

## ORIGION ARTICLE

### HOSPITALS PREPAREDNESS FOR COVID-19 PANDEMIC RESPONSE IN SOUTH-EAST ETHIOPIA

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#### ABSTRACT

**Background:** Healthcare facilities play a critical role within the health system in providing essential medical care to the community, particularly in a crisis or pandemic. Evidence regarding hospital preparedness during Corona Virus (COVID-19) pandemic is scarce in Ethiopia. Therefore, this study aimed to assess the level of hospital preparedness for the COVID-19 Response in Southeast Ethiopia.

**Methods:** A facility-based cross-section study was conducted in the health facilities of Bale, East Bale, and West Arsi zone from June 15-30, 2020. A total of ten hospitals were included in this study. Data were collected using a structured questionnaire. EpiData version 3.1 was used for data entry and SPSS version 20 was used for analysis. The results were described using tables and texts.

**Results:** None of the included hospitals started the COVID-19 testing service during the study period. Six hospitals have intensive care (ICU) units for adults, however, the maximum bed capacity per hospital was five. Only four hospitals incorporated COVID-19 disaster planning into their planning. Most (90%) of the hospital established multidisciplinary teams to address COVID-19. Nine hospitals prepared information materials on COVID-19 to communicate to patients and their families.

**Conclusion:** Hospital preparedness for the management and response to the COVID-19 pandemic was not practiced according to the standard set by the World Health Organization and Ministry of Health. Capacity-building activities are strongly recommended to fulfill the required supplies and skilled manpower.

**Key Words:** Health facility, preparedness, COVID-19, Health professionals, Ethiopia

#### INTRODUCTION

Coronavirus disease 2019 is an emerging respiratory disease that is caused by a novel coronavirus and was first detected in December 2019 in Wuhan, China (1-3). On January 30, 2020, the World Health Organization (WHO) declared the outbreak a Public Health Emergency of International Concern (4-7).

The infectious agent responsible for causing COVID-19 is transmitted via respiratory droplets from infected individuals and remains viable on non-living objects under appropriate atmospheric conditions for several days (8). The symptoms of COVID-19 may range from a mild to a severe presentation, causing acute respiratory distress syndrome (ARDS), thereby requiring mechanical ventilation (9).

Healthcare facilities play a critical role within the health system in providing essential medical care to the community, particularly in a crisis or pandemic. Prolonged and combined outbreaks can lead to the progressive spread of disease with rapidly increasing service demands that can potentially overwhelm the capacity of hospitals and the health system at large (10).

In developing countries, especially sub-Saharan African countries, there are concerns with their ability to adequately deal with COVID-19. Given the fragile health systems in most sub-Saharan African countries, new and re-emerging disease outbreaks such as the current COVID-19 epidemic can potentially paralyze health systems at the expense of primary healthcare requirements. Effective outbreak responses and preparedness during emergencies of such magnitude are challenging across African and other lower-middle-income countries (11).

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In Ethiopia, the first COVID-19 case was reported on 13 March 2020. As of September 13, 2020, Ethiopia reported a total of 64,301 COVID-19 cases and 1,013 deaths (12). A range of strategies was implemented by the government to reduce the spread of the pandemic: including quarantine of people coming from abroad at least for 14 days, closure of schools, suspending of public gatherings, and temporary closure of churches and mosques. Planning for a community outbreak of COVID-19 is critical for maintaining healthcare services during a response. All public health facilities in the study area should be prepared for the possible arrival of patients with COVID-19. According to World Health Organization, all public health facilities should ensure their staff is trained, equipped, and capable of delivering the needed services. To enhance the readiness of the health facilities to cope with the challenges of the outbreak, a pandemic, or any other emergency or disaster, hospital managers need to ensure the initiation of relevant generic priority action (10, 13). Without appropriate emergency planning, local health systems can easily become overwhelmed in attempting to provide care during a critical event. Limited resources, a surge in demand for medical services, and the disruption of communication and supply lines create a significant barrier to the provision of health care. To the best of our knowledge, there is no previous evidence showing the level of hospital preparedness for the COVID-19 pandemic in Ethiopia. Therefore, this study aimed to assess the preparedness of public hospitals for the reception and care of COVID-19 infected patients in Bale, East Bale, and West Arsi zones of southeast Ethiopia.

## METHODS

### Study setup, design, population, and sampling

An institution-based cross-sectional study was conducted in all government-owned hospitals in West Arsi, Bale, and East Bale Zones from June 15 to 30, 2020. All government Hospitals found in the three zones were included in the study to assess their preparedness for COVID-19 response. A total of ten hospitals were found in the three zones namely, Goba referral hospital, Robe general hospital, Madda Walabu hospital, Dellomena hospital, Ginnir hospital, Kokosa hospital, Arsi Negele hospital, Shahshemene referral hospital, Dodola hospital, and Melkaoda hospital. Out of the ten hospitals, three of them were primary hospitals, six general hospitals, and one specialized hospital. Those ten hospitals serve a total of 3, 642,023 populations in their catchment, according to the 2007 census.

### Data collection tools

The data were collected by using a structured checklist adopted from WHO and CDC (10, 13). It was modified to our context according to the Ethiopian Public Health Institute protocol for health facility preparedness and response (14). The core area of the checklist are (1) Prevent the spread of COVID-19 within the facility; (2) Promptly identify and isolate patients with possible COVID-19 and inform the correct facility staff and public health authorities; (3) Care for a limited number of patients with confirmed or suspected COVID-19 as part of routine operations; (4) Potentially care for a larger number of patients in the context of an escalating outbreak while maintaining adequate care for other patients; (5) Monitor and manage any healthcare personnel that might be exposed to COVID-19; and (6) Communicate effectively within the facility and plan for appropriate external communication related to COVID-19.

### Study Variables

The study assessed the aspect of the health facilities including physical infrastructure for COVID-19 patient's reception and care, the structural arrangement of the facility, equipment supplies, drugs, presence of plan for covid-19, the existence of indicators of success, human resource training, availability of human resource, triage system, and laboratory service, the capacity of adequate provision of emergency care; in terms of adequate provision of drugs, equipment and supplies, referral plan, suspect handling, and screening process, provision of conducive environment, waste management system, adequately trained personnel, appropriate triaging of patients to the right zone for medical attention, communication system.

### Data Collection Procedures and quality controls

Data were collected by trained data collectors through face-to-face interviews with Hospital managers and an interview was supported with observations wherever applicable as per the guidelines. Data collectors and interviewees' were provided with a facemask and instructed to have acceptable social distancing before the interview to prevent the risk of COVID-19 transmission. During the data collection procedures, all the collected data were reviewed and checked on daily bases. The questionnaire was pretested and modified before the actual data collection process.

### **Data Analysis procedures**

The collected data were entered using EpiData version 3.1, cleaned, and analyzed using SPSS V.20. The results of the study were organized and presented descriptively using frequency tables and text narration.

### **Ethical Considerations**

Ethical clearance was obtained from Madda Wababu University's research ethics committee. Letter of ethical clearance and support letters were submitted to the clinical director of respective hospitals. Permission to conduct the study was sought from Each department head. All collected data were kept confidential and analyzed in aggregate and were used only for the study.

## **RESULTS**

### **Basic description of the study hospitals**

A total of ten hospitals were included in this study. Four hospitals were from the Bale zone, one hospital from the East Bale and five hospitals were from the West Arsi zone.

Interview regarding the hospitals' preparedness plan was conducted with Medical directors, chief executive directors, and hospital managers. Among the hospitals, six hospitals were general hospitals, three hospitals were primary/district hospitals, and one hospital was a specialized hospital. Regarding bed capacities of the hospitals, it ranges from 47 to 230 beds. Among the total included hospitals, two hospitals were working as a COVID-19 treatment center and others were providing routine hospitals services during the data collection period. None of the hospitals have a COVID-19 testing service during the study period. Six hospitals have intensive care (ICU) units for adults. Only one hospital has an ICU bed for pediatrics. Six hospitals have ICU beds for neonates. Out of all hospitals, only five hospitals have a mechanical ventilator. Nine hospitals trained health professionals on how to take nasopharyngeal swab sample taking for COVID-19 testing (Table 1).

### **Development of written COVID-19 plan**

Out of ten hospitals included in the study, only four hospitals incorporated COVID-19 disaster planning into their planning. Most (90%) of the hospital established multidisciplinary teams to address COVID-19. All of the study hospitals designated patient isolation centers (Table 2).

### **Elements of COVID-19 plan**

Health facilities' plan regarding their preparedness and response in containing covid-19 has been assessed. Accordingly, fifty percent of health institutions completed planning for protecting patients, healthcare personnel, and visitors from COVID-19, and written protocol for identifying, monitoring, and reporting covid-19 among staff, hospitalized patients, attendants, and volunteers. Only 30% developed a written protocol for monitoring and tracking covid-19 related staff absence. In 50% of the institutions, the incident management team for covid-19 response has been completed. An incentive mechanism is also in place for staff working on direct care for COVID-19 management or prevention in half of the health institutions (Table3).

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### **Facility Communication plan for COVID-19**

Ninety percent of the health institutions had developed policies and information materials on covid-19 for communicating information on COVID-19 to patients and their families. A person taking responsibility for communication with public health authorities was also assigned in 90% and the rest 10% were in progress.

### **Consumables and durable medical equipment and supplies**

Twenty percent of health institutions completed estimating the quantities of essential patient care materials and equipment that would be needed for at least eight weeks of the outbreak. The stock was also prepared with a checklist for disaster response supplies and to address a likely shortage in 40%.

**Table 1: Descriptive characteristics of included hospitals**

<b>Items</b>	<b>Response</b>	<b>Fre- quency (%)</b>
Hospitals included by zone	Bale zone	4 (40)
	East Bale zone	1 (10)
	West Arsi zone	5 (50)
Level of the included hospitals	Primary hospital	3 (30)
	General hospital Spe- cialized/ Ref. hospital	6 (60)
		1 (10)
Bed capacity of included hospitals	Arsi Negele hospital	62
	Dellomena hospital	53
	Ginnir hospital	127
	Gobba referral hospi- tal Kokosa hospital	178
	47	
	Madda Walabu hospi- tal Shahshemene hos- pital Robe hospital	51
	230	
	80	
	Dodola hospital	85
Melkaoda hospital	114	
Does the hospital have ICU bed for adults?	Yes	6 (60)
	No	4 (40)
Hospitals bed capacity for adult ICU	<5 bed	8 (80)
	5 bed	2 (20)
Does the hospital have ICU beds for pedi- atrics?	Yes	1 (10)
	No	9 (90)
Does the hospital have ICU beds for neo- nates?	Yes	6 (60)
	No	4 (40)
Hospitals bed capacity for neonatal ICU	6-10 beds	3 (50)
	11-30 beds	3 (50)
Does the hospital have a mechanical ventila- tor?	Yes	5 (50)
	No	5 (50)
Number of mechanical ventilators	<5 ventilators	3 (60)
	5 ventilators	2 (40)
Does the hospital have a microbiology labora- tory that has culture testing?	Yes	2 (20)
	No	8 (80)
Does the hospital train health professionals on how to take a nasopharyngeal swab for COVID-19 testing?	Yes	9 (90)
	No	1 (10)
Does the facility start the COVID-19 test by PCR?	In progress	1 (10)
	Not start- ed	9 (90)
Does your facility currently work as a COVID -19 treatment center?	Yes	2 (20)
	No	8 (80)

**Table 2: Development of written COVID-19 plan in hospitals**

<b>Items</b>	<b>Response</b>	<b>Frequency %</b>
COVID-19 planning has been incorporated into disaster planning and exercises	Completed / observed	4 (40)
	Completed / but not observed	3 (30)
	In progress	2 (20)
	Not started yet	1 (10)
A multidisciplinary planning committee or team has been created specifically to address COVID-19	Completed / observed	8 (80)
	Completed / but not observed	1 (10)
	In progress	1 (10)
The facility designated a patient isolation center	Completed	10 (100)
The facility trained staff for the development of the COVID-19 treatment center	Completed	6 (60)
	In progress	1 (10)
	Not started yet	3 (30)
A facility collaborate with respective leadership for the decision to allocate potential resource for COVID-19 response	Completed	8 (80)
	In progress	2 (20)
A copy of the hospital COVID-19 preparedness plan is available at the facility	Completed	4 (40)
	In progress	4 (40)
	Not started	2 (20)
A copy of the hospital COVID-19 preparedness plan is accessible by staff	Completed/observed	2 (20)
	In progress	5 (50)
	Not started	3 (30)
The plan identifies the person(s) and the organizational structure authorized to implement the plan	Completed	4 (40)
	In progress	4 (40)
	Not started	2 (20)
Responsibilities of key personnel and departments within the facility related to executing the plan have been described	Completed	4 (40)
	In progress	4 (40)
	Not started	2 (20)

**Table 3: Elements of COVID-19 plan preparedness and response plan**

Items	Response	Frequency (%)
A plan/action is in place for protecting patients, healthcare personnel, and visitors from COVID-19	Completed	5(50)
	In progress	4(40)
	Not started	1(10)
A written protocol has been developed for identifying, monitoring, and reporting COVID-19 among staff.	Completed	5(50)
	In progress	2(20)
	Not started	3(30)
A written protocol has been developed for identifying, monitoring, and reporting COVID-19 among hospitalized patients, attendants, and volunteers	Completed	5(50)
	In progress	1(10)
	Not started	4(40)
A plan to monitor and track COVID-19 related staff absences has been developed	Completed	3(30)
	In progress	4(40)
	Not started	3(30)
Incident management team for COVID-19 response has been established	Completed/observed	5(50)
	Completed/not observed	4(40)
	In progress	1(10)
Incentive mechanism in place for staff working on direct care for COVID-19 management or prevention	Completed	5(50)
	In progress	4(40)
	Not started	1(10)

A process of ensuring the provision of supplies and material recommended in infection prevention and control measures is in place and the process is completed in 30% of health institutions (**Table 4**).

**Table 4: Status of consumables and durable medical equipment and supplies**

Items	Response	Frequency%
Estimates have been made of the quantities of essential patient care materials and equipment that would be needed for at least an eight-weeks of the outbreak (e.g., PPE, intravenous pumps and ventilators, pharmaceuticals)	Completed	2(20)
	In progress	6(60)
	Not started	2(20)
Prepared stock with a checklist for disaster response supplies	Completed/observed	4(40)
	In progress	6(60)
A plan has been developed to address likely supply shortages (e.g., personal protective equipment), including strategies for using normal and alternative channels.	Completed	4(40)
	In progress	6(60)
A process is in place to ensure that the facility provides supplies and materials necessary to adhere to recommended infection prevention and control practices (e.g. hand, respiratory hygiene, etc)	Completed	3(30)
	In progress	7(70)

### Identification and management of ill patients

Fifty percent of hospitals prepared pre triage areas as per protocol. Designation of location for covid-19 screening and case management is completed in 50 and 40% respectively. All of the health institutions completed the designation of location for hand washing. Half of the institutions did not establish alternatives to face-to-face triage, and 40% have no policy to test COVID-19 for any laboring mother, patient with cough and/or fever, and patients in the ICU and thirty percent have a policy (Table 5).

### Visitor's access and movement within the facility

Reviewing and updating a plan for the covid-19 pandemic for visitor access and movement within the facility has been completed in 20% of the health facility. Half of the health institutions have plans and materials developed to post signs at the entrances to the facility instructing visitors not to visit if they have fever or symptoms of a respiratory infection.

**Table 5: Identification and management of ill patients**

Items	Response	Frequency
The facility prepared pre triage area as per protocol	Completed	5(50)
	In progress	4(40)
	Not started	1(10)
Determined how suspected cases will be isolated from other waiting patients during emergency department care	Completed	7(70)
	In progress	2(20)
	Not started	1(10)
Specifically-trained healthcare personnel has been assigned responsibility for overseeing the triage process.	Completed	7(70)
	In progress	1(10)
	Not started	2(20)
A facility designated a location for COVID-19 screening	Completed/ observed	5(50)
	In progress	4(40)
	Not started yet	1(10)
A facility designated a location for COVID-19 screening isolation	Completed/ observed	5(50)
	Completed/not observed	1(10)
	In progress	3(30)
	Not started yet	1(10)
A facility designated a location for case management	Completed/ observed	4(40)
	Completed/ not observed	1(10)
	In progress	2(20)
	Not started yet	3(30)
A facility designated a location for a hand washing area.	Completed/ observed	10(100)
Alternatives to face-to-face triage have been established. Ex. a telephone triage system for prioritizing patients who require a medical evaluation.	Completed	3(30)
	In progress	2(20)
	Not started	5(50)
A facility has the policy to test COVID-19 for any laboring mother, patient with cough and/or fever, and patients in the ICU	Completed	3(30)
	In progress	3(30)
	Not started yet	4(40)

Fifty percent of the hospital has criteria and protocols for limiting or restricting visitors from the facility or into rooms of suspected patients or patients confirmed of COVID-19. Around one-third of the facility didn't start developing criteria for limiting / restricting visitors. Eighty percent has assigned a crowd controller to reduce patient and attendant crowding.

### **Occupational health**

In this study, half 5(50%) of the hospitals observed have employee sick leave that is none punitive, flexible, and consistent with the public health policy to stay at home. The process of identifying and managing health care providers with fever and symptoms of COVID-19 was found in 7 (70%) of the hospitals observed. A plan for monitoring and assigning work restrictions for ill and exposed health care providers was found completed in 5 (50%) of the hospitals. Four (40%) of the hospitals have a guideline for auditing adherence to the recommended personal protective equipment use by health care providers, similarly, a process of auditing adherence to recommended handwashing practice was present in 3(%) of the observed hospitals.

### **Education and training**

Regarding education and training provision preparedness on COVID-19 for staff five (50%) of the hospitals have a complete plan to provide education for patients and family members of patients on prevention and control of COVID-19. And 7(70%) of the observed hospitals have the plan to provide training to health care professionals. Six (60%) of the facilities have provided training on infection prevention and control for supportive staff ( guards, janitors, food service, and staff working in morgue) having closer contact with patients and monitoring their practices. Seven (70%) of the facilities also have designated a person or a team with responsibility for coordinating education and training on COVID-19

### **Health care/ Surge Capacity**

Regarding increased health care/ surge capacity, a plan to allow expanded service hours (shifting plan) was completed in 3 (30%) of the facilities. Strategies for maintaining the hospital routine and continuing care for patients with chronic disease, women giving birth, emergency service, and other none COVID-19 case was found completed in 7 (70%) of the facilities observed. Facilities space for expanding service need of inpatients beds was identified by only 2 (20%) of the hospitals. Criteria have been developed for determining when to cancel elective admission/ non-emergency service and surgeries have been completed in 4 (40%) of the observed facilities. Plan for shifting care service away from the hospital was completed for 4 (40%) of the observed facilities. It is only 1 (10%) of the hospitals that have a plan for initiating and expanding the use of call centers and telemedicine to serve patients without face-to-face contact. Ethical issues concerning how decisions will be made in the event healthcare services must be prioritized and allocated (e.g., decisions based on probability of survival) have been discussed were found completed in 1(10%) of the hospitals observed (**Table 6**).



**Table 6: Health care/ Surge capacity preparedness of hospitals to prevent and manage COVID-19**

<b>Item</b>	<b>Response</b>	<b>Frequency (%)</b>
Developed staffing plan to allow for expanded service hours when needed	Completed In progress Not started yet	3 (30) 4 (40) 3 (30)
Plans include strategies for maintaining the hospital's routine and continuing to care for patients with chronic diseases, women giving birth, emergency services, and other non-COVID-19 care	Completed In progress	7 (70) 3 (30)
Facility space has been identified that could be adapted for use as expanded inpatient beds. (E.g. convalescent homes, hotels, schools, community centers, etc...)	Completed In progress Not started yet	2 (20) 4 (40) 4 (40)
Criteria have been developed for determining when to cancel elective admissions/ non-emergency services and surgeries.	Completed In progress Not started yet	4 (40) 3 (30) 3 (30)
Plans for shifting healthcare services away from the hospital, e.g., to home care or pre-designated alternative care facilities have been discussed.	Completed In progress Not started yet	4 (40) 3 (30) 3 (30)
Created "fast-track" or another method for rapid evaluation and prescribing for minor illnesses	Completed In progress Not started yet	5 (50) 3 (30) 2 (20)
Developed a referral plan for non-COVID-19 patients that do not need emergency care	Completed In progress Not started yet Missing value	3 (33.3) 2 (22.2) 4 (44.4) 1
Plans for initiating and expanding the use of call centers and telemedicine to be able to serve patients without face-to-face contact.	Completed In progress Not started yet	1 (10) 2 (20) 7 (70)
Developed a care plan that reduces the number of staff caring for suspected/ confirmed cases until transferred	Completed In progress Not started yet	7 (70) 2 (20) 1 (10)
Maintaining two meters distance between beds in normal emergency department care in case COVID-19 increases	Completed In progress Not started yet	2 (20) 4 (40) 4 (40)
Developed risk communication and transportation plan for suspected cases	Completed In progress Not started yet	8 (80) 1 (10) 1 (10)
COVID-19 center dedicated treatment center for non-COVID-19 health problems e.g. <i>surgery, oby/gyne</i>	Completed Not started yet	4 (40) 6 (60)
Ethical issues concerning how decisions will be made in the event healthcare services must be prioritized and allocated (e.g., decisions based on probability of survival) have been discussed.	Completed In progress Not started yet	1 (10) 4 (40) 5 (50)
A procedure has been developed for communicating changes in hospital status to health authorities and the public.	Completed In progress Not started yet	5 (50) 4 (40) 1 (10)
Legal counsel and ministry of health contacts have been consulted to determine the applicability of declaring a facility "staffing crisis" and appropriate emergency staffing alternatives.	Completed In progress Not started yet	5 (50) 1 (10) 4 (40)
An ethical and morgue management team has been established	Completed In progress Not started yet	3 (30) 2 (20) 5 (50)
An area in the facility that could be used as a temporary morgue and expanding morgue capacity has been identified.	Completed In progress Not started yet	2 (20) 2 (20) 6 (60)

## DISCUSSION

Globally, hospitals are currently facing an enormous challenge in delivering routine health services and increased patients surges due to the coronavirus disease (COVID-19) pandemic. Hospitals are required to prepare all the necessary resources to handle the increased patient flow as well as the increased consumption of scarce health care resources (1). This study aimed to assess hospitals' preparedness for COVID-19 prevention and control in Bale, East Bale, and West Arsi hospitals.

In this study, the ten hospitals have a total bed capacity of 1,027. The minimum bed capacity among the included hospitals was 47 beds and the maximum was 230 beds. The bed capacities of the hospitals might be inadequate to effectively respond to the pandemic. In terms of Intensive Care Unit (ICU) capacities of the hospitals, of the ten hospitals, six hospitals had an adult ICU. The number of adult ICU beds per hospital was very low, the minimum was one, and the maximum was 5 beds. From the ten hospitals in the three zones, only five hospitals have mechanical ventilators. Among the five hospitals, two hospitals have five mechanical ventilators and the rest have less than five which is very low compared to the population size and the number of expected cases of COVID-19.

The data from China suggest that 15–20% of COVID-19 cases require hospitalization, with about 15% of cases presenting with severe symptoms and 5% requiring intensive care (15). In Italy and Spain, 40–55% of COVID-19 positive cases have been hospitalized, with 7–12% requiring admission to intensive care units (16). Estimates from China also suggest that patients in intensive care units (ICUs) require approximately 13 days of respiratory support, (17) while data from Italy show that 10–25% of patients will require ventilation and some patients will need ventilation for several weeks (18). This trend of hospitalization indicates that business-as-usual service delivery approaches are not sufficient to respond once a cluster of cases or widespread community transmission is registered and surge capacity will be needed. Modeling studies suggest non-pharmaceutical interventions such as physical distancing, school, and university closures, banning of mass gatherings, and remaining indoors, on spreading the number of cases over a longer period to give health systems the opportunities they need to cope with caseloads (19-21).

Half of the health institutions in the study area did not have a plan for protecting patients, healthcare personnel, and visitors from COVID-19, and also did not have a written protocol for identifying, monitoring, and reporting COVID-19 among staff.

Fifty percent of the institutions didn't have an incident management team for COVID-19 response and incentive mechanism for staff working on direct care for COVID-19 management or prevention. This indicates health facilities are not well prepared to combat the COVID-19 pandemic and insight of this COVID-19 will easily infect and spread to people receiving service from those hospitals.

The finding of this study revealed that 90% of health institutions assigned a person which is responsible for communication with external partners and developed informational materials on COVID-19 and relevant policies for their patients and families. In contrast, 10% didn't assign a person yet, although the Ethiopian Ministry of Health recommends that information should be provided to the family and their patients in a language easiest for them to understand (22).

Availability of personnel and medical supply must be ensured for the prevention of COVID-19 (23, 24), though only 20% of health institutions in the study area have made estimates of the quantities of essential patient care materials and equipment that would be needed for at least an eight-weeks of an outbreak. This indicates that health facilities are not well prepared to fight this pandemic and shows many activities are still to be done by these health institutions. Twenty percent have never made the estimates of quantities of necessary equipment and materials important for patient care when the disease is already spread throughout all the parts of the country.

Although World Health Organization (WHO) has designed a tool for forecasting/estimating supplies (25), 60% of health institutions did not make an estimate yet and were in the progress of estimating the necessary materials needed for at least the coming eight months. The first case of coronavirus was detected in Ethiopia on March 13, 2020 (22) and only 20% completed the estimation of materials needed and this is very late when compared to the work done with the time elapsed. WHO recommends that minimum standards should be in place to ensure the protection of health care workers, patients, and visitors from COVID-19 (26) even if only less than one-third of the facility completed the provision of supplies and materials necessary to adhere to recommended infection prevention and control practices.

Although Ethiopian Ministry of Health guidelines orders health care facilities to prepare pre-triage areas and determine ways of isolating suspected cases from others (22), only fifty percent of health facilities in the study area prepared pre-triage areas. Seventy percent (70%) completed determining how to isolate suspected cases from others. This is higher than the study conducted in Ukraine in which 33% of the facility screened COVID-19 suspected persons before entering the facility (27). This may be due to differences in the time of the study because the screening capacity of health facilities will increase over time. For identification and management of ill patients 70% assigned specifically-trained healthcare personnel to bear responsibility for overseeing the triage process, whereas only half of the health facilities completed designation of location and isolation for COVID-19 screening. A facility that has alternatives to face-to-face triage and that has the policy to test COVID-19 for any laboring mother, patient with cough and/or fever, and patients in the ICU is only 30%.

Health facilities preparedness in terms of limiting visitors' access and movement within the facility, limiting visitors not to enter the facility if they have symptoms of respiratory infections, and restricting the visitor's number entering the room of patients suspected of coronavirus is found incomplete. This shows that extra effort is needed from the respective hospitals to review and update a plan for visitors' access and movement within the facility, and also a plan for the visitors when to enter and not to enter the facility should be prepared and posted for the visitors.

Occupational health preparedness is a crucial activity to respond to and manage the COVID-19 pandemic. In this regard, having employee sick leave that is none punitive, flexible, and consistent with public policy; plan for monitoring and assigning work restrictions for ill and exposed health care providers; having a guideline for adherence to the recommended PPE for HCP and having auditing adherence to recommended handwashing practice were expected from each hospital (28).

The Ethiopian Public Health Institute standard for COVID-19 preparedness requires all hospitals to have employee sick-leave policies that are none punitive, flexible, and consistent with public policy (14). In the current study, only 4 (4%) of the observed hospitals have implemented this. All hospitals are expected to have a process to identify and manage HCP with fever and symptoms of COVID-19, in the current study 7 (70%) were found to have implemented this. .

Hospitals are expected to have a plan for monitoring and assigning work restrictions for ill and exposed Health Care Providers this is observed in only half 5(50%) of the observed hospitals. A guideline for auditing adherence to recommended PPE use by HCP and a process for auditing adherence to recommended hand hygiene practices by HCP was observed in 4(40%) and 3 (30%) of the observed hospitals respectively. In the study, it was found that still there are gaps in fulfilling the requirements for COVID-19 prevention as to the standard set by WHO, CDC, and Ministry of Health (10, 13, 14). Even if there were efforts made to practice as per the standard. The European Center for Disease Control has also stated that hospitals are required to provide a minimum composition of PPE to manage suspected or confirmed cases of COVI-19 (13, 14).

To respond and manage COVID-19 hospitals are responsible to provide education and training, providing training for their staff, training on infection prevention for support staff, and have designated a person of a team with responsibility for coordinating education and training on COVID-19 (29). In the current study Seven (70%) of the observed hospitals have the plan to provide training to health care professionals. Six (60%) of the facilities have provided training on infection prevention and control for supportive staff ( guards, janitors, food service, and staff working in morgue) having closer contact with patients and monitoring their practices. And seven (70%) of the facilities also have designated a person or a team with responsibility for coordinating education and training on COVID-19. This indicates that almost all of the studied hospitals did not completely implement the standard for the staff education and training preparedness as set by Ethiopian Public Health Institution, World Health Organization, and Center for Disease Control (10, 13, 14).

The study has also tried to assess the health care/ surge capacity preparedness of hospitals to prevent and manage COVID-19 in the hospitals found in the three zones. In this regard in most of the facilities, we have found the preparation to be less than fifty percent. Even if staffing plan is crucial in responding to COVID-19 (10, 14). In this study; only 3 (30%) of the hospitals have developed staffing plans to allow for expanded service hours when needed. Three 30% of the hospitals have not completed a plan that includes strategies for maintaining the hospital's routine and continuing to care for patients with chronic diseases, women giving birth, emergency services, and other non-COVID-19 care.

This may result in increased morbidity and mortality of people with conditions that could be managed otherwise. Eighty percent of the hospitals did not completely plan for facility space that could be adapted for use as expanded inpatient beds such as convalescent homes, hotels, schools, community centers, etc. And less than half 4(40%) of the hospitals have developed criteria for determining when to cancel elective admissions/ non-emergency services and surgeries and have completed a plan for shifting healthcare services away from the hospital, e.g., to home care or pre-designated alternative care facilities have been discussed.

Hospitals are expected to have referral plans and to have the plan to initiate alternative service approaches for clients (10, 14). Developed a referral plan for non-COVID-19 patients that do not need emergency care was found completed in 3 (30%) of the facilities assessed. And a completed plan for initiating and expanding the use of call centers and telemedicine to be able to serve patients without face-to-face contact was found only in one (10%).

Reducing the number of staff caring for suspected/confirmed cases until transferred and maintaining two meters distance between beds in normal emergency department care in case COVID-19 increases is an important component of COVID-19 prevention preparedness and management (14); in our observation, we noted that 7(70%) and 2 (20%) of the observed hospitals respectively have a complete plan for these actions.

Having developed risk communication and transportation plan for suspected cases is a requirement for preparedness and response to curb and manage outbreaks of COVID-19 (30). In this study, 80% of hospitals have completed the plan. And only four (40%) of the observed hospitals have COVID-19 center dedicated treatment centers for non-COVID-19 health problems such as surgery, obstetrics, and gynecology.

Discussion of ethical issues concerning how decisions will be made in the event healthcare services must be prioritized and allocated (e.g., decisions based on probability of survival) is a requirement for COVID-19 care and management (14) but it only 1 (10%) of the observed hospitals have completed plan. A procedure has to be developed for communicating changes in hospital status to health authorities and the public and legal counsel and ministry of health contacts have to consult to determine the applicability of declaring a facility "staffing crisis" and appropriate emergency staffing alternatives (14) in this aspect half (50%) observed hospitals have completed plan.

Legal counsel and Ministry of Health contacts to determine the applicability of declaring a facility "staffing crisis" and appropriate emergency staffing alternatives; planning for ethical and morgue management team establishment and an area in the facility that could be used as a temporary morgue and expanding morgue capacity has to be identified (14). But in this study 5 (50%), 3 (3%), and 2 (20%) of the observed hospitals respectively have completed such plan.

## CONCLUSION

Preparedness for management and response to the COVID-19 pandemic was not fully practiced according to the standard set by the world health organization and the national standard set by the Ministry of Health and Ethiopian Public Health Institute. Although there are efforts made towards the preparation and response to the pandemic, the achievements of almost all of the hospitals included in the study were below the expected standard. Capacity-building activities to fulfill the standard need in supplies and skilled human power to combat COVID -19 pandemics are mandatory. Concerned bodies including national, regional, and zonal stakeholders need to work on strengthening the capacities of hospitals to respond to COVID-19 by providing technical and materials support.

## Strength and limitations of the study

Among the strength, the study has tried to assess the preparedness and response of hospitals for the prevention and management of COVID-19 using a standard checklist through direct interview and observation of the facilities. Among the limitations, as we have included only 10 hospitals found in West Arsi, Bale, and East Bale zone, the finding may not be generalized to other hospitals in Oromia and national level.

## Acknowledgments

We are grateful to Madda Walabu University for its financial and logistic support.

## Conflict of Interest:

Authors have no conflict of interest to declare

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