Knowledge, attitude, and practice of health professionals in Ethiopia toward COVID-19 prevention at early phase

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Abstract

Introduction: Coronavirus disease (COVID-19) is a potentially lethal disease having significant public health concerns. As the disease is new, nothing has been intervened yet. Therefore, here we show the health worker’s knowledge, attitude, and practice toward COVID-19.

Methods: The online cross-sectional study design was conducted from April to May 2020, among Ethiopia health workers. The data were collected online, downloaded by an Excel sheet, and transferred to IBM SPSS version 24. Using questionnaire containing four parts sociodemographic, knowledge, attitude, and practice assessing. Linear logistic regression and binary logistic regression were performed to test the association between the dependent and the independent variables. We reported the 95% confidence intervals of adjusted odds ratios with a statistical significance level at less than 0.05 p-values.

Results and conclusion: A total of 441 health workers were included in this study. The majority of participants were from urban (88.7%), nurses (53.1%), male (88.4%), and have a degree educational level (66.7%). The mean knowledge level of respondents was 10.13 ± 0.057 standard deviation. The majority of respondents had a positive attitude toward control of COVID-19, 88%, and 77% of respondents had confidence that Ethiopia will control COVID-19. Similarly, male (2.746, 95% confidence interval (1.23, 6.02)) and good knowledge level (1.98, 95% confidence interval (1.01, 3.09)) were found to be a determinant for attitude regarding control of COVID-19. Good knowledge level 1.6 (1.02, 2.6), male sex 2.2 (1.07, 4.6), masters 2.33 (1.06, 5.08), and medical doctors 5.99 (1.76, 20.4) to practice wearing a mask when going out of the home. Knowledge, attitude, and practice of the participant health workers are considerable, but may not be enough to control the disease. Sex, age, and profession of the health workers were determinant factors for knowledge about COVID-19. Therefore, training has to be considered for updating health care workers on COVID-19 prevention and controlled at the national level.

Keywords
Knowledge, attitude, practice, Ethiopia, health professionals

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Introduction

Coronavirus disease (COVID-19) is a potentially lethal disease, which is of great public health concern. It is a new disease of human beings that is caused by a coronavirus, different from other viruses cause severe acute respiratory syndrome (SARS), middle east respiratory (MERS), and influenza.1,2 It was first reported in Wuhan city of China at the end of December 2019. On 30 January 2020, World Health Organization (WHO) announced that the COVID-19 outbreak could cause a Public Health Emergency of International Concern. Then, by 11 March 2020, WHO
described the COVID-19 as a pandemic. While more than three million cases of COVID-19 were reported, it killed over 200,000 lives until 1 May 2020.

Although African countries report a low number of cases, the third wave of the pandemic may occur in the continent. Before the spread of disease to different parts of the world, no country is prepared for this highly contagious disease. This has created an unprecedented strain on healthcare providers and the overall health care systems.

Due to its rapid transmission, COVID-19 has caused severe challenges both to patients and health workers stationed at the outbreak’s epicenter. It is also infecting health workers on the frontline in fighting the diseases. WHO reported that coronavirus has infected about 22,000 health workers as of 18 April 2020. To avert such infection among health workers, equipping health workers with good knowledge and practice is mandatory.

Ethiopia is one of the countries with a low health worker-to-population ratio. Evidence indicates less competent health professionals in professional practice, and it is high among fresh graduates. Factors associated with the knowledge, attitude, and practice of health workers could be at an individual or social level. So far, no study has assessed the knowledge, attitude, and practice of health workers toward COVID-19 in Ethiopia. Therefore, this study was designed to identify health workers’ knowledge, attitude, and practice on COVID-19 to inform policy-makers and decision-makers to design training for health workers on the disease symptoms, prevention, and treatments to prevent further spread of infection in Ethiopia.

Methods

Study setting, study design, and population

The study was conducted in Ethiopia through online survey among health professionals.

The online cross-sectional study design was conducted in Ethiopia to assess health workers’ knowledge, attitude, and practice through an online-created survey from 27 April to 3 May 2020. Health professionals of all types were involved in the study. From academic/teaching institution, primary/district hospital, general hospital, health center, Ministry of Health (MOH), non-governmental organization (NGO), private clinic, referral hospital, teaching hospital, Woreda Health Office, Zonal Health Department, and specialized hospital were included (Supplementary 1 and 2).

Inclusion criteria

Inclusion criteria include all health professionals of any category.

Exclusion criteria. We excluded responses with incomplete information.

Sample size determination

Single population proportion formula was used by considering 50% of proportion, as there is no previous similar study at data collection time

\[
\begin{align*}
n &= \frac{(Z_{\alpha/2})^2 \cdot P \cdot (1-P)}{d^2} \\
&= \frac{(1.96)^2 \cdot 0.50(1-0.50)}{(0.05)^2} = 384
\end{align*}
\]

Therefore, \(n = 384\).

After adding 15% non-response rate as study is through online which might have maximum non-response rate it gives 442.

Data collection tool

We adapted and used a validated tool that was conducted in China. It consists of four parts, Part I—sociodemographic variables (8), Part II knowledge 12 items Part III attitude (2), and Part IV practice (2).

Data were collected through an online survey questionnaire that was created on Google forms. The study participants were invited to respond to the survey questions through emails and social media (Facebook and Telegram). The questionnaire, which was created as online forms shared for the online participants, has three sections: the first page contains the study’s objective, an information sheet for study participants, and consent forms.

The demographic variables included age, gender, marital status, education, occupation, and current residence place. Knowledge has been assessed by 12 questions that were focused on health worker’s knowledge of clinical manifestations, ways of transmission, and prevention and control of COVID-19. Some of those questions had dichotomous responses while some had additional “I don’t know” responses.

Study variables and outcome measurement

Outcome variable consists of the knowledge, attitude, and practice of health workers on COVID-19.

Knowledge. We measured the knowledge of health workers using 12 items: four questions related to clinical presentations (K1–K4), three assessing routes of transmission (K5–K7), and five for identifying prevention and control (K8–K12) of COVID-19.

The tools are assessed with an option of true/false basis with an additional “I don’t know” option. A correct answer was coded as “1” point, and incorrect or unknown responses were given “0” points. The mean knowledge score of health workers toward COVID-19 was 10.13 (standard deviation (SD) = 0.057 and range = 7–12). The proportion of knowledge
score was categorized for below and above mean. Respondents obtaining a knowledge score above the mean of 10.13 were judged as having good knowledge.

Knowledge measurement question items contain three options (True, False, and I don’t know). All the twelve questions were given correct and wrong responses.

**Attitude.** Two questions assessed the health worker’s attitude: agreement on the absolute managing of COVID-19 and the confidence in overcoming the battle against COVID-19.

**Practice.** Health workers’ practice was evaluated by asking for went to an overcrowded area and wearing a mask when going out in recent days. The independent variables were sociodemographic characteristics of the study participants, their work experience, and their living place. Sociodemographic includes gender, age, marital status, education status, working of practice, profession, place of current residence, and town residing in currently.

**Data analysis**

Online collected data were downloaded by an Excel sheet and transferred to IBM SPSS version 24 for analysis. The level of knowledge was computed from 12 questions. A correct answer was assigned 1 point while an incorrect answer was given zero. The total knowledge score was ranged from 0 to 12, with the highest score denoting better knowledge of COVID-19. Then, the mean score of knowledge level was computed.

Associations between the overall knowledge scores and the collected sample covariates were examined by analysis of variance (ANOVA) and independent t-test. Factors related to the knowledge level of workers were identified by linear regression analysis. Then, we fitted the multivariable linear regression model to assess the association of explanatory variables and knowledge scores. The regression coefficient was calculated for all variables included in the analysis.

Then, binary logistic regression analysis was employed to identify factors associated with health workers’ practice and attitude. Odds ratios (ORs) and their 95% confidence intervals (CIs) were calculated to show the association’s strength and direction. All associations were considered statistically within the final models significant at \( p < 0.05 \).

**Ethical considerations**

Wollega University’s research ethics review committee (WUREC) approved the study. The objective of the study was explained through an online written form. After consented to participate through the online consent form, the participants were involved in the study by agreeing on the online consent form before continuing to fill the online tools. Personal identifiers were not included in the form to keep the confidentiality of the questions.

**Results**

A total of 441 study participants have entirely responded to the study of online questions. Most of the respondents were male in sex 390 (88.4%). More than half of the study, respondents were between the age group 25–29 years 243 (55.1%), and most of the respondents were urban residents 391 (88.7%) (Table 1).

**Knowledge regarding COVID-19, mean knowledge score, level of knowledge, and associated factors of study participant**

The correct answer rates of the 12 questions on the COVID-19 knowledge questionnaire were 36.7%–98.2% (Table 2). The mean knowledge score of health workers toward COVID-19 was 10.13 (SD = 0.057 and range = 7–12). The proportion of knowledge score was categorized for below and above mean. Accordingly, 59.5% of respondents had poor knowledge of COVID-19.

The mean knowledge score of sex \( (p < 0.0008) \), profession \( (p = 0.0223) \), and age groups \( (p = 0.0374) \) were significantly associated with the knowledge score of health professionals (Table 3).

**Attitude toward and factors associated with an attitude of health workers toward COVID-19**

The majority of the respondents agreed that COVID-19 would finally be successfully controlled 388 (88%). The majority of participants 340 (77.1%) have confidence that Ethiopia will mitigate COVID-19 (Table 4). The attitude toward preventing COVID-19 and the belief to control it differ across sex, marital status, current residence status, educational status, age group, and profession of the respondents (Table 5). Based on multivariate analysis, males and respondents with good knowledge levels are more likely to have a positive attitude toward controlling coronavirus spread (Table 6).

**Factors associated with knowledge of health workers about COVID-19 prevention**

Linear regression was fitted to identify factors associated with the knowledge of health workers toward COVID-19 prevention. Based on this, the male has a 0.6 increased mean knowledge level compared to female respondents. Furthermore, pharmacists have lower knowledge scores compared with medical doctors. Other variables included in the analysis do not show a statically significant association (Table 7).
Factor associated with the practice toward COVID-19

This study identified that 161 (36.5%) of health workers have gone to crowded places in recent days. On another way, it was found that 62.1% of health workers have never worn a mask when leaving home. Knowledge level, sex, educational status, and attitude toward global control of COVID-19 were significantly associated with the practice of COVID-19 prevention (Table 8).

Discussion

We identified that knowledge considerable respondents have a score below the mean, while the majority of respondents have a positive attitude toward control success, mitigation of COVID-19 in Ethiopia and the majority have reduced practice level for prevention of pandemic. About two-thirds of health workers had confidence toward control of COVID-19.

The outbreak is now a global pandemic and which become the reason for many life losses. Since it is a new disease to a
human being, health professionals still may not know about the disease yet. Health workers are also at higher risk during the outbreak, especially respiratory system disease. This the fact that factors like health professional’s poor knowledge possibly contribute to the rapidly increasing number of infected health workers during an outbreak if it is not identified yet. The COVID-19 attack is considered Public Health Emergency, and health professionals are underpinned to have an increased risk of infection.

The mean knowledge level of health professionals is 10.13 (95% CI 10.02, 10.24). This finding is relatively similar to the knowledge level of health workers in China.

### Table 2. Items used to measure knowledge level of health professionals in Ethiopia toward COVID-19, 2020.

| Serial number | Items                                                                 | % of correct answer |
|---------------|-----------------------------------------------------------------------|---------------------|
| 1             | The main clinical symptoms of COVID-19 are fever, fatigue, dry cough, and myalgia. | 97.1%               |
| 2             | Unlike the common cold, stuffy nose, runny nose, and sneezing are less common in persons infected with the COVID-19 virus | 36.7%               |
| 3             | There currently is no effective cure for COVID-19, but early symptomatic and supportive treatment can help most patients recover from the infection | 95.7%               |
| 4             | Not all persons with COVID-19 will develop to severe cases. Only those who are elderly, have chronic illnesses, and are obese are more likely to be severe cases | 86.2%               |
| 5             | Eating or contacting wild animals would result in the infection by the COVID-19 virus | 76.4%               |
| 6             | Persons with COVID-19 cannot infect the virus to others when a fever is not present | 88.7%               |
| 7             | The COVID-19 virus spreads via respiratory droplets of infected individuals | 98.2%               |
| 8             | Ordinary residents can wear general medical masks to prevent the infection by the COVID-19 virus | 45.8%               |
| 9             | It is not necessary for children and young adults to take measures to prevent the infection by the COVID-19 virus | 92.1%               |
| 10            | To prevent the infection by COVID-19, individuals should avoid going to crowded places such as train stations and avoid taking public transportations | 96.4%               |
| 11            | Isolation and treatment of people who are infected with the COVID-19 virus are effective ways to reduce the spread of the virus | 98.2%               |
| 12            | People who have contact with someone infected with the COVID-19 virus should be immediately isolated in a proper place. In general, the observation period is 14 days | 97.7%               |

### Table 3. Knowledge level by background characteristics of health workers in Ethiopia.

| Variables                  | Mean knowledge level | p-value |
|----------------------------|----------------------|---------|
| Gender                     |                      |         |
| Male                       | 10.2                 | 1.158   | 0.0008* |
| Female                     | 9.6                  | 1.355   |         |
| Marital status             |                      |         |
| Married                    | 10.11                | 1.23    | 0.7113  |
| Never married              | 10.15                | 1.08    |         |
| Current place of residence |                      |         |
| Urban                      | 10.12                | 1.19    | 0.5842  |
| Rural                      | 10.22                | 1.23    |         |
| Educational status         |                      |         |
| Degree                     | 10.3                 | 1.22    | 0.888   |
| Diploma                    | 10                   | 1.39    |         |
| Masters                    | 10.2                 | 1.12    |         |
| Medical doctor             | 10.1                 | 1.13    |         |
| Age group                  |                      |         |
| 20–24                      | 10.1                 | 1.04    | 0.0374* |
| 25–29                      | 10.21                | 1.12    |         |
| 30–34                      | 9.9                  | 1.27    |         |
| >35                        | 10.45                | 1.4     |         |
| Profession                 |                      |         |
| Medical doctor             | 10.05                | 1.12    | 0.0223* |
| Medical laboratory         | 10.64                | 0.6     |         |
| Midwifery                  | 9.9                  | 1.2     |         |
| Nurse                      | 10.14                | 1.24    |         |
| Pharmacy                   | 9.57                 | 1.13    |         |
| Public health              | 10.34                | 1.06    |         |

*Signifies associated variable.
more than half of the health workers who participated in this study had a knowledge level less average, similar to the study conducted in Vietnam.17

Increased knowledge score on coronavirus in this study is because health workers are exposed to different media exposure starting from the pandemic. Various media sources had been disseminating the information, which could contribute to the observed better knowledge.6 However, the participants’ understanding was not uniform across all contents. Only two out of five individuals had a good knowledge of clinical manifestation and ways of transmission. This finding is similar to the study conducted in Bangladesh.18 This because the disease is new, no detail about the disease was not established at the early phase of the pandemic is the main factor.

This finding indicates a need to improve the knowledge of health workers as a lack of awareness exposed health workers to the disease. Lesson from China suggests that many health workers could be affected by a coronavirus from a lack of understanding and precautionary measures for combating the COVID-19 outbreak at the beginning. Inadequate information on epidemiological transmission could also deter the application of prevention methods.14 Thus, about 3019 health workers were infected, and 10 died because of the disease.15

Table 4. Independent t-test to test covarieties of knowledge across sex, marital status, and place of residence.

| Group           | Observed | Mean     | Standard error | Standard deviation | 95% confidence interval |
|-----------------|----------|----------|----------------|--------------------|-------------------------|
| Married         | 256      | 10.05859 | 0.0855813      | 1.369301           | 9.890058, 10.22713     |
| Never married   | 185      | 10.13514 | 0.0824888      | 1.121968           | 9.97239, 10.29788      |
| Difference      | -0.0765414 | 0.1188636 |                |                    | -0.3101642, 0.1570814   |

Difference = mean (married) − mean (never married), t = -0.6439

| Group           | Observed | Mean     | Standard error | Standard deviation | 95% confidence interval |
|-----------------|----------|----------|----------------|--------------------|-------------------------|
| Male            | 390      | 10.16667 | 0.06184        | 1.22124            | 10.04508, 10.28825     |
| Female          | 51       | 9.509804 | 0.2083973      | 1.488255           | 9.091226, 9.928382     |
| Difference      | 0.658627 | 0.217379 |                |                    | 9.947312, 10.20103     |

Difference = mean (male) − mean (female), t = 3.0217

Table 5. Attitudes toward COVID-19 among health workers in Ethiopia, 2020.

| Gender          | Agree | Disagree | I don’t know | Confidence on winning by Ethiopia |
|-----------------|-------|----------|--------------|----------------------------------|
| Male            | 350 (89.7%) | 24 (6.2%) | 16 (4.1%) | Yes 303 (77.7%), No 87 (22.3%) |
| Female          | 38 (74.5%)  | 10 (19.6%) | 3 (5.9%)  | Yes 37 (72.5%), No 14 (27.5%)  |
| Marital status  |       |          |              |                                  |
| Married         | 229 (89.5%) | 18 (7.0%) | 2 (0.8%)   | Yes 204 (79.7%), No 52 (20.3%) |
| Never married   | 159 (85.9%) | 16 (8.6%) | 4 (2.5%)   | Yes 136 (73.5%), No 49 (26.5%) |
| Current place of residence |       |          |              |                                  |
| Urban           | 258 (87.8%) | 22 (7.5%) | 10 (3.7%)  | Yes 233 (79.3%), No 61 (20.7%) |
| Rural           | 145 (90.0%) | 8 (8.0%)  | 3 (2.0%)   | Yes 137 (76.7%), No 42 (23.3%) |
| Educational status |      |          |              |                                  |
| Degree          | 116 (87.9%) | 10 (7.6%) | 6 (4.5%)   | Yes 97 (73.5%), No 35 (26.5%)  |
| Diploma         | 21 (83.9%)  | 4 (12.9%) | 1 (3.2%)   | Yes 24 (77.4%), No 7 (22.6%)   |
| Masters         | 87 (89.7%)  | 6 (6.2%)  | 4 (4.1%)   | Yes 71 (73.2%), No 26 (26.8%)  |
| Medical doctor  | 17 (89.5%)  | 2 (10.5%) | 0           | Yes 12 (63.2%), No 7 (36.8%)   |
| Age group       |        |          |              |                                  |
| 20–24           | 26 (83.9%)  | 4 (12.9%) | 1 (3.2%)   | Yes 27 (87.1%), No 4 (12.9%)   |
| 25–29           | 213 (87.7%) | 18 (7.4%) | 12 (4.9%)  | Yes 185 (76.1%), No 58 (23.9%) |
| 30–34           | 116 (87.9%) | 10 (7.6%) | 6 (4.5%)   | Yes 97 (73.5%), No 35 (26.5%)  |
| >35             | 33 (94.3%)  | 2 (5.7%)  | 0           | Yes 31 (88.6%), No 4 (11.4%)   |
| Profession      |        |          |              |                                  |
| Medical doctor  | 17 (89.5%)  | 2 (10.5%) | 0           | Yes 12 (63.2%), No 7 (36.8%)   |
| Medical laboratory | 14 (100.0%) | 0       | 0           | Yes 11 (78.6%), No 3 (21.4%)   |
| Midwifery       | 51 (83.6%)  | 7 (11.9%) | 2 (3.5%)   | Yes 45 (73.8%), No 16 (26.2%)  |
| Nurse           | 202 (86.3%) | 21 (9.0%) | 7 (3.7%)   | Yes 185 (79.1%), No 49 (20.9%) |
| Pharmacy        | 24 (92.3%)  | 0         | 2 (7.7%)   | Yes 21 (80.8%), No 5 (19.2%)   |
| Public health   | 80 (92.0%)  | 5 (5.7%)  | 2 (2.3%)   | Yes 66 (75.9%), No 21 (24.1%)  |
### Table 6. Factors associated with attitudes of health workers in Ethiopia, 2020.

| Variables                      | COVID-19 can be successfully controlled | AOR (95% CI) |
|--------------------------------|----------------------------------------|--------------|
|                                | Disagree | Agree |                                |              |
| Sex                            |          |       |                                |              |
| Male                           | 40 (10.3%) | 350 (89.7%) | 2.746 (1.23, 6.02) |
| Female                         | 13 (25.5%) | 38 (74.5%) | 1                           |
| Knowledge level                 |          |       |                                |              |
| Poor knowledge                 | 40 (15.2%) | 224 (84.8%) | 1                           |
| Good knowledge                 | 13 (7.3%)  | 164 (92.7%) | 1.98 (1.01, 3.09) |
| Confidence on winning COVID-19 by Ethiopia |          |       |                                |              |
| Yes                            |          |       |                                |              |
| No                             |          |       |                                |              |
| Profession                     |          |       |                                |              |
| Medical doctor                 | 12 (63.2%) | 7 (36.8%) | 1                           |
| Medical laboratory             | 11 (78.6%) | 3 (21.4%) | 5.178 (0.8, 32.5) |
| Midwifery                      | 45 (73.8%) | 16 (26.2%) | 4.11 (0.99, 17.1) |
| Nurse                          | 185 (79.1%) | 49 (20.9%) | 4.56 (1.21, 17.1) |
| Pharmacy                       | 21 (80.8%) | 5 (19.2%) | 9.34 (1.7, 50.2) |
| Public health                  | 66 (75.9%) | 21 (24.1%) | 5.2 (1.33, 20.6) |
| Knowledge level                |          |       |                                |              |
| Poor knowledge                 | 193 (73.1%) | 71 (26.9%) | 1                           |
| Good knowledge                 | 147 (83.1%) | 30 (16.9%) | 1.65 (0.9, 2.7) |

AOR: adjusted odds ratio; CI: confidence interval.

### Table 7. Linear regression output for factors associated with knowledge of health workers toward COVID-19, in Ethiopia.

| Knowledge level                          | Coefficient | T  | p-value | 95% confidence interval |
|------------------------------------------|-------------|----|---------|-------------------------|
| Sex (male vs female)                     | 0.60        | 3.30| 0.001   | 0.24                    |
| Education level (degree vs medical doctors) | 0.59   | 1.38| 0.169   | -0.25                   |
| Education level (diploma vs medical doctor) | 0.57    | 1.32| 0.213   | -0.33                   |
| Place of residence (urban vs urban)      | -0.05       | -0.29| 0.771   | -0.042                  |
| Age in years                             | -0.01       | 1.76| 0.000   | 8.80                    |

### Table 8. Multivariable logistic regression factors associated with practice of health workers in Ethiopia, 2020.

| Variable                          | Wearing a mask when going out of home | AOR at 95% CI |
|-----------------------------------|--------------------------------------|--------------|
| Categorized knowledge             | Poor knowledge                       | 157 (59.5%) | 107 (40.5%) | 1 |
|                                  | Good knowledge                       | 117 (66.1%) | 60 (33.9%) | 1.6 (1.02, 2.6) |
| Sex                               | Male                                 | 250 (64.1%) | 140 (35.9%) | 1 |
|                                  | Female                               | 24 (47.1%)  | 27 (52.9%)  | 2.2 (1.07, 4.6) |
| Educational status                | Degree                               | 189 (64.3%) | 105 (35.7%) | 1 |
|                                  | Diploma                              | 16 (51.6%)  | 15 (48.4%)  | 0.67 (0.21, 1.6) |
|                                  | Masters                              | 59 (60.8%)  | 38 (39.2%)  | 2.33 (1.06, 5.08) |
|                                  | Medical doctor                       | 10 (52.6%)  | 9 (47.4%)   | 5.99 (1.76, 20.4) |
| Going to a crowded place          | Yes                                  | 54 (53.5%)  | 47 (46.5%)  | 1.645 (1.05, 2.6) |
|                                  | No                                   | 226 (66.5%) | 114 (33.5%) | 1 |

AOR: adjusted odds ratio; CI: confidence interval.
This can be applied in any country if appropriate management is not taken in a country like Ethiopia.

Poor knowledge of health workers is a concern during such pandemic. According to a study conducted in China, 85% of health workers fear that coronavirus could infect them at health facilities due to a lack of awareness about the disease.\(^{16}\) Their fear can result in reduced quality of care and prevention of COVID-19.

We identified nine out of ten respondents of this study correctly mentioned the signs and symptoms of COVID-19. This finding is higher than the study from Vietnam, in which only 72.8% of health professionals respond to correct signs and symptoms of COVID.\(^{17}\) It is consistent with another study result from Bangladesh\(^{18}\) and Egypt.\(^{19}\) It is also higher than the study conducted the United State (79.8%) and UK (84.6%).\(^{20}\) As also supported by India’s study,\(^{21}\) participants of this survey also indicated that isolation and treatment of persons infected with the coronavirus are essential for prevention and control mechanisms.

Male participants have better knowledge scores when compared with female participants. This finding cannot be conclusive because their comparison groups were small in number; however, it is consistent with study result from Nepal.\(^{22}\) It is different from South Korea, in which females were good in knowledge.\(^{23}\) Besides, pharmacists had lower knowledge scores compared with medical doctors. The insufficient knowledge of pharmacists indicates a need to train health professionals focusing on COVID-19. This finding is similar to the study finding of Vietnam.\(^{17}\) This is because the disease is new, and there was new drug for the treatment on which pharmacist may read it.

A higher proportion of study participants had a positive attitude regarding final success in the control of COVID-19 as also participants in the Vietnamese study believed.\(^{17}\) While a small number of the case has detected in Ethiopia, it may be not easy to measure the attitude at the level. Because the attitude may change with an increased number of patients in the country. This finding is also consistent with a study conducted in Nepal\(^{22}\) and China.\(^{24}\) This finding gives decision-makers confidence in controlling the pandemic’s effects because health workers had a favorable attitude on managing COVID-19.

Going to a crowded area is one of the risk factors for coronavirus transmission. In this study, about one-third of the study participants have gone to overcrowded areas. As health professionals are also part of the community that goes to the high-risk program, it will double the risk. Health professionals are also at high risk because of working in the clinical area where they may contract the virus.\(^{22}\) This is because they will have close contact with the disease through infected personal at a nearby distance.

**Limitation of the study**

Considering the limitation of an online survey platform is indispensable while accepting the findings of this study. Online platforms might not be accessible to health professionals, especially those working, because of inadequate access to Internet service in rural areas. However, most healthcare providers visit districts found near while they are duty-free, making us get those working in rural parts of the country. As the study design was cross-sectional, it might not assess the cause and effect at the same time that may be lead us to use the appropriate design for the identified gap. As well, the tool was not pre-tested in country’s contexts even if it was used in other countries.

**Conclusion**

Health workers have considerable knowledge scores toward COVID-19 symptoms, practices, and prevention methods. However, female health workers and pharmacists had a statistically significantly lower level of knowledge score. The majority of respondents have a positive attitude toward control success and mitigation of COVID-19 in Ethiopia. It is not adequate with the pandemics of the disease. Decision-makers and program managers could facilitate intervention packages like training health workers on COVID-19 at an early stage to mitigate the devastating effect of the virus on health workers and the community as large.

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**Author contributions**

G.F. and B.E. have developed the proposal, participated in data collection supervision, and data analysis. G.F., B.E., T.T., M.G., T.T.B., B.W., G.F., A.M., and W.E. have participated in the manuscript writing. All authors read and approved the final manuscript.

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Supplemental material

Supplemental material for this article is available online.

References

1. Rahaman ST. A Comprehensive review on COVID-19 and its prevention and possible treatments. *International Journal of Scientific Research* 2020; 9(4): 66–68.
2. World Health Organization. *Critical preparedness, readiness and response actions for COVID-19: interim guidance, March 22 2020*. Geneva: World Health Organization, 2020.
3. Mahalle P, Kalamkar AB, Dey N, et al. Forecasting models for coronavirus (COVID-19): a survey of the state-of-the-art, https://www.cursero.com/file/63388583/Proof-Read-Forecasting-Models-for-Coronavirus-COVID19-4-Aprilpdf/
4. Anjorin AA. The coronavirus disease 2019 (COVID-19) pandemic: a review and an update on cases in Africa. *Asian Pacific J Trop Med* 2020; 13(5): 199.
5. Deng CX. The global battle against SARS-CoV-2 and COVID-19. *Int J Biol Sci* 2020; 16(10): 1676–1677.
6. Garfin DR, Silver RC and Holman EA. The novel coronavirus (COVID-19) outbreak: amplification of public health consequences by media exposure. *Health Psychol* 2020; 39(5): 355–357.
7. Guo YR, Cao QD, Hong ZS, et al. The origin, transmission and clinical therapies on coronavirus disease 2019 (COVID-19) outbreak—an update on the status. *Military Med Res* 2020; 7(1): 11.
8. Nemati M, Ebrahimi B and Nemati F. Assessment of Iranian nurses’ knowledge and anxiety toward COVID-19 during the current outbreak in Iran. *Arch Clin Infect Dis* 2020; 15: e102848.
9. Feyesia B, Herbst C, Lemma W, et al. The health workforce in Ethiopia: addressing the remaining challenges. *The World Bank*, 4 January 2012, https://documents.worldbank.org/en/publication/documents-reports/documentdetail/433741468250204395/the-health-workforce-in-ethiopia-addressing-the-remaining-challenges
10. Gee S and Skovdal M. The role of risk perception in willingness to respond to the 2014–2016 West African Ebola outbreak: a qualitative study of international health care workers. *Glob Health Res Policy* 2017; 2: 21.
11. Health; Federal Democratic Republic of Ethiopia Ministry of Health. *Health and health-related indicators*. Addis Ababa: Federal Democratic Republic of Ethiopia Ministry of Health, 2017.
12. Zhong BL, Luo W, Li HM, 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. *Int J Biol Sci* 2020; 16(10): 1745–1752.
13. He Y, Wei J, Bian J, et al. Chinese Society of Anesthesiology expert consensus on anesthetic management of cardiac surgical patients with suspected or confirmed coronavirus disease 2019. *J Cardiothorac Vasc Anesth* 2020; 34: 1397–1401.
14. Hung LS. The SARS epidemic in Hong Kong: what lessons have we learned? *J R Soc Med* 2003; 96(8): 374–378.
15. Xiang YT, Jin Y, Wang Y, et al. Tribute to health workers in China: A group of respectable population during the outbreak of the COVID-19. *Int J Biol Sci* 2020; 16(10): 1739–1740.
16. Zhou M, Tang F, Wang Y, et al. Knowledge, attitude and practice regarding COVID-19 among healthcare workers in Henan, China. *J Hospital Infect* 2020; 4: 88–91.
17. Gao H, Han NT, Van Khanh T, et al. Knowledge and attitude toward COVID-19 among healthcare workers at District 2 Hospital, Ho Chi Minh City. *Asian Pacific J Trop Med* 2020; 13: 260–265.
18. Kazi Abdul M and Khandaker Mursheda F. Knowledge and perception towards Novel Coronavirus (COVID 19) in Bangladesh, 2020, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3578477
19. Abdelhafiz AS, Mohammed Z, Ibrahim ME, et al. Knowledge, Perceptions, and Attitude of Egyptians Towards the Novel Coronavirus Disease (COVID-19). *J Community Health* 2020; 45(5): 881–890.
20. Geldsetzer P. Knowledge and perceptions of COVID-19 among the general public in the United States and the United Kingdom: a cross-sectional online survey. *Ann Intern Med* 2020; 2020: M20.
21. Roy D, Tripathy S, Kar SK, et al. Study of knowledge, attitude, anxiety & perceived mental healthcare need in Indian population during COVID-19 pandemic. *Asian J Psychiatr* 2020; 51: 102083.
22. Tamang N, Rai P, Dhungana S, et al. COVID-19: a National Survey on perceived level of knowledge, attitude and practice among frontline healthcare Workers in Nepal. *BMC Public Health* 2020; 20(1): 1905.
23. Lee M, Kang BA and You M. Knowledge, attitudes, and practices (KAP) toward COVID-19: a cross-sectional study in South Korea. *BMC Public Health* 2021; 21(1): 295.
24. Shi Y, Wang J, Yang Y, et al. Knowledge and attitudes of medical staff in Chinese psychiatric hospitals regarding COVID-19. *Brain Behav Immun Health* 2020; 4: 100064.