight hospitals in Ethiopia including Menelik II referral hospital of Kotebe Metropolitan University, Felegehiwot teaching and referral hospital of Bahir-Dar University, Hawassa University teaching and referral hospital, Jimma University specialized hospital, Dilla University referral hospital, Hayder teaching and referral hospital of Mekele University, Adigerat university hospital, Debre-Berhan University hospital and Debre-Tabor University Hospital. Participants were selected randomly from each hospital proportionally. All randomly selected healthcare workers in the selected hospitals had a willingness to participate in the study were included in the study.

Data collection tools and sample size determination

Data were collected from different healthcare workers in the medical and surgical ward. A questionnaire was developed and content validity and reliability were checked using item-objective congruence to detect validity. In addition, a pretest was done before actual data collection on 5% of a similar population in one teaching and referral hospital not included in actual data collection to assess flow, readability, and clarity of the questionnaire. Data quality assurance was ensured during data collection, regular supervision and follow up were made. The investigator cross checked for completeness and consistency of data on a daily basis.

Finally, the questionnaire containing four parts were used to collect information from healthcare workers. The first part of the questions was used to assess socio-demographic and general characteristics of healthcare workers such as gender, age, educational status, work experience, marital status, profession, religion, travel history and training on COVID-19. In the second part, 9 questions were used to assess healthcare workers knowledge on COVID-19. The third part, 10 questions were used to assess the healthcare workers attitude towards COVID-19. Then the last part contains seven questions used to assess the practice of healthcare workers attitude towards COVID-19. See Additional file 2 for the detailed question used to assess healthcare workers knowledge, attitude, and practice.

The required sample size was calculated using single proportion formula to obtain the sample size needed to estimate the prevalence of KAP. Since there is no similar study in Ethiopia, the maximum prevalence was used, $P = 0.5$, confidence interval = 95% and margin of error (d) = 5%. The finite population correction formula was not applied for the study population since greater than 10,000. Finally, a 10% non-response rate was added and the required sample size became 422.

Data interpretation and statistical analysis

After completeness of collection data were first crosschecked manually for completeness and entered into Epi-Data version 3.1 statistical software transported to SPSS version 25 for further analysis cleaning. Knowledge about COVID-19 was measured using ninety knowledge questions and dichotomized to good knowledge and poor knowledge. The levels of knowledge, attitude, and practice were dichotomized into "good" and "poor" or "positive" and "negative" for attitude based on a 60% cut-off point of the total score within each domain of knowledge, attitude and practice.

Healthcare worker attitude towards COVID-19 was assessed by using five points Likert scale as individuals responding for positive attitude were given scores of 5, 4, and 3, and a score of 2 and 1 was given for negative attitudes. Then, the score was dichotomized into a positive and negative attitude for each question.

Descriptive statistics were used to summarize tables and figures and summary measure were used for data presentation. Outlier and multi-collinearity were checked using standardized residual tests, VIF, and tolerance respectively. Logistic regression analysis was used to identify factors associated with the attitude and knowledge of healthcare workers towards COVID-19. Binary logistic regression analysis was used to identify potential associated factors between dependent and independent variables. Multivariate

logistic regression analysis was used to determine the association of combination of risk factors with attitude and knowledge. All variables with a $P < 0.05$ in univariate analysis were entered jointly into multivariate logistic regression. Odds ratios (OR) and 95% confidence intervals were then calculated. A p -value less than 0.05 was considered significant. Model fit was assessed using the Hosmer-Lemeshow goodness of fit test.

Ethical Consideration

Ethical clearance and approval was obtained from the ethical review board (IRB). Both oral and written informed consent was obtained from respondents who participated in the study. All the information was kept confidential, and no individual identifiers were collected. The methodology in this study followed the international guidelines for observational studies according to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) 2010 statement (see Additional file 1 for the detailed checklist of STROBE criteria).

Results

A total of 397 healthcare workers were interviewed in this research, which yields a response rate of 94%. More than half of, 203(51.1%), participants' age were between 26-30 years old with a mean age of 29.28 ± 5.44 . Majority, 225(56.7%) of the interviewed participants were males. Most respondents (35.5%) were nurses, and 16% were physicians. Seventy six (19.1%) of participants had a history of traveling in the last month (Table 1).

Knowledge of HCWs towards COVID-19

This study revealed that 350 (88.2%) of participants had good knowledge about COVID-19. The respondents' correct answer rates on the manifestation of COVID-19 were 66.5%. About 75.5% and 82.6% of participants said, that COVID-19 has no specific treatment and vaccine respectively.

Attitude of HCWs towards COVID-19

We found that 376(94.7%) of participants have a positive attitude towards COVID-19. The majority (75.6%) of respondents said that COVID-19 is a seriously dangerous disease and 69.3% perceived that they are at high risk of contracting the disease. About 51.4% of respondents believed that taking hot drink prevent COVID-19 infection, 38.5% of respondents said COVID-19 will not spread in hot climate area and 15.4% of respondents believed herbal medication will cure COVID-19.

Practice of HCWs towards COVID-19

This study showed that 252(63.5%) of participants had good practice towards COVID-19 and its prevention. Based on our result, 67.3% of respondents are using a facemask, 81.4% were practicing handwashing and only 22.4% of respondents were practicing social distance (figure 3).

Correlation between knowledge, attitude, and practice

Our study revealed that there was weak positive correlation knowledge, attitude, and practice towards COVID-19 disease ($r=0.13$, 95% CI=3.1-5.2, $p<0.001$). This indicates that the impact of knowledge and attitude on practice was very small (figure 2).

Factors associated with knowledge

Among the independent variables that were assessed, having history of chronic medical illness was associated negatively with the knowledge level of HCWs and source of information (social media/internet, government, television/radio, telecommunication, and peer) were associated with good knowledge level in the bivariable analysis (OR: 4.7, 95% CI: 2.5-8.8, OR: 2.5, 95% CI: 1.3-50, OR: 3.3, 95% CI: 1.8-6.3, OR: 7.3, 95% CI: 3.0-17.6 and OR: 4.6, 95% CI: 1.6-13.3). The multivariable analysis revealed that use of social media, telecommunication, and television/radio as a source of information were significantly associated with knowledge (OR: 3.4, 95% CI: 1.5-7.4, OR: 4.3, 95% CI: 1.3-14.3 and OR: 3.2, 95% CI: 1.4-7.2) (Table 2).

Factors associated with attitude

The multivariable analysis result of this study showed that only a history of chronic illness has a statistically significant association with the attitude towards COVID-19 at a 5% level of significance (Table 3). Regarding the confidence of HCWs on treating confirmed COVID-19, the level of knowledge is significantly associated (OR: 2.3, 95% CI: 1.17-4.54, $P=0.15$). Additionally, HCWs with good knowledge level were associated with maintaining self-isolation and visiting hospitals if they manifest symptoms of COVID-19.

Discussion

Healthcare workers are frontline worker who are directly involved in COVID-19 prevention and treatment in Ethiopia and other countries, and their ability to systematically react to the disease in their community and treatment center will depend on their knowledge, attitude, and practice of healthcare workers. To the best of our understanding, this is the first study investigating KAP towards COVID-19 and its prevention among healthcare workers of teaching and referral hospitals of Ethiopian. This study was conducted to fill the gap in the literature and providing a reference on KAP among health care workers. We found that majority of the participant (88.2%) had good knowledge about COVID-19 related issues. This finding is consistent with a report by other studies that around 90% of the healthcare worker had knowledge about COVID-19(14-16). This high percentage of knowledge about COVID-19 among healthcare workers is due to prolonged exposure to information since its global topic of discussion in the media and public. Another reason could be the effort of government and media in providing information starting from the time of the outbreak. This is strengthened by the association of source of information with knowledge regarding COVID-19, and it is similar to the finding of other studies(17). We found that the majority of healthcare workers gathered information regarding COVID-19 from social media (73.6%) and television (71.5%). This

differs from previously published finding Saudi Arabia where the website of ministry of health as the main source of information(18). Our study showed that source of information has a positive relationship with HCWs knowledge. For instance, 93% of social media users have good knowledge compared to those not using social media (74%) as source knowledge for the disease. Similar findings were reported from previous studies in Vietnam(19), but different from studies in Saudi Arabia (36%) and UAE (40%) in which relatively a small percentage of HCWs used social media as a source of information about COVID-19(18, 20, 21). This might be due to the fact that during the SARS outbreak the issue was not a global concern like COVID-19.

The majority of HCWs aware that patients with comorbid illness are at high risk of infection and mortality from COVID-19 which accounts for around 91.1%.The finding of our study is also consistent with the finding of Vietnam healthcare workers' knowledge towards COVID-19(19).

The current study showed that there is a significant association between sources of information (Social media, Telecommunication, and television/radio) and HCWs' knowledge about COVID-19. It is also similar to the findings of studies in Vietnam and China (17, 19, 22).

Those who use social media as a source of information had about three times more chance of having good knowledge about COVID-19 than those not using social media as a source of information. This result is in line with studies conducted in China, Vietnam, and Iran in which the main source of knowledge was social media (14, 17, 19). On the other hand, a study from Saudi and UAE showed only a small percentage of HCWs used social media as a source of knowledge about COVID-19(18, 20). This might be due to the use of global crises of outbreak social media platforms as a facilitator and distributor of COVID-19 related information for HCWs during this critical time. The other reason for the difference could be the study was done during the active phase of the outbreak when HCWs were exposed to a lot of information about the disease. We understand from this that social media is a great way of providing the latest update about this COVID-19 pandemic for individuals and the community.

Furthermore, our study revealed that HCWs' knowledge of COVID-19 was positively correlated with having a positive attitude and good practice towards COVID-19 and its prevention technique. Additionally, HCWs with good knowledge of COVID-19 were significantly associated with the confidence of treating confirmed cases of COVID-19 and maintaining self-isolation if they manifest symptoms of the disease. Our findings are consistent with the previous KAP study in china(15).

In the current study, the overall positive attitude towards COVID-19 was 94.7% among the Ethiopian healthcare workers. This was significantly lower among HCWs with co-morbid illnesses. Although attitudes towards COVID-19 were positive, most HCWs (69.6%) perceived that they are at high risk of contracting the disease and around 75% recognized that COVID-19 is a seriously dangerous disease. This perception is possibly related to the shortage of personal protective equipment and inadequate training on COVID-19 in the country.

About sixty-three percent of healthcare workers had good practice towards prevention methods of coronavirus disease; around 67% of HCWs wore facemask in public, and 36.4% practiced frequent handwashing with soap. However, these practices towards COVID-19 were lower than the practice of many other countries (15, 17, 21, 23). The possible reason for this difference might be due to the shortage of infrastructure and inadequate training provided for the healthcare workers. This suggests further implementation and encouragement from the government is required for the application of good practice towards COVID-19 and its preventions.

This study has some limitations. One of the limitations is bias occurred as a result of study design (cross-sectional) since the study took information at specified time-points and cause and effect association cannot be studied. To reduce this potential bias, different mechanisms were used. The other limitation was lack of sufficient similar study; which limit comparison with other studies. However, identifying knowledge gaps, attitudes, and practice can be used to develop effective interventions and establish baseline levels to set priorities for program managers. Finally, the study pinpointed ways of information dissemination or by whom to disseminate; which are very important for the preparation and prevention of disease.

Conclusion

In conclusion, the majority of healthcare workers in Ethiopia appeared to have good knowledge and positive attitude about COVID-19 despite relatively poor practice regarding COVID-19 prevention during the outbreak. Additionally, source of information (social media/internet, television, and telecommunication) has a positive association with knowledge of HCWs regarding COVID-19.

Abbreviations

CDC: Centre of Disease Control; COVID-19: Coronavirus Disease-2019; MERS: Middle East Respiratory Syndrome; SARS: Severe Acute Respiratory Syndrome; SARS-COV2: Severe Acute Respiratory Syndrome Corona Virus 2; WHO: World Health Organization; CI: Confidence Intervals; KAPs: Knowledge, Attitudes and Practices; OR: Odds Ratio; HCW: Healthcare Worker

Declarations

Ethics approval and consent to participate: The study was performed according to our Institutional Review Board guidance in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments. Participation in the study was voluntary and based on each participants willingness to give informed consent.

Consent for Publication: Not Applicable

Availability of data and material: The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interest: The authors declares that they have no competing interests

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Tables

Table 1 Socio-demographic characteristics of health workers

Variable		Number	Percent
Age	>25	97	24.4
	26-30	203	51.1
	>30	97	24.4
Gender	Female	172	43.3
	Male	225	56.7
Level of Education	Diploma	72	18.1
	BSc Degree	249	62.7
	Masters and above	76	19.1
Marital status	Married	186	46.9
	Unmarried	211	53.1
Religion	Orthodox	273	68.8
	Catholic	6	1.5
	Protestant	84	21.2
	Muslim	30	7.6
	Others**	4	1.0
Profession	Physician	63	15.9
	Anesthetist	102	25.7
	Nurse	141	35.5
	Pharmacy	26	6.5
	Others*	65	16.4
Work experience	>5 years	104	26.2
	2-5 years	141	35.5
	<2 years	152	38.3
Training on COVID-19	Yes	26	6.5
	No	371	93.5
Travel history	Yes	76	19.1
	No	321	80.9
Chronic medical illness	Yes	30	7.6
	No	367	92.4

* =medical laboratory, Midwifery and Public Health

**= Wakefeta

Table 2 Univariate and multivariate logistic regression analysis showing predictors of knowledge about COVID-19 (good vs. poor) (N = 397)

Variable		COVID-19 Knowledge		COR	AOR
		good	Poor		
Age	>25	89(91.8%)	8(8.2%)	2.198(.893-5.408)	1.837(.458-7.361)
	26-30	180(88.7%)	23(11.3%)	1.546(.776-3.082)	1.278(.495-3.295)
	>30	81(83.5%)	16(16.5%)	Ref	Ref
Gender	Female	152(88.4%)	20(11.6%)	1.036(.560-1.918)	
	Male	198(88.0%)	27(12.0%)	Ref	
Level of Education	Diploma	62(86.1%)	10(13.9%)	Ref	Ref
	Bsc Degree	216(86.7%)	33(13.3%)	1.056(.493-2.261)	.525(.206-1.337)
	Masters and above	72(94.7%)	4(5.3%)	2.903(.867-9.719)	.931(.213-4.073)
Marital status	Married	162(87.1%)	24(12.9%)	.826(.449-1.519)	
	Unmarried	188(89.1%)	23(10.9%)	Ref	
Religion	Orthodox	245(89.7%)	28(10.3%)	2.917(.293-28.995)	
	Catholic	5(83.3%)	1(16.7%)	1.667(.074-37.728)	
	Protestant	69(82.1%)	15(17.9%)	1.533(.149-15.776)	
	Muslim	28(93.3%)	2(6.7%)	4.667(.320-68.032)	
Work experience	Others	3(75.0%)	1(25.0%)	Ref	
	>5 years	128(84.2%)	24(15.8%)	.762(.368-1.575)	1.622(.497-5.288)
	2-5 years	131(92.9%)	10(7.1%)	1.871(.787-4.452)	2.738(.960-7.810)
	<2 years	91(87.5%)	13(12.5%)	Ref	Ref
Training on COVID-19	Yes	20(76.9%)	6(23.1%)	.414(.157-1.091)	.572(.166-1.970)
	No	330(88.9%)	41(11.1%)	Ref	Ref
Travel history	Yes	67(88.2%)	9(11.8%)	1.000(.461-2.167)	
	No	283(11.8%)	38(88.2%)	Ref	
Chronic medical illness	Yes	20(66.7%)	10(33.3%)	.224(.098-.515)	.193(.063-.593)
	No	330(10.1%)	37(89.9%)	Ref	Ref
Social media as a source of information	Yes	272(93.2%)	20(6.8%)	4.708(2.506-8.845)	3.408(1.563-7.428)
	No	78(74.3%)	27(25.7%)	Ref	Ref
Government as a source of information	Yes	173(93.0%)	13(7.0%)	2.556(1.305-5.009)	1.375(.572-3.307)
	No	177(83.9%)	34(16.1%)	Ref	Ref
Television /Radio	Yes	262(92.3%)	22(7.7%)	3.383(1.817-6.300)	3.266(1.465-7.282)
	No	88(77.9%)	25(22.1%)	Ref	Ref
Telecommunication	Yes			7.319(3.030-	4.328(1.308-

		181(96.8%)	6(3.2%)	17.679)	14.316)
	No	169(80.5%)	41(19.5%)	Ref	Ref
Peer	Yes	106(96.4%)	4(3.6%)	4.670(1.635-13.340)	.967(.235-3.984)
	No	244(85.0%)	43(15.0%)	Ref	Ref
Religious place	Yes	84(90.3%)	9(9.7%)	1.333(.619-2.871)	
	No	266(87.5%)	38(12.5%)	Ref	

Table 3 Univariate and multivariate logistic regression analysis showing predictors of attitude about COVID-19 (good vs. poor) (N = 397)

Variable		COVID-19 Attitude		COR(95% CI)	AOR(95% CI)
		good	Poor		
Age	>25	91(93.8%)	6(6.2%)	.652(.178-2.388)	
	26-30	192(94.6%)	11(5.4%)	.751(.233-2.421)	
	>30	93(95.9%)	4(4.1%)	Ref	
Gender	Female	163(94.8%)	9(5.2%)	1.020(.420-2.480)	
	Male	213(94.7%)	12(5.3%)	Ref	
Level of Education	Diploma	66(91.7%)	6(8.3%)	Ref	
	Bsc Degree	235(94.4%)	14(5.6%)	1.526(.564-4.126)	.208(.023-1.860)
	Masters and above	75(98.7%)	1(1.3%)	6.818(.800-58.107)	.322(.040-2.605)
Marital status	Married	180(96.8%)	6(3.2%)	2.296(.872-6.045)	1.643(.544-4.964)
	Unmarried	196(92.9%)	15(7.1%)	Ref	Ref
Religion	Orthodox	257(94.1%)	16(5.9%)		
	Catholic	6(100.0%)	0(0.0%)		
	Protestant	80(95.2%)	4(4.8%)		
	Muslim	29(96.7%)	1(3.3%)		
	Others	4(100.0%)	0(0.0%)		
Work experience	>5 years	146(96.1%)	6(3.9%)	2.589(.911-7.359)	2.246(.662-7.617)
	2-5 years	136(96.5%)	5(3.5%)	2.894(.958-8.739)	2.463(.772-7.862)
	<2 years	94(90.4%)	10(9.6%)	Ref	Ref
Training on COVID-19	Yes	26(100.0%)	0(0.0%)		
	No	350(94.3%)	21(5.7%)		
Travel history	Yes	74(97.4%)	2(2.6%)	2.328(.530-10.216)	
	No	302(94.1%)	19(5.9%)	Ref	
Chronic medical illness	Yes	25(83.3%)	5(16.7%)	.228(.077-.673)	.217(.069-.690)
	No	351(95.6%)	16(4.4%)	Ref	Ref
Social media as a source of information	Yes	278(95.2%)	14(4.8%)	1.418(.556-3.617)	
	No	98(93.3%)	7(6.7%)	Ref	
Government as source of information	Yes	175(94.1%)	11(5.9%)	.791(.328-1.908)	
	No	201(95.3%)	10(4.7%)	Ref	
Television /Radio	Yes	268(94.4%)	16(5.6%)	.775(.277-2.169)	
	No	108(95.6%)	5(4.4%)	Ref	
Telecommunication	Yes	178(95.2%)	9(4.8%)	1.199(.493-2.912)	
	No	198(94.3%)	12(5.7%)	Ref	
Peer	Yes	102(92.7%)	8(7.3%)	.605(.244-	

	No	274(95.5%)	13(4.5%)	1.502)	
Religious place	Yes	85(91.4%)	8(8.6%)	.475(.190-1.183)	.494(.189-1.289)
	No	291(95.7%)	13(4.3%)	Ref	Ref

Additional Files

Additional file 1: STROBE checklist of the study.

Additional file 2: Detailed questions used to assess knowledge, attitude, and practice

Figures

Figure 1

Distribution source of information and knowledge of healthcare workers concerning COVID-19

Figure 2

Correlation scatter among knowledge, attitude, and practice in Ethiopian Healthcare workers: A: knowledge vs Attitude, B: knowledge vs practice

Figure 3

Practice of Health workers towards COVID-19 and prevention

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [Additionalfile1.docx](#)
- [Additionalfile2.docx](#)