

Preparedness level and associated factors of health professionals regarding COVID-19

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Abstract

Objective: To assess the level of preparedness of health professionals working in South Gondar Zone public hospital, Debre Tabor Comprehensive specialized Hospital for coronavirus.

Methods: An institutional-based cross-sectional survey was conducted with a self-administered questionnaire from April 20 to May 20. Descriptive statistics, chi-square test, bivariable, and multivariable logistic analysis were done. Bivariable and multivariable regression was held to determine significant predictors for preparedness. For all statistical analyses, a p value ≤ 0.05 was considered as significant.

Results: From a total health professionals, 301 health professionals with a response rate of 86% participated in the study. Among these, 206 were males while 95 participants were females with a mean age of 29.71 ± 5.84 years. To determine the preparedness level, we use the mean preparedness score of the respondents. Around 64.1% of health professionals were well prepared. Among 20 respondents who had a chronic illness, 80% of them think their illness is risky for the pandemic. The majority of the respondents (229/76.1%) responded as they were working without protective equipment. From the multivariable analysis male sex (adjusted odds ratio = 2.07, 95% confidence interval = 1.193–3.590), family living with them (adjusted odds ratio = 4.507, 95% confidence interval = 1.863–10.90), and involvement of other previous outbreak (adjusted odds ratio = 2.245, 95% confidence interval = 1.176–4.286) were the predictors for good preparedness.

Conclusion: Most of the health professionals were well prepared. Being male, living within a family, and involvement of other outbreaks leads to good preparation. Governmental bodies and hospital managers have to help health professionals to be prepared enough to combat the pandemic.

Keywords

COVID 19, preparedness, health professionals, Ethiopia

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Background

A novel coronavirus (COVID 19) started from china at the end of December 2019 and later declared to be pandemic by the World Health Organization (WHO).¹ The lives of infected individuals, family, and friends, and society are at stake due to the disseminated potential effects of the novel coronavirus (COVID-19).¹

Even though some countries in Africa were stepping up their preparedness to cope with the pandemic, other countries including Ethiopia had a low capacity to respond to the outbreak even though they have a higher risk of the vulnerability of the disease.² Around 74% of countries in Africa had the previous influenza preparedness plan most of which

were outdated not adequate to combat the current outbreak.³ In the current outbreak, there was a significant gap including a shortage of oxygen and intensive care unit (ICU) beds in Kenya hospitals to accommodate the surge of cases.⁴

Coronavirus outbreak is a particularly hazardous phenomenon for health professionals. Therefore, preventing the patients come for other disease conditions and health

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professionals from infection should be the new normal practice.⁵ Although the exact numbers are not yet clear, thousands of healthcare workers worldwide have caught COVID-19 and many have lost their lives.^{6,7}

In the fight against this pandemic, health professionals have been facing enormous pressure, including a high risk of infection and inadequate protection from contamination, overwork, frustration, discrimination, isolation, patients with negative emotions, a lack of contact with their families, and exhaustion.⁸

To make a health system more functional, a sufficient number of healthy and competent health professionals are mandatory. All health professionals should protect themselves and have sufficient provision of personal protective equipment and other tools to prevent them from contamination, get priority regarding working hours, rest, and other measures.⁹

A web-based international survey on health professionals showed that the professionals' usage of personal protective equipment was varied and there was a shortage of protective equipment due to this there was re-usage of single-use protective equipments.¹⁰ Another cross-sectional showed that preparedness and awareness of the disease was low among frontline workers.¹¹

Therefore, this study aimed to assess the level of preparedness of health professionals working in Debre Tabor Comprehensive specialized Hospital for coronavirus.

Methods

Study area and period

The study was conducted in Ethiopia at the South Gondar zone of Debre Tabor Comprehensive specialized hospital from 20th April to 20th May 2020. Debre Tabor Comprehensive specialized Hospital is found in Debre Tabor Town, North-Central Ethiopia, in South Gondar Zone. The Town is found in the Amhara region 669 km North West of Addis Ababa, the capital city of Ethiopia and 97 km South West of Bahir Dar, the capital city of the Amhara region. This town has a latitude and longitude of 11°51'N 38°1'E/11.850°N 38.017°E with an elevation of 2,706 m above sea level. The Hospital is the only Comprehensive specialized hospital of the South Gondar Zone since all the hospitals are primary.

Study design

An Institutional based cross-sectional survey was conducted on health professionals working in South Gondar zone Debre Tabor Comprehensive specialized Hospital using self-administered questionnaires.

Study populations

All health professionals working in the study area who were at the workplace during the data collection time were included.

Exclusion criteria

Health professionals who were not at the workplace during the data collection were excluded.

Dependent variable

Level of preparedness.

Independent variable

Sociodemographic characteristics (gender, age, marital status, religion, region), educational level, job title, experience, availability of PPE, family member, and chronic illness.

Operational definition

Preparedness level: The preparedness level was determined by the mean score of the respondents; the mean score of preparedness level of the participants was 13.77, HPs who had a total preparedness score of above the mean score (13.77) considered as having good preparedness and below the mean score poor preparedness. Questions related to preparedness were adapted from the center for disease control (CDC), the reliability of the tool was checked and it has a Cronbach's alpha value of 72.4%.

Concern level: It is determined by a 4-point Likert-type scale including strongly agree, agree, disagree, and strongly disagree. A scoring system includes no points ("strongly disagree") to three points ("strongly agree"). The level of concern is grouped into two categories based on the mean score of concern from a total score of 93. A score of greater than the mean score was considered to be a high concern and below the mean score considered not concerned.¹² It has a Cronbach's alpha value of 88.3%.

Chronic illness: Defined broadly as conditions that last 1 year or more and require ongoing medical attention or limit activities of daily living or both. Chronic diseases such as heart diseases, diabetes, hypertension, asthma, chronic obstructive pulmonary disease (COPD), cancer, and so on.¹³

Living with family member: A health professional living with greater than or equal to two within a house including a spouse, former spouse, child, step-child, grand-child, parent, step-parent, grand-parent, niece, nephew, and so on including adoptive relationships.

Sample size determination and sampling procedure

It is an institutionally based survey that included all health professionals working in the hospital during the data collection period. Anesthesia professionals, physicians, nurses, midwives, pharmacists, laboratory professionals, and radiology professionals were investigated.

Table 1. Sociodemographic characteristics of health professionals working in Debre Tabor general hospital (N= 301).

| Characters | Categories | Frequency (%) | Percentage |
|--------------------------------------|----------------|---------------|------------|
| Age | <29 | 147 | 48.8 |
| | ≥29 | 154 | 51.2 |
| Sex | Male | 206 | 68.4 |
| | Female | 95 | 31.6 |
| Marital status | Single | 128 | 42.5 |
| | Married | 173 | 57.5 |
| Family member | Have no family | 97 | 32.2 |
| | Have family | 204 | 67.8 |
| Do you have children living with you | Yes | 145 | 48.2 |
| | No | 156 | 51.8 |
| Educational level | BSc and below | 250 | 83.1 |
| | MSc and above | 52 | 16.9 |
| Job title | Physician | 83 | 27.5 |
| | Anesthetist | 15 | 5 |
| | Laboratory | 30 | 10 |
| | Radiologist | 6 | 2 |
| | Midwifery | 40 | 13.3 |
| | Nurse | 118 | 39.2 |
| | Pharmacist | 9 | 3 |

Data collection tool and procedures

The data collection tool was adapted from the CDC health care professional's preparedness checklist for COVID-19.^{12,14} We assigned two data collectors in the study area after they had adequate training. The data were collected using a self-administered questionnaire, and it was distributed to the study participants by data collectors. After taking consent for participation in this study, the participants were ordered to fill the questionnaire. The questionnaire to collect the data addressed as a Supplementary file.

Data quality management

To ensure the quality of data, the pretest was done on health professionals working nearby primary hospital. The questionnaire checked for its accuracy, clarity, and consistency cleaning up data and cross-checking done before data processing and analysis. Ambiguous or uncompleted data did not send for analysis. The supervisor controlled the data collectors and check for the completeness of the data every day during data collection time.

Data processing and analysis methods

The data entered into Epi-data version 4.2 statistical software and exported to SPSS version 23 for statistical analysis. According to the Shapiro–Wilk's test, data were normally distributed. Categorical sociodemographic data were summarized by frequencies and percentages of occurrence. The chi-square was held to compare frequencies of respondents at different preparedness levels associated with categorical variables. Bivariable and multivariable regression analyses

were held to determine significant predictors for low preparedness level. For all statistical analyses, a p value of ≤ 0.05 was considered significant.

Ethical consideration

Ethical clearance to conduct the research was obtained from the ethical review committee of Debre Tabor University. Written informed consent was presented and had taken from each study participant. Confidentiality was ensured by removing identifiers and locking the questionnaires after data collection in a secured area.

Result

Characteristics of the participants

From a total of 350 health professionals, 301 health professionals with a response rate of 86% participated in the study to assess the level of preparedness. The mean age of the participants was 29.71 ± 5.84 years (206 males and 95 females). The majority of the participants (67.8%) have family leaving with them and around 173 (57.5%) participants were married. Twenty HPs had chronic illness among this 16 (80%), participants think their illness is risky for COVID 19. The majority of the respondents (229/ 76.1%) are working without access of PPE, and the same number of participants were not involved in previous outbreaks (Tables 1 and 2).

Preparedness level of the HPs

Around one-third (108 (35.9%)) of the HPs were not prepared well and 193 (64.1%) were well prepared. Around 48

Table 2. Working environment characteristics of health professionals working in Debre Tabor general hospital, 2020.

| Variables | Categories | Frequency | Percentage |
|--|-----------------------|-----------|------------|
| Working area | COVID 19 center | 8 | 2.7 |
| | Regular hospital work | 293 | 97.3 |
| Work experience | >5 years | 132 | 43.9 |
| | ≤5 years | 169 | 56.1 |
| Do you have a chronic illness | Yes | 15 | 5 |
| | No | 286 | 95 |
| Do you have PPE access | Yes | 72 | 23.9 |
| | No | 229 | 76.1 |
| Are you involved in previous outbreaks | Yes | 72 | 23.9 |
| | No | 229 | 76.1 |
| Is there suspected or confirmed case near your environment | Yes | 38 | 12.6 |
| | No | 263 | 87.4 |
| Level of concern | Concerned | 150 | 49.8 |
| | Not concerned | 151 | 50.2 |

PPE: personal protective equipment.

Table 3. Results regarding preparedness health professionals working in Debre Tabor general hospital, 2020 (N=301).

| Variables | Categories | Frequency (%) |
|--|------------|---------------|
| I am ready to assess and triage of patients with acute respiratory symptoms | Yes | 254 (84.4) |
| | No | 47 (15.6) |
| I am ready to implement/implementing the standard, contact, and Airborne precautions, including the use of eye protection | Yes | 214 (71.1) |
| | No | 87 (28.9) |
| I will put masks on patients of suspected cases | Yes | 253 (84.1) |
| | No | 48 (15.9) |
| I am ready to implement requirements for performing aerosol-generating procedures | Yes | 212 (70.4) |
| | No | 89 (29.6) |
| I know how to report a potential COVID-19 case or exposure to facility infection control leads and public health officials | Yes | 227 (75.4) |
| | No | 74 (24.6) |
| I know who, when, and how to seek evaluation by occupational health following an unprotected | Yes | 149 (49.5) |
| | No | 152 (50.5) |
| If I am ill, I will remain at home and notify occupational health services | Yes | 225 (74.8) |
| | No | 76 (25.2) |
| I know how to contact and receive information from my state or local public health agency | Yes | 205 (68.1) |
| | No | 96 (31.9) |

(15.9%) of the respondents still did not put on masks while caring in suspected cases (Table 3).

The predictors that lead to health professional's preparedness

From the bivariable binary logistic regression; age (crude odds ratio (COR)=0.657, confidence interval (CI)=0.409–1.055, $p=0.082$), sex (COR=2.180, CI=1.352–3.597, $p=0.002$), marital status (COR=1.920, CI=1.191–3.097, $p=0.007$), those who are living in a family (COR=2.859, CI=1.730–4.725, $p=0.00$), previous involvement of outbreaks (COR=2.133, CI=1.165–3.906, $p=0.014$), and concern level (COR=0.714, CI 0.445–1.146, $p=0.162$) were significantly associated with preparedness.

According to the multivariable binary logistic regression result sex, living within the family, and involvement in

other previous outbreaks were significantly associated with preparedness. Males are 2.0 times more prepared than females (adjusted odds ratio (AOR)=2.070, CI=1.193–3.590, $p=0.01$). HPs who had previous exposure to other outbreaks are also 2.2 times well prepared than those who were not involved (AOR=2.245, CI=1.176–4.286, $p=0.014$; Table 4).

Discussion

Health care professionals are at risk of contracting the disease directly while they care for patients who are positive and indirectly while they care for other patients whose status is not known. So, preparedness is key to protect themselves and their patients.

The health professionals preparedness was determined by the mean score of the respondents, 64.1% of the health

Table 4. The factors of health professional's preparedness.

| Variables | Category | Odds ratio | | p value |
|----------------------------------|---------------|----------------------|----------------------|---------|
| | | Crude, (95% CI) | Adjusted, (95% CI) | |
| Age | <29 | 0.657, (0.409–1.055) | 0.886, (0.509–1.540) | 0.667** |
| | ≥29 | 1.00 | 1.00 | |
| Sex | Male | 2.180, (1.352–3.597) | 2.070, (1.193–3.590) | 0.01* |
| | Female | 1.00 | 1.00 | |
| Marital status | Married | 1.920, (1.191–3.097) | 1.474, (0.725–4.270) | 0.214** |
| | Unmarried | 1.00 | 1.00 | |
| Family member | Yes | 2.859, (1.730–4.725) | 4.507, (1.863–10.90) | 0.001* |
| | No | 1.00 | 1.00 | |
| Involvement on previous outbreak | Yes | 2.133, (1.165–3.906) | 2.245, (1.176–4.286) | 0.014* |
| | No | 1.00 | 1.00 | |
| Concern level | Concerned | 1.00 | 1.00 | 0.067** |
| | Not concerned | 0.714, (0.445–1.146) | 1.610, (0.966–2.684) | |

CI-confidence interval

*Significantly associated

**Not associated I-constant.

professionals were well prepared and 34.9% of them were poorly prepared.

In this study, HPs who were married (70.5%) and those who were living in the family member (72.1%) were well prepared compared with those unmarried and living alone. This may be because they feared to transmit COVID 19 to their family member, which indicates preparedness is beyond protecting self but it is also protecting family members and loved ones.

A hospital-based cross-sectional study showed that 41.8% of the HPs perceived their infection was inappropriate usage of protective equipment such as face mask and gloves.¹⁵ In this study, most of the HPs (84%) put on masks while they care suspected cases but still 16% of the HPs were not wearing masks, and 29.5% of the HPs were not implementing the requirements for performing aerosol-generating procedures, though the primary transmission route is aerosolized droplets while the patients with COVID 19 cough and sneeze.^{16–18} To examine the effectiveness of protective equipments on frontlines, a study showed that all the HPs were protected and a single HPs has not contracted the disease.¹⁹ It is recommended to apply protective equipments while caring for suspected or confirmed cases even if the protective equipments associated with headache.²⁰

Among the factors that lead to good preparation is male sex which is 2.0 times more than females. This may be associated with the disease condition which is highly prevalent among males.^{21–23} Professionals who were involved in the previous outbreak or who participated in the COVID 19 isolation center were 2.2 times more prepared compared with those who did not involve.

Another study done in Jordan aimed to assess the preparedness of the frontline health professionals on different hospitals revealed that only 18.5% of the respondents were

working with PPE, and 25% of the doctors had previous experience of managing patients contracting COVID 19.²⁴ The access of PPE in our study was 23.9% which is almost in line with this study but only 8 (2.65%) of the HPs were involved in the isolation center of COVID 19 because there was no confirmed case till rather suspected cases in the area.

Regarding the access of PPE, most of the study participants in the United Kingdom (Northern Ireland: 61.53%, England: 68.11%, Wales: 77.14%) responded that there was no access to PPE²⁵ which is similar to our result, 76.1% of our study participants has no access of PPE even though it is recommended to secure PPE of good quality and to give concentrated attention for health workers in Africa.²⁶ In another study, the HPs working in the ICU were obliged to reuse the single-use PPE due to a shortage of access.¹⁰ There was no training on how to use PPE until the conduction of this study. Similarly, a study done in Nigeria on eye care practitioners showed that the majority of them did not receive training on how to use PPE.²⁷

A review of articles to assess health care preparedness and health care worker's protection during COVID 19 pandemic recommends to prepare and apply PPE like, gloves, aprons, gown, eye-protective, N95 masks, surgical masks, while working in fever clinic and during the managing of suspected cases, beyond this, the study recommends to fulfill and use overshoes and headcovers while working in COVID 19-positive wards and ICU.²⁸ Also, a WHO report regarding critical preparedness, readiness, and response actions for COVID 19 to stop or slow the transmission and to prevent the spread recommend increasing the level of preparedness activate emergency response mechanisms for the case of community transmission, a cluster of cases, sporadic cases even with no reported cases. It also recommends preparing

PPE while caring for suspected or confirmed cases²⁹ but in our study area, the HPs had limited access to N95 masks, eye protection, and PPE.

Protecting staff working in the area and era of an outbreak is a critical challenge for health care systems, it also reduced TB care and research activities significantly in Ethiopia.³⁰ A study in Ethiopia showed that necessary pharmacy services have been rendered to all clients but drugs and medical supplies were scarce.³¹ If the system fails to achieve this, it will increase the sick leave from the institution,³² but in our institution, it's made a little to protect the staffs, in Debre Tabor Hospital one health professional left the job due to fear of contracting the disease.

Limitation of the study

The limitation of this study was it is a single institution study. Due to no study before regarding the cut value, to determine the preparedness level, we used the mean score. Another limitation of the study was that we did not calculate sample size/power analysis, and pilot was not conducted to validate the questionnaire in this study.

Conclusion

Most of the health professionals were well prepared. Being male, living within a family, and involvement in other outbreaks leads to good preparation. The health professionals have to be prepared enough to combat the outbreak; the health system should help professionals to have access of protective equipments.

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Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethical approval

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Informed consent

Written informed consent presented and had taken from each study participant. Confidentiality was ensured by removing identifiers and locking the questionnaires after data collection in a secured area.

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Supplemental material

Supplemental material for this article is available online.

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