



# Preparedness of governmental hospitals for COVID 19 prevention and care in Eastern Amhara region, Amhara Ethiopia, 2020

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## ABSTRACT

**Background:** Coronavirus disease affects the world in multidisciplinary ways. In Ethiopia, it affects many people, including health professionals. Health institutions should have been ready to handle COVID-19 cases and protect their staff from this pandemic. Hospitals in eastern Amhara provide services for more than 30 million people.

**Objectives:** To assess the readiness of government hospitals in eastern Amhara for coronavirus disease prevention and treatment in 2019.

**Methods:** The institutional-based descriptive cross-sectional study design was conducted in 28 governmental hospitals in the eastern Amhara region. A structured checklist exported to the word processing system online link was created. Randomly selected nurses in each hospital were virtually trained and collected the data; the link was shared with them. We use SPSS version 23 for data cleaning and analysis. For data summary and presentation, frequency, mean, tables, graphs, and text were used. Using concept analysis, different sections of these hospitals were assessed. A linear regression was done and Pearson correlation coefficient ( $r$ ) values were used to measure the degree of relationship between dependent and independent variables.

**Results:** This study indicates that more than half (57.14%) responded "no" to the questions, suggesting unpreparedness. The age of the hospital ( $r = 0.25$ ), distance from the regional capital city ( $r = 0.113$ ), distance from the capital city ( $r = 0.125$ ), and location of the hospital ( $r = 0.094$ ) had little relationship with the readiness of the hospital for COVID-19 disease prevention and care.

**Conclusion and recommendation:** In this most hospitals were not ready to handle COVID-19 cases and couldn't protect staff from this pandemic. Therefore, local and regional health offices and the federal ministry of health, as well as other health organizations, should enhance their capacity to fight COVID 19.

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## Introduction

Severe acute respiratory infections remain one of the leading causes of mortality around the world. It affects the world in many ways (1). The recently emerged disease, which belongs to the group of CORONA viruses, termed coronavirus disease 2019 (COVID 19), is posing stress to both developing and poor countries. It is caused by the SARS COV 2 virus (2). The risk of global health system overcapacity is considered high and the problem persists (3, 4). The risk of transmission of COVID-19 in vulnerable populations is considered high. Currently, in Africa, more than 10,000 health professionals have been infected by this pandemic (4). The impact of transmission in health and social institutions can be mediated by the application of

effective infection prevention and control (5). Since it emerged in China, COVID 19 poses various problems in different aspects. It has affected more than 16 million cases and caused more than 700,000 deaths worldwide (6). It also results in job losses of billions and a huge economic crisis for the world economy. The disease also affects international relations due to the limitations of international mobilization (7). The political and psychosocial crises are also the other burden of this disease on the world, even in developed countries (8). Our country, Ethiopia, also confirmed the first case months ago, and now the case has grown to 10,000, and we have lost more than 200 people. The report from the Ethiopian public health institute reveals that 350 health professionals and workers in health institutions were infected by this pandemic and four of them died. (9). With a limited setup, our country faces this challenge (8). But, proclamations and regulations are ordered without considering the setup (10, 11). Every health facility should be ready to combat it, giving care and preventing other patients as well as staff from infection. They should prepare and equip all the necessary materials for staff and infected personnel. This study aims to assess hospital preparedness for COVID-19

*Acronyms and abbreviations:* AIIR, Airborne Infection Isolation Room; CDC, Center for Disease and Control; COVID, Coronavirus Disease; HCP, Health Care Professionals; ICU, - Intensive Care Unit; SARS COV, Severe Acute Respiratory Syndrome Corona Virus; WHO, World Health Organization

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prevention and care in the eastern Amhara region as well as at the national level. Identification of health facility preparedness figures out our capacity to fight against the disease.

## Methods

The institutional-based descriptive cross-sectional study design was conducted in 28 governmental hospitals in the eastern Amhara region. All governmental hospitals in this region were included in the study. Data collectors were selected randomly from nurses working in each hospital. A structured checklist was drafted by the Centers for Disease Control (CDC) for Coronavirus Disease 2019 (COVID-19) Hospital Preparedness Assessment Tool (3) and online links were created using a word processing system (WPS). The training was given virtually on data collection techniques and an online submission system. The link was created by the principal investigator and shared with data collectors through telegram and email. Data was collected and compiled into a checklist by directly observing the institutional setup, interviewing hospital administrators, and reviewing documents check the readiness of materials and equipment and the hospital as a whole for COVID-19 disease prevention and care. After they finished data collection, online submission to the principal investigator was done. After all the data collectors submitted the data to the principal investigator, it was converted to SPSS version 23 for data cleaning and analysis. Frequency, mean, median, and standard deviation were used to summarize descriptive statistics. Tables' graphs and text were used for data presentation. Using concept analysis, different sections of these hospitals were assessed. Linear regression was done to show the relationships between dependent and independent variables. The Pearson correlation coefficient ( $r$ ) values were used to measure the degree of relationship between dependent and independent variables. To show the strength of the relationship, we considered  $r \neq 0$  and approaches to 1 and -1.

## Result

### Characteristics of the study context

The study was conducted in 28 public hospitals in the Eastern Amhara region. Hospitals have a mean age of 11.29 years ( $\pm 1.802$  years) and three-fourths (75%) of hospitals are primary level (See Figures 1 & 2).

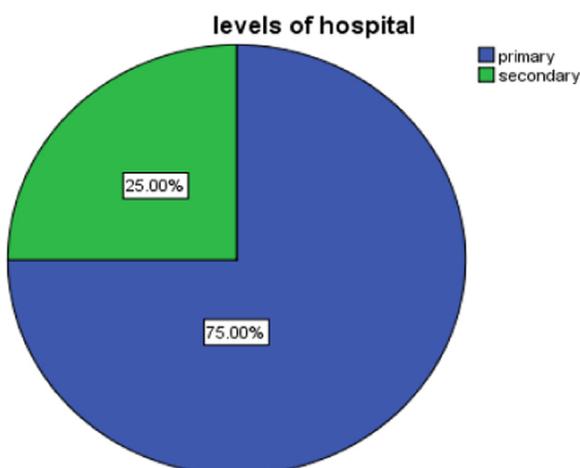


Fig. 1. Level of hospital in eastern AMhara region, 2020.

### Hospital preparedness for COVID-19

About 46.4% ( $n = 13$ ) hospitals didn't review the Centers for Disease Control and Prevention (CDC) guidelines concerning COVID 19 disease, and 42.9% ( $n = 12$ ) didn't provide education and job-specific training regarding COVID 19 disease. In three-fourths (75%,  $n = 21$ ) of hospitals, signs and transmission mechanisms are posted at the patient entrance site. However, face masks are provided only in 53.6% ( $n = 15$ ) of hospitals, and alcohol-based sanitizer is not available in 64.3% ( $n = 18$ ) of hospitals. In 57.1% ( $n = 16$ ) of hospitals, confirmed or suspected cases were not quickly transported to an airborne infection isolation room (AIIR), and triage personnel were not trained in rapidly isolating confirmed or suspected cases in 50% ( $n = 14$ ) of hospitals. (See Table 1). The number and location of airborne infection isolation rooms were not identified in 53.6% hospitals, and their effectiveness was not tested in the same manner (53.6% ( $n = 15$ )), but the protocol was established in 57.1% of hospitals. Health care personnel restrictions in AIIR were not structured in 42.9% ( $n=13$ ) of hospitals. Fifteen (53.6%) hospitals had policies for dedicating non-critical patient care equipment to patients. (See table 1). Personnel protective equipment (PPE) was not supplied sufficiently in 50% ( $n = 14$ ) of hospitals, and appropriate HCPs have not been medically cleared, fit-tested, or trained for respirator use in 57.1% of hospitals. See Table 2. Patient movement outside of the AIIR was not limited to medically essential purposes in 42.9% ( $n =12$ ) of hospitals, and the protocol was not in place to ensure that patients were out of risky areas in 64.3% of hospitals. More than half (60.7% ( $n = 17$ )) of hospitals don't have an adequate oxygen supply. Isolation rooms are not suitable for adequate oxygen sources in 19 hospitals (67.9%). Aerosolized devices are not fulfilled in 19 (67.9%) hospitals, and 18 (64.3%) hospitals did not have well-qualified personnel for specific ICU care of patients with COVID 19. See Table 2. To assess the readiness of hospitals for COVID-19 prevention and care, questions are computed and their sum is calculated. The data is not normally distributed and it is skewed to the left. The mode is less than the median value, and the median value is less than the mean value. So, the median (MD = 18) value is taken as the cut point. The results show more than half (57.14%,  $n=16$ ) of hospitals were not prepared to prevent and treat COVID19 disease for their staff and the surrounding community.(See Figure 4)

### Factors Influencing Hospital Preparedness for COVID19

A linear regression was conducted, and Pearson correlation ( $r$ ) results were taken to show the relationship between dependent and independent variables. The age of the hospital ( $r = 0.25$ ), distance from the regional capital city ( $r = 0.113$ ), distance from capital city ( $r = 0.125$ ), and location of the hospital (0.094) had little relationship with the readiness of hospitals for COVID-19 prevention and care. The availability of funding agencies other than governmental aid ( $r = 0.352$ ) had a moderate relationship with hospital readiness, while the level of hospitals was highly related to the readiness of the hospitals for COVID-19 disease prevention and care. (See table 3).

## Discussion

Each facility should be prepared to preserve its staff and the surrounding community as a first response, as it is the neighboring health facility. The progression of the disease is increasing from day to day, with a high infectious and fatality rate. Today, staff at health institutions is highly at risk for COVID-19 disease. This is because they are not sure that all clients and their attendants are free from this pandemic disease (9). So health institutions should be aware of the situation and ready to protect their staff and their community as well from this pandemic.

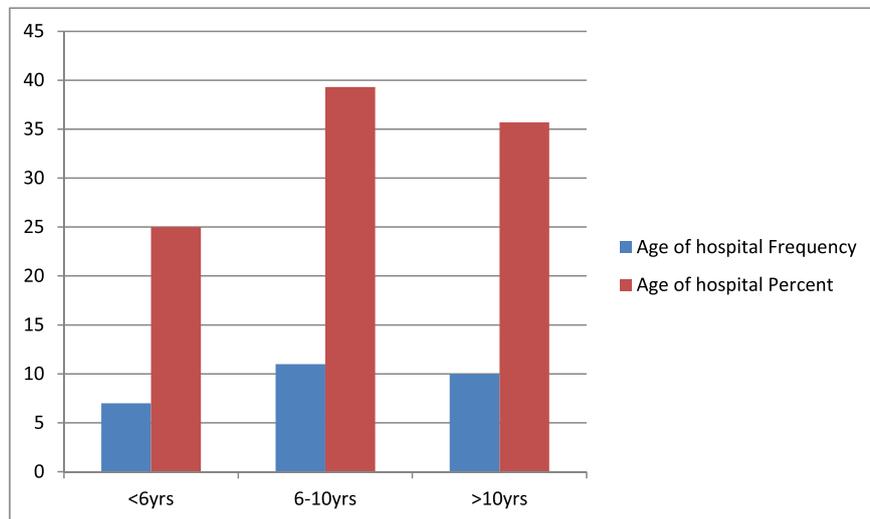


Fig. 2. Age of hospital since established in eastern Amhara region, 2020.

Table 1.

Infection prevention, patient identification and placement and precaution measure in Eastern Amhara region, 2020.

| Items   | Frequency | Percent |
|---|-----------|---------|
| <b>Infection prevention and control policies and training for healthcare personnel (HCP):</b>   |           |         |
| Facility leadership including the Chief Medical Officer, quality officers, hospital epidemiologist, and heads of services has reviewed the Centers for Disease Control and Preventions COVID-19 guidance.   | No 13     | 46.4    |
|   | yes 15    | 53.6    |
| Facility provides education and job-specific training to HCP regarding COVID-19   | no 12     | 42.9    |
|   | Yes 16    | 57.1    |
| <b>Process for rapidly identifying and isolating patients with confirmed or suspected COVID-19:</b>   |           |         |
| Signs are posted at entrances of the institution  | no 7      | 25      |
|   | yes 21    | 75      |
| Face masks are provided to coughing patients and other symptomatic individuals upon entry to the facility   | No 13     | 46.4    |
|   | Yes 15    | 53.6    |
| Signs are posted in triage areas advising patients with fever or symptoms of respiratory infection and recent travel history, to immediately notify triage personnel so appropriate precautions can be put in place.  | no 9      | 32.1    |
|   | Yes 19    | 67.9    |
| Alcohol based hand sanitizer for hand hygiene is available at each entrance and in all common areas.  | No 18     | 64.3    |
|   | Yes 10    | 35.7    |
| Facility has a process to ensure patients with confirmed or suspected COVID-19 are rapidly moved to an Airborne Infection Isolation Room (AIIR).  | no 16     | 57.1    |
|   | Yes 12    | 42.9    |
| Alternatively, for patients that cannot be immediately placed in a room for further evaluation, a system is provided that allows them to wait in a personal vehicle or outside the facility and be notified by phone or other remote methods when it is their turn to be evaluated. | no 13     | 46.4    |
|   | yes 15    | 53.6    |
| Triage personnel are trained on appropriate processes to rapidly identify and isolate suspect cases.  | no 14     | 50      |
|   | Yes 14    | 50      |
| Facility has a process that occurs after a suspect case is identified to include immediate notification of facility leadership/infection control.   | no 9      | 32.1    |
|   | yes 19    | 67.9    |
| Facility has a process to notify local or state health department of a suspect case soon after arrival  | no 9      | 32.1    |
|   | Yes 19    | 67.9    |
| Facility has a process for receiving suspect cases arriving by ambulance.   | No 13     | 46.4    |
|   | Yes 15    | 53.6    |
| <b>Patient placement</b>  |           |         |
| Confirm the number and location of Airborne Infection Isolation Rooms (AIIRs) available in the facility   | No 15     | 53.6    |
|   | Yes 13    | 46.4    |
| Document that each AIIR has been tested and is effective within the last month. The AIIR should be checked for negative pressure before occupancy.  | no 15     | 53.6    |
|   | Yes 13    | 46.4    |
| A protocol is established, which specifies that aerosol-generating procedures that are likely to induce coughing are to be performed in an AIIR using appropriate PPE.  | no 12     | 42.9    |
|   | Yes 16    | 57.1    |
| Facility has plans to minimize the number of HCP who enter the room. Only essential personnel enter the AIIR. Facilities should consider caring for these patients with dedicated HCP to minimize risk of transmission and exposure to other patients and HCP.                      | no 13     | 46.4    |
|   | Yes 15    | 53.6    |
| Facility has a process) for documenting HCP entering and exiting the patient room.  | No 15     | 53.6    |
|   | Yes 13    | 46.4    |
| Facility has policies for dedicating non-critical patient-care equipment to the patient.  | No 16     | 57.1    |
|   | Yes 12    | 42.9    |
| <b>Transmission-Based Precautions</b>   |           |         |
| Personal protective equipment (PPE) and other infection prevention and control supplies are located in sufficient supply including at patient arrival, triage, and assessment locations.  | No 14     | 50      |
|   | Yes 14    | 50      |
| Facility has a respiratory protection program. Appropriate HCP have been medically cleared, fit-tested, and trained for respirator use.   | No 16     | 57.1    |
|   | Yes 12    | 42.9    |
| HCP receive appropriate training, including “just in time” training on selection and proper use of (including putting on and removing) PPE, with a required demonstration of competency.  | No 9      | 32.1    |
|   | Yes 19    | 67.9    |
| Facility has a process for auditing adherence to recommended PPE use by HCP   | No 17     | 60.7    |
|   | Yes 11    | 39.3    |

**Table 2.**  
Patient movement and specific preparation of hospitals in eastern Amhara region, 2020.

| Items  | Frequency       | Percent      |
|--|-----------------|--------------|
| <b>Movement of patients with confirmed or suspected COVID-19 within the facility and sanitary procedure</b>  |                 |              |
| Patient movement outside of the AIIR will be limited to medically-essential purposes   | No 12<br>Yes 16 | 42.9<br>57.1 |
| A protocol is in place to ensure that, if the patient is being transported outside of the room, HCP in the receiving area are notified in advance. | No 18<br>Yes 10 | 64.3<br>35.7 |
| Patients transported outside of their AIIR will be asked to wear a face mask and be covered with a clean sheet during transport.                   | No 9<br>Yes 19  | 32.1<br>67.9 |
| Facility has a plan to ensure proper cleaning and disinfection of environmental surfaces and equipment in the patient room.                        | no 14<br>Yes 14 | 50<br>50     |
| Does trained and fit-tested responsible personnel is assigned to own environmental cleaning  | No 16<br>Yes 12 | 57.1<br>42.9 |
| All HCP with cleaning responsibilities understand the contact time for selected products.  | No 15<br>Yes 13 | 53.6<br>46.4 |
| Plans for visitor access and movement within the facility have been reviewed and updated within the last 12 months.                                | No 14<br>Yes 14 | 50<br>50     |
| Visitors are screened for symptoms of acute respiratory illness before entering the hospital   | no 13<br>yes 15 | 46.4<br>53.6 |
| Facility has a plan to restrict visitation to rooms of patients with confirmed or suspected COVID-19   | No 14<br>Yes 14 | 50<br>50     |
| <b>Specific preparation of hospitals</b>   |                 |              |
| Does your hospital has adequate Oxygen source  | No 17<br>Yes 11 | 60.7<br>39.3 |
| Does isolation room is suited with adequate source   | No 19<br>Yes 9  | 67.9<br>32.1 |
| Does isolation room is suited with aerosolised device (invasive and non- invasive mechanical device)   | No 19<br>Yes 9  | 67.9<br>32.1 |
| Does the hospital has well qualified personnel for ICU care (eg. incubation and airway prequation)   | No 18<br>Yes 10 | 64.3<br>35.7 |
| Does point of entry screening done for patients at the gate of hospital  | No 11<br>Yes 17 | 39.3<br>60.7 |

In this study, most hospitals were not ready to handle COVID-19 cases and protect their staff from this pandemic. Staff should be trained, materials should be fulfilled, qualified personnel should be assigned to the treatment area, plans should be adjusted, the area should be organized and safe for COVID-19 treatment and care, and all the necessary resources like oxygen, aerosolized devices, personal protective equipment, and medications should be on.

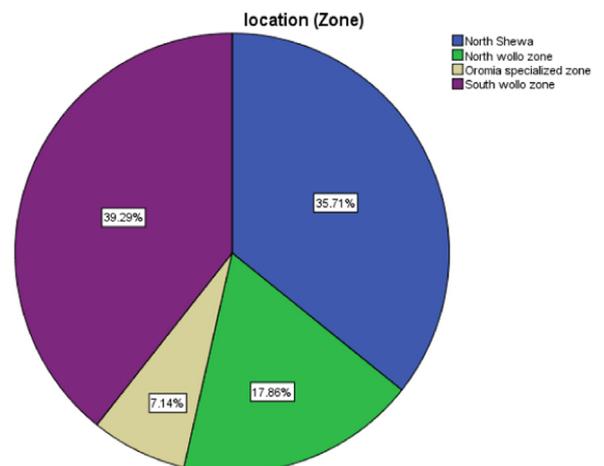
In Ethiopia, Yeka Kotebe General Hospital and St Paul’s Millennium Medical College are listed as COVID-19 treatment centers. All confirmed cases were referred to this hospital for admission. According to this study, most hospitals are located at a further distance from the central city where the COVID-19 treatment center is found. To get adequate care, patients must be transported to the treatment center, but it can take days to reach the center at this distance. It deviates from the real scenario where patients with COVID-19 should be treated in nearby and well-organized health institutions. The reason may be that most of the materials used for COVID-19 prevention and care are beyond our economic standards.

When a newly emerging disease exists, monitoring and treatment guidelines should be revised, and job-specific education and training should be given based on the disease condition. But in this study, almost half of the hospitals in the study site do not perform examinations guidelines provided by the CDC for infectious diseases and do not provide job-specific training and education. The possible reasons may be poor understanding of the disease and a lack of commitment in different professions. This may also be because of political abnormalities.

In this finding, face masks are not provided in a sufficient way to all staff in more than half of hospitals, and alcohol-based sanitizers as well as hand washing facilities are not available in nearly two-thirds of hospitals. However, the WHO, CDC, Ministry of Health, Ethiopian Institute of Public Health and others health organizations advised people to wash their hands frequently and use hand sanitizer (12). It could be attributed to staff and managerial negligence in controlling

**Table 3.**  
Factors affecting hospital preparedness in eastern Amhara region 2020.

| Items                             | Category            | Hospital preparedness |            | r     |
|-----------------------------------|---------------------|-----------------------|------------|-------|
|                                   |                     | not prepared          | Prepared   |       |
| Age of hospital since established | <6 years            | (5) 41.7%             | (7) 58.3%  | 0.25  |
|                                   | >= 6 years          | (11) 68.8%            | (5) 31.3%  |       |
| Distance from Addis Ababa         | <=350km             | (5) 38.5%             | (8) 61.5%  | 0.125 |
|                                   | >350km              | (11) 73.3%            | (4) 26.7%  |       |
| Distance from Bahirdar            | <=350kmm            | (4) 100.0%            | 0.00%      | 0.113 |
|                                   | >350km              | (12) 50.0%            | (12) 50.0% |       |
| Availability of funding agency    | Yes                 | (7) 50.0%             | (7) 50.0%  | 0.352 |
|                                   | No                  | (9) 64.3%             | (5) 35.7%  |       |
| Level of hospital                 | Primary             | (12) 57.1%            | (9) 42.9%  | 1     |
|                                   | Secondary           | (4) 57.1%             | (3) 42.9%  |       |
| Location of hospital              | North shewa         | (3) 30.0%             | (7) 70.0%  | 0.094 |
|                                   | North Wollo         | (3) 60.0%             | (2) 40.0%  |       |
|                                   | Oromo distinct zone | (2) 100.0%            | 0.00%      |       |
|                                   | South Wollo         | (8) 72.7%             | (3) 27.3%  |       |



**Fig. 3.** Location of hospitals in eastern Amhara region, 2020.

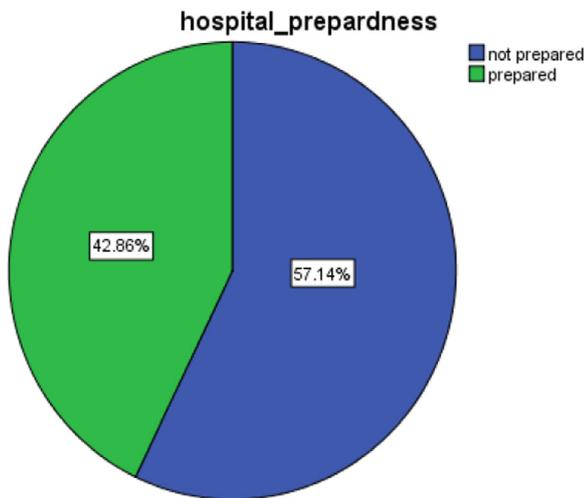


Fig. 4. Preparedness of hospitals for COVID 19 disease in eastern Amhara region, 2020.

and distributing those protective materials. And in some hospitals, those materials are stocked in the store and not allocated from the central dispensary unit.

The study shows more than two-fifths of hospitals had no plans to restrict the number of HCP entering airborne infection isolation rooms (AIIR). However, as we have heard from various health organizations and seen in various documents, the number of people entering should be limited, and only trained and well-qualified personnel should provide care to COVID-19 patient (12, 13). This discrepancy may be due to managerial problems and an inadequate understanding of the transmission rate of the disease.

Airborne infection isolation rooms and intensive care units should be adequately equipped with an oxygen source, ventilating device, and infection prevention materials (5). But in this study, more than two-thirds of hospitals in the study area didn't have adequate oxygen sources, and their intensive care units were not suited with enough ventilating devices and infection prevention materials. These are because of inadequate funding agencies, poor health system/policy, and a lack of attention to quality of care.

According to this result, ICU and airborne infection isolation rooms are not run by well-qualified personnel in nearly two thirds of hospitals. WHO recommends that airborne infection isolation rooms should be administered by trained professionals and that those who give care in the rooms should have job-specific education and training. Workers in the ICU should also be critical care professionals and able to care for organ failures (2, 14). It could also be due to bad policy and inadequate managerial activity or an inadequate number of critical care and intensive care unit specialists in the country.

The results show more than half of hospitals were not ready to prevent and care for COVID-19 disease for their staff and the surrounding community. However, the World Health Organization and the Federal Ministry of Health recommend that all health institutions be prepared to combat the transmission and short- and long-term impact of COVID-19 disease in such communities and organizations (2, 5, 14). Even if there are specific isolation and treatment centers for COVID-19 disease, all hospitals have a mandate to protect their staff and community. The reasons may be forwarding responsibility for isolation centers and inadequate coordination with the local, regional, and central administrators.

The availability of funding agencies other than governmental aid ( $r = 0.352$ ) had a moderate relationship with hospital readiness, while the level of hospitals ( $r = 1$ ) was highly related to the readiness of hospitals for COVID-19 disease prevention and care. It is obvious that the presence of funding organizations enhances the capacity of hospitals to handle emergency situations. As the level of hospitals

increased, their acceptance by governmental and non-governmental bodies also increased, and their experience helped them cope with such emergency situations.

## Conclusion

The study's findings claim that more than half of hospitals were not ready to fight against COVID-19 in their compound as well as in the surrounding community. Materials were not distributed evenly; personnel protective equipment was not available to all staff in a sufficient way; isolation centers were not organized and equipped with necessary materials; and appropriate staff was not allocated in the area either. Location, age, distance from regional and national capital cities, hospital level, and availability of funds have little to no correlation with hospital readiness for COVID-19 disease. This may be due to the low economic status of the country, the lack of active involvement of governmental and nongovernmental organizations in the health sectors, and a poor understanding of the disease progression since it is a newly emerging pandemic.

## Recommendation

COVID-19 treatment centers in Addis Ababa are well equipped and ready to fight against this pandemic. So, most hospitals in the region should take experience from these institutions. COVID-19 treatment should be initiated and organized at the regional level.

Local health offices, regional health offices, and the federal ministry of health, as well as other governmental and non-governmental health organizations, should enhance their capacity to fight COVID-19 properly

## Declaration

### *Ethical approval and consent to participate*

Permission and a cooperation letter to carry out the study were obtained from the Wollo University Research and Community Service Directorate with reference number **CMHS-450/013/12** and submitted to each hospital. All the necessary information has been provided to the study participants until they understand and ensure their willingness. Verbal consent was obtained from the participants after full information was provided and declared their understanding of the right to interrupt the data collection process at any time. Their confidentiality was kept; names and any other personal identifiers were not used during data collection and analysis. The data collectors are notified to keep patient information confidential.

## The author's contribution

Brihanu D: -title selection, proposal writing, data analysis, and manuscript write-up; Lehulu T: data analysis and manuscript write-up; Mulusew Z: data analysis and manuscript write-up

\*All authors have read and approved the manuscript.

## Data availability

Data and materials are available online at birhandesu@gmail.com or birhanu.desu@wu.edu.et upon request.

## Funding

The research work was sponsored by Wollo University.(Figure 3)

## Declaration of Competing Interest

The authors declare that they have no competing interests.

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