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# Factors associated with knowledge of health care workers toward COVID-19 in health facilities West Guji zone, Southern Ethiopia, 2020

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## Abstract:

**BACKGROUND:** Coronavirus pandemic puts healthcare workers (HCWs) at high risk and challenges the abilities of healthcare systems to respond to the crisis. This study aimed to assess the level of knowledge of HCWs and associated factors in West Guji zone public health facilities in southern Ethiopia.

**MATERIALS AND METHODS:** A health facility-based quantitative cross-sectional study was undertaken from June 10 to July 10, 2020. Two hundred and eighty-three HCWs were involved in the study using a systematic sampling method. The instrument was pretested on 5% of the sample in Yabello Hospital. Data were analyzed using bivariate and multivariate logistic regression.

**RESULTS:** The HCW who had good knowledge was 84.7%. HCWs who had degree holders, masters and above holders, work experience of 2–4 years, and >4 years of experiences, had training on Coronavirus, and medical diseases were significantly associated with good knowledge of Coronavirus.

**CONCLUSIONS:** This study indicated that HCWs' knowledge about the Coronavirus was good. Improving the educational status of HCWs and giving updated training on the Coronavirus will improve HCW's knowledge of the Coronavirus.

## Keywords:

COVID-19, Ethiopia, health personnel/classification, knowledge, protective factors

## Introduction

Globally, on 30 January, the WHO declared an international public health emergency and called on all countries to make cooperative efforts to prevent the rapid spread of coronavirus disease 2019 (COVID-19).<sup>[1,2]</sup> As of February 14, 2021, the COVID-19 pandemic had resulted in 107,838,255 cases and 2,373,398 deaths worldwide, including 2,713,855 cases and 68,043 deaths in Africa and 145,548 cases, and 2177 deaths in Ethiopia.<sup>[3]</sup> Scientists and health professionals around the world are working together to accelerate research and

develop new standards and standards to stop the spread of the coronavirus pandemic and to help treat infected people.<sup>[4,5]</sup>

Health care workers (HCWs) are at the front position of the response to the ending of COVID 19 pandemic and other pathogens, violence, harassment, stigmatization, discrimination, heavy workload, and the long-term use of personal protective equipment (PPE).<sup>[6]</sup> Hand washing and proper PPE are important to reduce the spread and risk of COVID-19 infections in hospitals.<sup>[7]</sup> Knowledge of HCWs on COVID-19 prevention methods such as maintaining hand hygiene, covering mouth and nose when coughing or sneezing,

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avoiding close contact with anyone showing symptoms of respiratory disease, and avoiding unprotected contact with farm or wild animals is critical to avoiding a fast-growing COVID 19 pandemic.<sup>[8]</sup>

In low- and middle-income countries, HCWs are at high risk of exposure to COVID-19<sup>[9,10]</sup> due to lack of preventive measures, inadequate protective equipment, and a lack of supportive working environments. The pandemic puts HCWs at great risk and challenges the capacity of health systems to respond to crises.<sup>[11]</sup> The situation in sub-Saharan Africa can be serious because of HIV, tuberculosis, malaria, poverty, poor quality of health services, and high access to health facilities.<sup>[12]</sup>

Although the Ethiopian Government has taken a number of steps to curb the rapid growth of COVID 19 cases, Ethiopia has the highest number of infections in East Africa. Lack of evidence, inadequate protection and supply of treatment and infrastructure, inadequate isolation and isolation centers, and misunderstandings among community members about the risk and source of HIV infection has affected the federal response efforts in most parts of the country.<sup>[13]</sup> Despite the measures taken to establish a health system, there was a dramatic increase in the number of patients.<sup>[14]</sup>

Many health care work is complicated by several challenges related to access, security, supply chain logistics, and financial stress.<sup>[15]</sup> HCWs are at the forefront of the fight against the COVID-19 pandemic, while most other public officials stay at home; As a result, thousands of HCWs are infected with COVID-19 around the world as they provide clinical services to COVID-19 patients, and the condition is worse in developing countries with poor health systems.<sup>[16]</sup> Therefore, this study was assess the level of HCWs' knowledge about COVID-19 and associated factors in West Guji zone public health facilities in southern Ethiopia. This benefits all stakeholders including governmental and nongovernmental organizations, HCWs, health care planners, and health institutions by providing current knowledge about COVID-19 and can provide relevant information for planning interventions in the study area.

## Materials and Methods

### Study design and setting

A facility-based cross-sectional study was conducted in West Guji Zone, Oromia Region. West Guji zone is one of among 20 zones in the Oromia Region. Bule Hora town is a capital city of West Guji zone which is located 467 Km far from Addis Ababa to the south direction at 5°35' N Latitude and 38°15'E Longitude. The zone has also 196 kebeles the lower administrative body, of these 166 are rural, and 30 are urban kebeles. It has an estimated

population of 1,389,821 of whom 681,012 are male and 708,809 are females. West Guji Zone has one general hospital, 2 primary hospitals, 42 health centers, and 166 health posts, and has 860 health care providers and 478 health extension workers. The study was conducted from June 10 to July 10, 2020.

### Study participants and sampling

All selected health care providers in selected public health facilities at the time of data collection were included and those who were new employers recruited within the last 6 months were excluded. The sample size was determined by using single population proportion formula. By considering the level of knowledge of HCWs as 50% because to get maximum sample sizes. Ninety-five percent confidence interval (CI) and margin of error 5% between the sample size and the underlining population were considered. Finally, 283 HCWs were included in the study. Among the total of 3 Public hospitals and 42 health centers in the Zone, all hospitals were selected purposefully. In addition, 15 health centers were selected by simple random sampling technique. From all Hospitals, 208 HCWs were selected, and from all health centers, 214 HCW were selected by proportional allocation to sample size. Finally, a simple random sampling technique was employed to select 283 study participants. The dependent variable was the level of knowledge about COVID-19 and independents variables were sociodemographic factors, knowledge-related factors, chronic conditions, and behavioral factors.

### Data collection tool and technique

The data were collected using a pretested structured self-administered questionnaire with data collector guidance. The questionnaire was initially prepared in English and then translated into Afaan Oromoo and Amharic then back into English by fluent speakers to check its consistency [Annex A and B]. The questions which assess the level of knowledge about COVID 19 and its associated factors among HCWs were adopted from similar previous studies.<sup>[5,6,9,10]</sup> The Knowledge level was assessed by 12 components of knowledge-related questions, which was calculated by assigning one (1) point to each correct answer, and a zero (0) points to an incorrect/unknown answer. The total knowledge score ranged from 0 to 12, with higher scores indicating good knowledge, if they respond to at least 6 items/ components of knowledge-related questions and if their response was below 6 items they had poor knowledge on coronavirus knowledge.

The collected data were coded, entered, and cleaned by Epi-DATA version 3.1 (Epidata Association, Odense, Denmark) and exported to Statistical Package for Social Science version 25.0(IBM, Armonk, New York, USA) for analysis. Descriptive statistics were used to describe the

data. Binary logistic regression analysis was employed to examine the statistical association between knowledge and every single independent variable. Adjusted odds ratios with 95% CI will be estimated to assess the strength of associations and statistical significance was declared at a  $P < 0.05$ . Hosmer and Lemeshow test was done to check model fitness. Results were presented by using tables, figures, and texts.

### Ethical consideration

Ethical clearance was obtained from Bule Bora University Institutional Review Board with a reference number; Ref. No (BHU/PRD/01/2012 E. C/2020) and verbal consents were obtained from all respondents [Annex A and B]. To get full co-operation, respondents were reassured about the confidentiality of their responses. Their voluntary participation and the right to take part or terminate at any time they wanted were assured. The data collectors were trained by the principal investigators on how to keep the confidentiality and anonymity of the responses of the respondents in all aspects.

## Results

### Socio-demographic characteristics of the respondents

Out of a total of 283 eligible HCWs, 275 respondents had participated in this study with a 97.2% response rate. Nearly two-third, 173 (62.9%) were male respondents. The mean age of respondents was 29.83 years with standard deviation (SD)  $\pm 4.794$ , ranging from 20 to 56 years. The majority of the age respondents lie between 25–29 and 30–34, which accounts for 44.4 and 36.4%, respectively [Table 1].

### Knowledge of health care workers about coronavirus disease 2019

Overall the level of HCW's knowledge regarding COVID-19 was classified as good knowledge and poor knowledge based on their responses. Of the surveyed HCWs, 84.7% (233) had demonstrated good knowledge about COVID-19. The mean of the knowledge was 9.90 with a 2.42 SD. The majority of HCWs, (260/94.5%) responded with the correct answers that the main clinical symptoms of COVID-19 are fever, fatigue, dry cough, and myalgia. Nearly two-thirds (176/64.0%) of the respondents responded to the correct answer Eating or contacting wild animals would result in the infection by the COVID-19 virus [Table 2].

Regarding the experiences of HCWs, the majority of HCWs 159 (57.80%) had 2–4 years and the mean was 4.15 years with a SD of 2.86 years of experiences [Figure 1]. Nearly two-thirds of health workers 177 (64.4%) had training on COVID-19 and around one-third, 78 (28.4%) had experiences of outbreak management.

**Table 1: Sociodemographic of Health care workers in West Guji Zone Public Health Facilities, Southern Ethiopia, 2020**

Sociodemographic characteristics	Frequency (%)
Age of respondents	
20-24	22 (8.0)
25-29	122 (44.4)
30-34	100 (36.4)
35-39	27 (9.8)
$\geq 40$	4 (1.5)
Marital status	
Married	153 (55.6)
Single	106 (38.5)
Divorced	13 (4.7)
Widowed	3 (1.1)
Ethnicity	
Oromo	191 (69.5)
Amhara	55 (20.0)
Burji	7 (2.5)
Others	22 (8.0)
Qualification of health care workers	
Diploma	88 (32.0)
Degree	167 (60.7)
Masters	15 (5.5)
Specialist	5 (1.8)
Profession of health care workers	
General practitioner	11 (4.0)
Health officer	39 (14.2)
Nurses	98 (35.6)
Midwifery	36 (13.1)
Laboratory	38 (13.8)
Pharmacy	39 (14.2)
Anesthesia	7 (2.5)
IESO	4 (1.5)
Others	3 (1.1)
Religion	
Orthodox	73 (26.5)
Muslim	45 (16.4)
Protestant	127 (46.2)
Wakeffata	25 (9.1)
Others	5 (1.8)
Residence	
Rural	74 (26.9)
Urban	201 (73.1)
Family size	
1	76 (27.6)
2-3	98 (35.6)
4-5	66 (24.0)
$\geq 6$	35 (12.7)
Monthly income	
$\leq 4000$	35 (12.7)
4001-8000	210 (76.4)
$>8000$	30 (10.9)

IESO=Integrated emergency surgical officers

### Chronic and behavioral related factors

Regarding the psychologic distress of HCWs, 38 (13.8%) had a previous history and 18 (6.5%) had

**Table 2: Knowledge of health care workers about coronavirus disease 2019 in West Guji Zone Public Health Facilities, Southern Ethiopia, 2020**

Knowledge of health care workers about COVID-19	True (%)	False (%)	I don't know (%)
The main clinical symptoms of COVID-19 are fever, fatigue, dry cough, and myalgia	260 (94.5)	15 (5.5)	0
Unlike the common cold, stuffy nose, runny nose, and sneezing are less common in persons infected with the COVID-19 virus	239 (86.9)	36 (13.1)	0
There currently is no effective cure for COVID-2019, but early symptomatic and supportive treatment can help most patients recover from the infection	233 (84.7)	38 (13.8)	4 (1.5)
Not all persons with COVID-2019 will develop to severe cases. Only those who are elderly, have chronic illnesses and obese are more likely to be severe cases	223 (81.1)	52 (18.9)	0
Eating or contacting wild animals would result in the infection by the COVID-19 virus	176 (64.0)	80 (29.1)	19 (6.9)
Persons with COVID-2019 cannot infect the virus to others when a fever is not present	196 (71.3)	74 (26.9)	5 (1.8)
The COVID-19 virus spreads via respiratory droplets of infected individuals	229 (83.3)	42 (15.3)	4 (1.5)
Ordinary residents can wear general medical masks to prevent the infection by the COVID-19 virus	225 (81.8)	43 (15.6)	7 (2.5)
It is not necessary for children and young adults to take measures to prevent the infection by the COVID-19 virus	229 (83.3)	42 (15.3)	4 (1.5)
To prevent the infection by COVID-19, individuals should avoid going to crowded places such as train stations and avoid taking public transportations	235 (85.5)	39 (14.2)	1 (0.4)
Isolation and treatment of people who are infected with the COVID-19 virus are effective ways to reduce the spread of the virus	234 (85.1)	40 (14.5)	1 (0.4)
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	244 (88.7)	29 (10.5)	2 (0.7)

COVID-19=Coronavirus disease 2019

Parental history of psychological distress. Out of study participants, 45 (16.4%) of HCWs ever had any medical illness. The medical illnesses were; diabetic mellitus 24 (8.7%), chronic hypertension 22 (8%), asthmatic disease 7 (2.5%), chronic bronchitis 6 (2.2%), renal disease 6 (2.2%), and anemia 6 (2.2%). This study revealed that 183 (66.5%) practiced PPE. Ninety-one (33.1%) of HCWs had travel history for the past 2 weeks before the survey. Five (1.8%) of them were had ever smoked tobacco/cigarettes. Concerning alcohol use, 74 (26.9%) drunk alcohol with the frequency of 40 (14.5%) once or twice a week, 35 (12.7%) one to three per month, 4 (1.5%) occasionally, and 2 (0.7%) every day of study participants, 14 (5.1%) used psychoactive drugs.

### Factors associated with knowledge of health care workers about coronavirus disease 2019

HCWs who had degree holders were 2.31 (95% CI = 1.75–7.55) and masters and above holders were 4.56 (95% CI = 3.78–13.51) times more likely to have good knowledge than diploma holders. HCWs who had 2–4 years and >4 years of experiences were 2.61 (95% CI = 1.85–9.65) and 3.02 (95% CI = 2.47–8.02) times more likely to have good knowledge on COVID-19, respectively than those who are <2 years of experience. Having trained on COVID-19 were 3.62 (95% CI = 2.80–11.707) times more likely to have good knowledge about COVID-19, and HCWs who had medical diseases were 2.38 (95% CI = 1.97–13.32) times more likely to have knowledge on COVID-19 than HCWs after controlling confounding variables [Table 3].

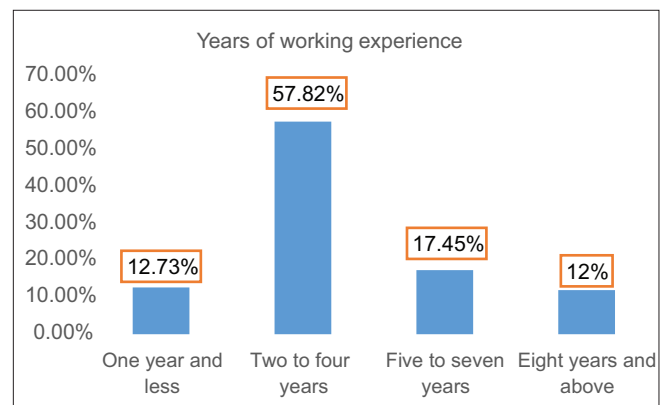


Figure 1: Percentage of health care workers experiences of west Guji Zone public health facilities, 2020

## Discussion

This study assessed the level of knowledge of HCWs and associated factors towards COVID-19 in public health facilities in the West Guji zone, southern Ethiopia. HCWs who had good knowledge were 84.7%. This study was consistent with the finding in a multicenter study in Ethiopia 88.2%,<sup>[17]</sup> Northwest Gondar Ethiopia (94.2%),<sup>[18]</sup> Lebanon (90%),<sup>[19]</sup> and Nigeria (88.75%).<sup>[20]</sup> However, a study conducted in Rural Cross River State, Nigeria (6.7%–53.3%),<sup>[21]</sup> Addis Ababa Ethiopia (26.5%),<sup>[22]</sup> Uganda (69%),<sup>[16]</sup> Ethiopia Amhara region (70%),<sup>[23]</sup> India 70.91%,<sup>[24]</sup> a systematic review (72.2%),<sup>[25]</sup> and systematic review conducted on HCWs and the general population (59%)<sup>[26]</sup> were lower than this study. The reasons for the difference might be due to sampling size, study design, study area and the reason for a higher proportion of good

**Table 3: Bivariate and multivariate logistic regression analysis of factors associated with knowledge of health care workers about coronavirus disease 2019 in health Facilities west Guji Zone, southern Ethiopia 2020**

Variables	Knowledge		COR (95% CI)	P	AOR (95% CI)	P
	Good	Poor				
Sex						
Male	144	29	1		1	
Female	89	13	1.379 (0.681-2.792)	0.372	0.938 (0.543-7.566)	0.746
Level of education						
Diploma	71	17	1		1	
Degree	143	24	2.47 (1.730-12.975)	0.001	2.310 (1.746-7.553)	0.001
Master and above	14	6	3.81 (2.236-9.834)	<0.001	4.562 (3.781-13.509)	<0.001
Residence						
Rural	61	13	1.264 (0.617-2.588)	0.522	0.830 (0.256-2.625)	0.85
Urban	172	29	1		1	
Marital status						
Married	129	24	1		1	
Single	93	13	2.443 (0.779-7.665)	0.126	0.490 (0.304-2.942)	0.230
Divorced and widowed	11	5	3.252 (0.974-10.861)	0.055	0.714 (0.535-8.463)	0.982
Working experiences (years)						
<2	70	14	1		1	
2-4	91	19	1.358 (1.449-2.043)	0.011	2.608 (1.853-9.657)	0.042
>4	72	9	2.600 (1.651-3.934)	0.006	3.023 (2.472-8.023)	0.021
Psychoactive drug use						
No	223	38	1		1	
Yes	10	4	0.426 (0.127-1.428)	0.167	1.75 (0.793-4.179)	0.680
Alcohol use						
No	170	31	1		1	
Yes	63	11	1.044 (0.495-2.202)	0.909	0.680 (0.833-3.657)	0.532
Had medical illness						
No	193	37	1		1	
Yes	40	5	2.171 (1.847-10.612)	0.003	2.38 (1.97-13.32)	0.021
Previous history of psychological distress?						
No	203	34	1		1	
Yes	30	8	0.628 (0.266-1.485)	0.289	0.76 (0.336-3.608)	0.542
Training on COVID-19						
No	88	24	1		1	1
Yes	145	18	2.197 (1.129-4.276)	0.021	3.62 (2.800-11.707)	0.034
Previous outbreak managements experience						
No	158	39	1		1	
Yes	70	8	1.534 (0.568-4.144)	0.399	1.722 (0.768-3.844)	0.432

COVID-19=Coronavirus disease 2019, COR=Crude odds ratios, CI=Confidence interval, AOR=Adjusted odds ratio

knowledge was probably due to better preparedness for the worst.

Unlike the present study, many different studies show that socio-demographic factors age, sex, marital status, and residence were statistically significant associations with good knowledge about COVID-19.<sup>[16,23,27]</sup> The possible reason might be because health care providers having sufficient knowledge toward the route of transmission, characteristics of the disease, diagnosis, treatment, and prevention of COVID-19 will help to reduce comorbidities due to COVID-19. Knowing the transmission and prevention of COVID-19 also makes it easier for health care providers to know who and when patients died from COVID-19 because they are aware of the severity of the disease. The difference is

might also due to the study area and socio-cultural difference.

This study revealed that HCWs who had more working experiences have good knowledge about COVID-19 than those with fewer experiences. A similar finding was reported in a study done in China,<sup>[28]</sup> Nepal,<sup>[27]</sup> Cyprus,<sup>[29]</sup> and India.<sup>[30]</sup> This indicates HCWs who have more work experience played a fundamental role in fighting any new emerging diseases and respond to this crisis with more self-confidence. The level of HCWs' education was significantly associated with knowledge related to COVID-19. This study was consistent with the study done in Northwest Ethiopia,<sup>[31]</sup> China and India.<sup>[32,33,34]</sup> The possible justification might be HCWs who have higher educational levels might have better opportunities to access

better information, read different research articles, and participate in different training than those with diplomas.

The study indicates HCWs who had training on the COVID-19 pandemic were statistically significantly associated with good knowledge about COVID-19. This study is in line with a study conducted in some parts of Ethiopia in Amhara,<sup>[23]</sup> Low resource setting<sup>[35]</sup> and Addis Ababa,<sup>[22]</sup> and Nepal.<sup>[27]</sup> It implies that HCWs who had training on COVID-19 will protect themselves and family, teach others about the mode of transmission, prevention methods, and signs and symptoms of COVID-19. Availability of PPE, water, and soap supply to all health facilities are also very important components to fight this pandemic disease.

The current study identified that HCWs who had medical diseases were more knowledgeable about COVID-19 than others after controlling confounding variables. This is in line with a study conducted in a multi-center study in Ethiopia.<sup>[17]</sup> On the other hand, a study conducted in Nepal<sup>[27]</sup> indicates health workers with a medical disease had inadequate knowledge of COVID-19. The reason might be there was consistent evidence that specific conditions increase a person's risk of severe COVID-19 illness such as chronic kidney disease, obstructive pulmonary disease, obesity, immunocompromised state, serious heart conditions, such as heart failure, coronary artery disease, or cardiomyopathies, sickle cell disease and type 2 diabetes.<sup>[36]</sup>

### Limitation and recommendation

The demerits of this study were, the cross-sectional study design was employed, which has limitations in establishing a causal relationship. The responses provided were self-reported and may be subject to recall bias and this study lacks the level of practice of coronavirus prevention measures. Government and nongovernmental organizations should give training on COVID-19 for health care work for depth understanding and further studies should be done by using a mixed method of data collection approach to assessing the availability and accessibility of PPE and the level of HCWs' practice about coronavirus prevention and control.

### Conclusions

This study indicated that HCWs' knowledge about COVID-19 was good. Factors significantly associated with good knowledge were high educational status, working experiences, had training on COVID-19, and having medical diseases. Thus improving the educational status of HCWs and giving updated training on COVID-19 will improve HCWs' knowledge.

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### Conflicts of interest

There are no conflicts of interest.

### References

1. Coronavirus Disease (COVID-19) Advice for the Public. World Health Organization. Available from: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public>. [Last accessed on 2021 Feb 10].
2. World Health Organization. 2019-nCoV Outbreak is an Emergency of International Concern; 2020. Available from: <http://www.euro.who.int/en/health-topics/health-emergencies/international-healthregulations/news/news/2020/2/2019-ncov-outbreak-is-an-emergency-ofinternational-concern>. [Last accessed on 2020 Jun 02].
3. "WHO Coronavirus Disease (COVID-19) Dashboard." World Health Organization, World Health Organization. Available from: <https://covid19.who.int/>. [Last accessed on 2021 Feb 14].
4. "Global Research on Coronavirus Disease (COVID-19)." World Health Organization, World Health Organization. Available from: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/global-research-on-novel-coronavirus-2019-ncov>. [Last accessed on 2021 Feb 14].
5. "COVID-19 Vaccines." World Health Organization, World Health Organization. Available from: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/covid-19-vaccines>. [Last accessed on 2021 Feb 14].
6. World Health Organization. Coronavirus Disease COVID-19 Outbreak: Rights, Roles and Responsibilities of Health Workers, Including Key Considerations for Occupational Safety and Health: Interim Guidance, 19 March 2020. World Health Organization; 2020.
7. Jin YH, Huang Q, Wang YY, Zeng XT, Luo LS, Pan ZY, *et al*. Perceived infection transmission routes, infection control practices, psychosocial changes, and management of COVID-19 infected healthcare workers in a tertiary acute care hospital in Wuhan: A cross-sectional survey. *Mil Med Res* 2020;7:24.
8. Tripathi R, Alqahtani SS, Albarraq AA, Meraya AM, Tripathi P, Banji D, *et al*. Awareness and preparedness of COVID-19 outbreak among healthcare workers and other residents of South-West Saudi Arabia: A cross-sectional survey. *Front Public Health* 2020;8:482.
9. Cirrincione L, Plescia F, Ledda C, Rapisarda V, Martorana D, Moldovan RE, *et al*. COVID-19 pandemic: Prevention and protection measures to be adopted at the workplace. *Sustainability* 2020;12:3603.
10. Kassie BA, Adane A, Abebe Kassahun E, Ayele AS, Kassahun Belew A. Poor COVID-19 preventive practice among healthcare workers in Northwest Ethiopia, 2020. *Adv Public Health* 2020 Oct 20;2020: 1-7.
11. WHO. Health Workforce in the COVID-19 Response Pdf. Available from: <https://www.who.int/docs/default-source/nursing/who-healthworkforce-in-the-covid-19response>.

- pdf?sfvrsn=62d228b0\_2. [Last accessed on 2020 Jun 03].
12. Osakunor DN, Sengeh DM, Mutapi F. Coinfections and comorbidities in African health systems: At the interface of infectious and noninfectious diseases. *PLoS Negl Trop Dis* 2018;12:e0006711.
  13. ETHIOPIA: COVID-19 Humanitarian Impact Situation Update No. 11. Available from: [https://reliefweb.int/sites/reliefweb.int/files/resources/Ethiopia\\_covid19\\_humanitarian\\_impact\\_sitrep\\_11\\_as\\_of\\_22\\_august\\_2020.pdf](https://reliefweb.int/sites/reliefweb.int/files/resources/Ethiopia_covid19_humanitarian_impact_sitrep_11_as_of_22_august_2020.pdf). [Last accessed on 2020 Jun 03].
  14. Shigute Z, Mebratie AD, Alemu G, Bedi A. Containing the spread of COVID-19 in Ethiopia. *J Glob Health* 2020; 10 (1).
  15. Igoe M, Chadwick V. After the Pandemic: How Will COVID-19 Transform Global Health and Development? April 13, 2020. Available from: <https://www.devex.com/news/after-the-pandemic-how-will-covid-19-transform-global-health-and-development-96936>. [Last accessed on 2020 Jun 02].
  16. Olum R, Chekwech G, Wekha G, Nassozi DR, Bongomin F. Coronavirus disease-2019: Knowledge, attitude, and practices of health care workers at Makerere University Teaching Hospitals, Uganda. *Front Public Health* 2020;8:181.
  17. Jemal B, Ferede ZA, Mola S, Hailu S, Abiy S, Wolde GD, *et al.* Knowledge, attitude and practice of healthcare workers towards COVID-19 and its prevention in Ethiopia: A multicenter study. Available from: [https://assets.researchsquare.com/files/rs\\_29437/v1/2802c94a-b237-458f-ac48-ae72c4ae793.pdf?c=1590157036](https://assets.researchsquare.com/files/rs_29437/v1/2802c94a-b237-458f-ac48-ae72c4ae793.pdf?c=1590157036). [Last accessed on 2020 Jun 02].
  18. Shibabaw T, Teferi B. Knowledge and practice toward prevention of SARS-CoV-2 among healthcare workers at Delhi primary hospital during a massive test campaign in northwest Gondar, Ethiopia: Institution-based descriptive cross-sectional survey. *Infect Drug Resist* 2021;14:381-90.
  19. Zeenny RM, Ramia E, Akiki Y, Hallit S, Salameh P. Assessing knowledge, attitude, practice, and preparedness of hospital pharmacists in Lebanon towards COVID-19 pandemic: A cross-sectional study. *J Pharm Policy Pract* 2020;13:54.
  20. Ejeh FE, Saidu AS, Owoicho S, Maurice NA, Jauro S, Madukaji L, *et al.* Knowledge, attitude, and practice among healthcare workers towards COVID-19 outbreak in Nigeria. *Heliyon* 2020;6:e05557.
  21. Omoronyia O, Ekpenyong N, Ukweh I, Mpama E. Knowledge and practice of COVID-19 prevention among community health workers in rural Cross River State, Nigeria: Implications for disease control in Africa. *Pan Afr Med J* 2020;37:50.
  22. Desalegn Z, Deyessa N, Tekla B, Shiferaw W, Yohannes M, Hailemariam D, *et al.* Evaluation of COVID-19 related knowledge and preparedness in health professionals at selected health facilities in a resource-limited setting in Addis Ababa, Ethiopia. *PLoS One* 2021;16:e0244050.
  23. Asemahagn MA. Factors determining the knowledge and prevention practice of healthcare workers towards COVID-19 in Amhara region, Ethiopia: A cross-sectional survey. *Trop Med Health* 2020;48:1.
  24. Gohel KH, Patel PB, Shah PM, Patel JR, Pandit N, Raut A. Knowledge and perceptions about COVID-19 among the medical and allied health science students in India: An online cross-sectional survey. *Clin Epidemiol Glob Health* 2021;9:104-9.
  25. Hesaraki M, Akbarizadeh M, Ahmadidarrehshima S, Moghadam MP, Izadpanah F. Knowledge, attitude, practice and clinical recommendations of health care workers towards COVID-19: A systematic review. *Rev Environ Health* 2020;1:1-13.
  26. Saadatjoo S, Miri M, Hassanipour S, Ameri H, Arab-Zozani M. A systematic review of the knowledge, attitudes, and practices of physicians, health workers, and the general population about coronavirus disease 2019 (COVID-19). *MedRxiv* 2020; Available from: <https://www.medrxiv.org/content/10.1101/2020.10.04.20206094v1.full.pdf>. [Last accessed on 2020 Jun 03].
  27. Tamang N, Rai P, Dhungana S, Sherchan B, Shah B, Pyakurel P, *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;20:1905.
  28. Zhang M, Zhou M, Tang F, Wang Y, Nie H, Zhang L, *et al.* Knowledge, attitude, and practice regarding COVID-19 among healthcare workers in Henan, China. *J Hosp Infect* 2020;105:183-7.
  29. Roupa Z, Polychronis G, Latzourakis E, Nikitara M, Ghobrial S, Chrysafi A, *et al.* Assessment of knowledge and perceptions of health workers regarding COVID-19: A cross-sectional study from cyprus. *J Community Health* 2021;46:251-8.
  30. Rani M, Sharma I, Sharma S, Sharma L, Kumar S. Exploring the knowledge, attitude, and practice of health-care professionals on coronavirus (COVID-19) pandemic infection. *J Educ Health Promot* 2021;10:115.
  31. Kassie BA, Adane A, Tilahun YT, Kassahun EA, Ayele AS, Belew AK. Knowledge and attitude towards COVID-19 and associated factors among health care providers in Northwest Ethiopia. *PLoS One* 2020;15:e0238415.
  32. Zhong BL, Luo W, Li HM, Zhang QQ, Liu XG, Li WT, *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;16:1745-52.
  33. Li ZH, Zhang XR, Zhong WF, Song WQ, Wang ZH, Chen Q, *et al.* Knowledge, attitudes, and practices related to coronavirus disease 2019 during the outbreak among workers in China: A large cross-sectional study. *PLoS Negl Trop Dis* 2020;14:e0008584.
  34. Kumar R, Singh V, Mohanty A, Bahurupi Y, Gupta PK. Corona health-care warriors in India: Knowledge, attitude, and practices during COVID-19 outbreak. *J Educ Health Promot* 2021;10:44.
  35. Elhadi M, Msherghi A, Alkeelani M, Zorgani A, Zaid A, Alsuyihili A, *et al.* Assessment of healthcare workers' levels of preparedness and awareness regarding COVID-19 infection in low-resource settings. *Am J Trop Med Hyg* 2020;103:828-33.
  36. CDC, Centers for Disease Control and Prevention "CDC Updates, Expands List of People at Risk of Severe COVID-19 Illness; 25 June, 2020. Available from: <https://www.cdc.gov/media/releases/2020/p0625-update-expands-covid-19.html>. [Last accessed on 2020 Jun 04].

**Bule Hora University**

**College of Health and Medical Sciences**

**Annex A: Participant information sheet and informed consent form**

**For study participants**

Good morning/afternoon dear participant! My name is \_\_\_\_\_. I am working as a data collector for the study being conducted in this health facility on the level of knowledge of health care workers and associated factors in West Guji zone public health facilities in southern Ethiopia by instructors of Bule Hora University College of Health and Medical Science. I kindly request you to give me your attention to explain about the study and being you selected as the study participant.

The study title: The level of knowledge of health care workers and associated factors towards COVID - 19 in West Guji zone public health facilities in southern Ethiopia, 2020.

Procedure and duration: The majority of questions will be responded orally; data collection will take 30 to 40 minutes.

Risk and benefits: The questions will take your time. There is no direct benefit from study but in directly you will get benefit when our country's development improved.

Confidentiality: The information collected about you will be accessed only by the researcher and research assistant. For this matter we will use number code instead of writing your name.

Rights: Participation is based on only your decision; you can either to participate or not. You can also withdrawal at any time if you feel discomfort and your refusal to participate do not cause any harm.

Interviewer: Shall I continue? 1. Yes 2. No, Stop and thank the respondent.

Name of data collector: ----- Signature- ----- Date -----

Contact address of PI:

Name of PI: Mr. Zelalem Jabessa Phone number: 0917096816

**Annex B: English version questionnaire for participant interview**



**Part 1: Socio demographic information**

Questions	Possible responses	Skip
Sex of the respondents	1. Male 2. Female	
Age of the respondents	_____	
Residence?	1. Rural 2. Urban	
Current marital status of the HCW	1. Married 2. Single 3. Divorced 4. Widowed	
Ethnicity	1. Oromo 2. Amhara 3. Burji 4. Others specify_____	
Religion	1. Orthodox 2. Muslim 3. Protestant 4. Wakeffata 5. Others	
Educational level of HCW	1. Diploma 2. Degree 3. Masters 4. Specialist	
Profession of the HCW	1. General practioner 2. Health officers 3. Nurses 4. Midwifery 5. Laboratory 6. pharmacy 7. Anesthesia 8. IESO 9. Others specify_____	
Family size	_____	
Monthly income	_____	

HCW=Health care workers, IESO=Integrated emergency surgical officers

**Part 2: Knowledge related to coronavirus disease 2019 questionnaires**

Questions	Possible responses		
Work experience	_____year(s)		
Previous experience of outbreak management	1. Yes, 2. No		
Did you trained for COVID 19?	1. Yes, 2. No		
Items or components of knowledge-related questions used to measure level of knowledge of health care workers	Yes	No	I don't know
The main clinical symptoms of COVID-19 are fever, fatigue, dry cough, and myalgia			
Like the common cold, stuffy nose, runny nose, and sneezing are common in persons infected with the COVID-19 virus			
Currently there is no effective cure for COVID-19, but early symptomatic and supportive treatment can help most patients recover from the infection			
Not all persons with COVID-19 will develop to severe cases. Only those who are elderly, have chronic illnesses and obese are more likely to be severe cases			
Eating or contacting wild animals would result in the infection by the COVID-19 virus			
Persons with COVID-19 can infect the virus to others when a fever is not present			
The COVID-19 virus spreads via respiratory droplets of infected individuals			
Ordinary residents can wear general medical masks to prevent the infection by the COVID-19 virus			
It is necessary for children and young adults to take measures to prevent the infection by the COVID-19 virus like adults			
To prevent the infection by COVID-19, individuals should avoid going to crowded places such as train stations and avoid taking public transportations			
Isolation and treatment of people who are infected with the COVID-19 virus are effective ways to reduce the spread of the virus			
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			
COVID-19=Coronavirus disease 2019			

**Part 3: Chronic disease related factors**

Questions	Possible responses	Skip
Have you previous history of psychologic distress? (before 6 months)	1. Yes, 0. No	
Have you parental history of psychological distress? (before 6 months)	1. Yes, 0. No	
Have you ever had any medical illness?	1. Yes, 0. No	If 1→403
If yes Q402, select medical illnessess you had?		
Chronic HTN	1. Yes, 0. No	
DM	1. Yes, 0. No	
Cardiac disease	1. Yes, 0. No	
Anemia	1. Yes, 0. No	
Seizure disorder	1. Yes, 0. No	
Asthma	1. Yes, 0. No	
Other specify	.....	
Do you have a family or relatives with suspected/confirmed COVID 19?	1. Yes. 0. No	
Do you had a family or relative passed due to COVID-19?	1. Yes 2. No	
COVID-19=Coronavirus disease 2019, HTN=Hypertension, DM=Diabetes mellitus		

**Part 4: Behavioral related factors**

Questions	Possible responses	Skip
Appropriately practicing PPE	1. Yes 0. No	
Travel history for past 2 weeks	1. Yes 0. No	
Have you ever smoked tobacco/cigarette?	1. Yes 2. No	If no skip to Q 503
How often do you smoke?	1. Every day or nearly every day 2. Once or twice a week 3. 1-3 times a month 4. Occasionally, <1 a month	
Have you ever consumed alcohol (beer, areke, tella, tej)?	1. Yes 2. No	
How often do you drink alcohol (beer, areke, tella, tej)?	1. Every day/nearly every day 2. Once or twice a week 3. 1-3 times a month 4. Occasionally, <1 a month	
Have you ever used psycho active drugs?	1. Yes 2. No	

COVID-19=Coronavirus disease 2019, PPE=Personal protective equipment