Introduction

The coronavirus outbreak is a global concern. With each passing day, the situation seems to change for the worst. More and more people are confirmed as infected, the mortality rate goes up slightly with each fatal case. The coronavirus (COVID-19) pandemic is an unprecedented public health emergency affecting all countries worldwide and correctly challenging the provision of essential services for low-resource countries. Healthcare workers involved in providing care are at high risk of developing mental health problems. The aim of this was to determine the prevalence of depressive symptoms due to COVID-19 and associated factors among healthcare workers in the West Guji zone in public health facilities, southern Ethiopia.

Abstract

Objectives: Globally, novel coronavirus disease 2019 (COVID-19) has spread rapidly since it was first identified and challenging the provision of essential services for low-resource countries. Healthcare workers involved in providing care are at high risk of developing mental health problems. The aim of this was to determine the prevalence of depressive symptoms due to COVID-19 and associated factors among healthcare workers in the West Guji zone in public health facilities, southern Ethiopia.

Methods: A facility-based cross-sectional study was conducted in public health facilities found in the West Guji zone. A simple random sampling technique was employed to select 283 study subjects. This study was used to assess the prevalence of depression symptoms using Depression, Anxiety and Stress Scale-21, a depression subscale. Descriptive statistics, binary and multiple logistic regressions were used. Adjusted odds ratios (AORs) with 95% confidence interval will be estimated to assess the strength of associations and statistical significance will be declared at a $p$-value $< 0.05$.

Results: Out of 283 eligible healthcare workers, 275 respondents had participated in this study with a 97.2% response rate. The prevalence of depressive symptoms was 21.5%. The independent predictors associated with depressive symptoms due to COVID-19 were age (adjusted odds ratio = 2.35, 95% confidence interval = 1.126–3.95), family size (adjusted odds ratio = 3.56, 95% confidence interval = 1.09–11.62), alcohol use (adjusted odds ratio = 4.31, 95% confidence interval = 1.76–10.55), medical illness (adjusted odds ratio = 9.56, 95% confidence interval = 3.71–24.59), having training on COVID-19 (adjusted odds ratio = 0.37, 95% confidence interval = 0.17–0.81), and lack of knowledge on COVID-19 (adjusted odds ratio = 15.34, 95% confidence interval = 6.32–37.21).

Conclusion: The prevalence of depressive symptoms among healthcare workers due to COVID-19 was high. Factors associated with depressive symptoms were age, family size, alcohol use, medical illness, having training on COVID-19, and lack of knowledge on COVID-19.

Keywords

Depression, COVID-19, healthcare workers, associated factors, West Guji zone

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low-resource countries and frightening human life. Even though all countries are under the burden of the COVID-19 crisis, the severity is high in developing countries. According to a comparison study done between the Philippines and China, the lower-middle-income countries (Philippines) have higher levels of depression, anxiety, and stress than upper-middle-income countries (China). The COVID-19 pandemic has caused serious threats to people’s physical and mental health and also triggered a wide range of psychological problems, such as panic disorder, anxiety, depression, post-traumatic stress disorder (PTSD) symptoms, and insomnia.

A study conducted in China shows that healthcare workers (HCWs) are sensitive to complex emotional reactions and psychological distress. Consequently, the mental health problem of HCWs would affect care, cognitive functioning, clinical decision-making, and the incidence of errors and medical accidents increases and ultimately puts patients at risk. It was also known that acute stress in catastrophes could have a lasting effect on general well-being. During the pandemic, in China, 50% of HCWs have reported high rates of depression, in Pakistan, 42% of HCWs had moderate, and in Canada, 47% of HCWs need for psychological support. COVID-19 primarily affects the respiratory and cardiovascular systems. Stress, social isolation, and family violence can affect brain health and development in children and adolescents. Social isolation, reduced physical activity, and reduced intellectual stimulation increase the risk of cognitive decline and dementia in the elderly.

Many people around the world have to isolate themselves, keep their social distance, avoid crowds, or even work at home. These measures will certainly influence people’s psychological well-being. Stresses due to COVID-19 are at risk of infection and infecting others, common symptoms of other health problems (e.g. fever), and stigmatization toward those who work with patients with COVID-19. Strict biosecurity measures, increased environmental demands, reduced ability to use social support due to intense hours of work and stigma within the community toward first-line workers, insufficient staff or ability to implement basic self-care, especially among people with disabilities, insufficient information on long-term exposure to people infected with COVID-19, and fear that frontline workers will transmit COVID-19 to their friends and family because of their work.

In Ethiopia, a study conducted at the University of Gondar, graduates indicate that the prevalence of depression was 41.2%, and students who came from an urban area, live with a family, study departments that are not doctors or health, had confirmed family cases, and lack of exercise were more likely to develop depression. Furthermore, a study conducted in the Bench-Sheko zone of university students shows that the prevalence of depression was 21.2%. WHO reports the prevalence of depression symptoms increased by threefold in comparison to the estimates before the epidemics and specific population groups are at particular risk of COVID-related psychological distress. The frontline HCWs, faced with heavy workloads, life-or-death decisions, and risk of infection, are particularly affected.

However, HCWs involved in providing frontline care during any types of pandemic outbreaks are at high risk of developing mental health problems and need immediate interventions to enhance psychological resilience and strengthen the healthcare systems’ capacity. Providing timely and appropriately tailored mental health support through hotline teams, media, or multidisciplinary teams, including mental health professionals is also vital. Therefore, the purpose of this study was to determine the prevalence of depressive symptoms related to COVID-19 and associated factors among HCWs in the West Guji zone in public health facilities. The conceptual framework was developed after reviewing different works of literature by investigators (Figure 1).

Methods and materials

Study area and study period

The study was conducted in West Guji zone, Oromia region. West Guji zone is one of among 20 zones in the Oromia region. Bule Hora town is a capital city of West Guji zone which is located 467 km far from Addis Ababa to the south direction at 5°35′N latitude and 38°15′E longitude. The zone has also 196 kebeles the lower administrative body, of these 166 are rural, and 30 are the urban kebeles. It has an estimated population of 1,389,821 of whom 681,012 are male and 708,809 are females. West Guji zone has one general hospital, 2 primary hospitals, 42 health centers, and 166 health posts, and has 860 healthcare providers and 478 health extension workers. The study was conducted from 10 June to 10 July 2020.

Study design

A facility-based cross-sectional study was conducted to assess the prevalence of depressive symptoms due to COVID-19 and associated factors among HCWs of West Guji 2020 G.C.

Source population

All HCWs of West Guji zone public health facilities.

Study population

All HCWs of West Guji zone of selected public health facilities.

Inclusion and exclusion criteria

Inclusion criteria. All selected healthcare providers in selected public health facilities at the time of data collection were included.
Exclusion criteria. Those HCWs who were new employers were recruited within the last 6 months.

Sample size determination and sampling procedure

Sample size determination. The sample size was determined using single population proportion formula. By considering the magnitude of depressive symptoms in population as 50% because there was no study conducted in the study area on this title. 95% confidence interval (CI) and margin of error 5% between the sample size and the underlining population were considered. The following single population proportion formula was used

\[ n = \left( \frac{Z\alpha}{2} \right)^2 \frac{p(1-p)}{d^2} = \frac{1.96^2(0.5*0.5)}{0.05^2} = 384 \]

where \( n \) is the sample size, \( p \) is the estimated prevalence of depressive symptoms in population: 50%, \( d \) is the error allowed 5%, and \( Z\alpha/2 \) is the critical value at 95% CI is 1.96.

By adding 10% of non-response rate \( 384 + 10\% = 422 \),

The source populations are 860 HCWs. So, the finite population correction formula was used

\[ n_f = \frac{n}{1+n/N} = \frac{422}{1+422/860} = 283 \]

Sampling technique and sampling procedure

Among the total 3 public hospitals and 42 health centers in zone, all hospitals were selected purposefully and 15 health centers were selected by simple random sampling technique. The hospitals selected for the study were Bule Hora General Hospital, Kerca Primary Hospital, and Melka Soda Primary Hospitals which have 183, 72, and 59 HCWs, respectively.
Health centers selected for this study were Rophi Magada, Garba, Ela Farda, Eguu Abbay, G/Soke, Ela Dima, Corso Golija, Tore, Mexaari, Dangoo, Guwanguwa, Buqqiisa, Fincaawa, Afalata, and Hidha Korma which have a total of 323 HCWs. The required numbers of study subjects were proportionally allocated to each hospital according to the number of healthcare providers in each health facility. From all hospitals, 208 HCWs were selected and from all health centers, 214 HCWs were selected by proportional allocation to sample size. Finally, a simple random sampling technique was employed to select 283 study participants.

Study variables

Dependent variable. Depressive symptoms due to COVID 19.

Independent variables

- Socio-demographic factors: sex, age, marital status, level of education, income, residence, family size, and profession.
- Knowledge-related factors: knowledge about COVID-19, training on COVID-19, the experience of outbreak management, and year of working experience.
- Chronic conditions: history of psychological distress, parental history of psychological distress, and medical comorbidities.
- Behavioral factors: appropriately practicing personal protective equipment (PPE), smoking, drinking, exercise habit, and travel history for the past 2 weeks.

Operational definitions

Depression is a mental disorder, characterized by sadness, loss of interest or pleasure, feelings of guilt or low self-worth, disturbed sleep or appetite, feelings of tiredness, and poor concentration, measured using Depression, Anxiety and Stress Scale-21 (DASS-21), depression subscale.17 The DASS-21 was validated in different countries during the COVID-19 pandemic.12,18–21 Knowledge scores were calculated by assigning one point to each correct answer, and a zero to an incorrect/unknown answer. The total knowledge score ranged from 0 to 12, with higher scores signifying good knowledge, if they respond at least six items/components of knowledge-related questions.

Data collection instrument and techniques and procedures

Data collection instruments. The data were collected using a pretested structured self-administered questionnaire with data collector guidance. The questionnaire was initially prepared in English and then translated into Afana Oromoo and then back into English by fluent speakers to check its consistency. The tool was prepared to assess the magnitude of depressive symptoms related to COVID-19 and its associated factors among HCWs and adopted from similar previous studies.2,7,8 It contains socio-demographic characteristics, knowledge about preventive measures of COVID-19, chronic medical conditions, history of psychological distress, and behavioral factors (supplemental material).

Data collection procedure

The data collection was conducted by eighteen diploma holder nurses and nine degree holder nurses were assigned as supervisors of data collection. Two days of training were given for data collectors and supervisors on how they approach the study groups and fill the questionnaires. The overall supervision was carried out by the principal investigator and coinvestigators. The selected participants were informed by data collectors about the significances of the study involved in the study.

Data quality control

A structured questionnaire was developed in English and then translated to Afana Oromoo by a fluent speaker of both languages and then translated back to English. A pretest was done on 5% of the sample at Yabelo General Hospital before data collection to check whether the questionnaire was correct and consistent. The additional adjustment was made based on the result of the pretest. Supervision during the data collection period was carried out daily, and data were cleared and checked every day for completeness and consistency before processing and analysis.

Data processing and analysis

The collected data were coded, entered, and cleaned by EpiData version 3.1 and exported to statistical package for social science (SPSS) version 25.0 for analysis. Binary logistic regression analysis was employed to examine the statistical association between the depressive symptoms of HCWs and the independent variables. Variables that showed statistical significance during bivariate analysis at p-value < 0.25 were entered into a multivariable logistic regression to identify statistically significant variables. Adjusted odds ratios (AORs) with 95% CI were estimated to assess the strength of associations and statistical significance will be declared at a p-value < 0.05. Hosmer and Lemeshow test will be done to check model fitness. Results were presented using tables, figures, and texts.

Ethical considerations

Ethical approval for this study was obtained from Bule Hora University Institutional Review Board (reference no. BHU/PRD/01/2020). Based on the approval, an official letter was written by the research and publication directorate of Bule Hora University to the West Guji zone health departments.
Explanation of the objective of the research was provided to the concerned personnel at each level. The zone health department wrote the letters to respective health facilities for cooperation and permission of conducting the study. Finally, data were collected after assuring the confidentiality nature of responses and obtaining written consent from the study participant. All the study participants were encouraged to participate in the study, and at the same time, they were also told that they have the right not to participate.

Results

Socio-demographic characteristics of the respondents

Out of 283 eligible HCWs, 275 respondents had participated in this study with a 97.2% response rate. Nearly two-third (173/62.9%) were male respondents. The mean age of respondents was 29.83 years with standard deviation (SD) ±4.794, ranging from 20 to 56 years. The majority of the age respondents were in between 25–29 and 30–34 years, which accounts for 44.4% and 36.4%, respectively. Nearly more than two-thirds of the respondents (201/73.1%) were living in an urban area, and more than half (153/55.6%) were married. Nearly two-third (191/69.5%) of respondents were Oromo in ethnicity. One hundred twenty-seven (46.2%) of the respondents were protestant, and 167 (60.7%) attended degree programs, and about 98 (35.6%) of the respondents were nurses by profession. The family size of HCWs was ranging from 1 to 12 and the minimum monthly income was 2000 Ethiopian birr (Table 1).

Knowledge of HCWs about COVID-19

The majority of HCWs 159 (57.80%) had 2–4 years and the mean was 4.15 years with a standard deviation of 2.86 years of experience. Nearly two-thirds of health workers (177/64.4%) had training on COVID-19, and around one-third (78/28.4%) had experiences of outbreak management.

Overall, the level of HCWs’ knowledge regarding COVID-19 was classified as good knowledge and poor knowledge based on their responses. According to the definition, 84.7% (233) HCWs had good knowledge of COVID-19 and the rest of them had poor knowledge. The mean of the knowledge was 9.90 with a 2.42 SD. The majority of HCWs (260/94.5%) responded with the correct answers that the main clinical symptoms of COVID-19 are fever, fatigue, dry cough, and myalgia. Nearly two-thirds (176/64.0%) of the respondents responded with the correct answer eating or contacting wild animals would result in the infection by the COVID-19 virus.

Prevalence of depression among HCWs

Out of study participants, 59 (21.5%) had depressive symptoms.

Factors associated with depression of HCWs

The factors associated with depressions were identified by binary logistic regression, and variables with p-value < 0.25 were considered for the candidate of multiple logistic regressions. Accordingly, multiple logistic regression was conducted to determine confounding factors. After analysis, the variables associated with depression because of COVID-19 were age, family size, alcohol use, medical illness, having training and knowledge on COVID-19 (Table 2).

The age of HCWs was statistically significant with depression. The odd of being 25–29 years old was more likely to increase the risk of developing depression by 2.35 (odds ratio (OR) = 2.35, 95% CI = 1.126–3.95) compared with those whose age was more than the 35 years of age group. Having four family members and above were significantly associated with depression related to COVID-19. Four family members and above were 3.56 (OR = 3.56, 95% CI = 1.09–11.62) times more likely to develop depression compared with a person who lived alone after controlling confounding factors. Alcohol use is significant associated with depression. HCWs those use alcohols were 4.31 (OR = 4.31, 95% CI = 1.76–10.55) more likely to develop depression symptoms compared with counterpart.

The medical illness of HCWs was significantly associated with depressions. The odd of having medical illness is 9.56 (OR = 9.56, 95% CI = 3.71–24.59) times more likely to develop depression compared with HCWs free from medical illness. Having trained on COVID-19 significantly decreases the incidence of depression among HCWs. The odd of having training on COVID-19 decreases the depression by 63% (OR = 0.37, 95% CI = 0.17–0.81) compared with none trained HCWs after controlling other factors. The knowledge of HCWs on COVID-19 is also another variable significantly associated with depressions. The odd of having poor knowledge on COVID-19 is 15.34 (OR = 15.34, 95% CI = 6.32–37.21) times more likely to develop depression compared with good knowledge.

Discussion

This study was conducted to assess the prevalence of depression among HCWs of the West Guji zone and associated factors. The increasing number of confirmed and suspected cases, lack of personal protection equipment, lack of specific drugs, increased risk of infection for families and colleagues, and unable to adhere to prevention strategies will increase the level of depression among HCWs. According to this finding, the prevalence of depression was 21.5%.

The prevalence of depression symptoms (21.5%) among health workers in this study was in line with the study conducted on systematic review and meta-analysis 24.3%, 20 22.8%, 22 Benchi Maji zone 21.2%, 15 Thailand 19.74%, 23 and study done in China 18.9%. 5 The study finding of this study was higher than the study done in Pakistan 11.33% and Philippines 9.72%, 23 a multinational, multicenter study in
India and Singapore 10.6%, 24 Singapore 8.9%, 25 and China 18.29%. 26 On the contrary, the study conducted in Oman 32.3%, 27 East Ethiopia 66.4%, 28 North Ethiopia University of Gondar 41.2%, 14 online survey in China 50.4%, 29 Malaysia 31%, 17 Turkey 77.6%, 30 and study in 31 countries 53% 31 was higher than this study’s finding. The reason for the difference might be due to study design, sample size, study populations, the increased risk of infection, stressful environment, travel restrictions and an expected economic recession, job insecurity, and being isolated from their families.

In this study, several factors were associated with depressions. The factors associated with depression were age, family size, alcohol use, medical illness, having training, and knowledge on COVID-19. According to this study, HCWs 25–29 years old have a high risk to develop depression symptoms. And also, the odd of 20–24 years old was more likely to develop anxiety symptoms by 5.39, compared with 35 and above age groups. This study was similar to a study done in India and Singapore. 32 The possible reasons might be, as the age of HCWs increases, they will adapt to a

### Table 1. Socio-demographic characteristics of healthcare workers in West Guji zone public health facilities, Southern Ethiopia, 2020.

| Serial number | Socio-demographic characteristics | Frequency | % |
|---------------|----------------------------------|-----------|---|
| 1             | Age of respondents                |           |   |
|               | 20–24                            | 22        | 8.0 |
|               | 25–29                            | 122       | 44.4|
|               | 30–34                            | 100       | 36.4|
|               | 35–39                            | 27        | 9.8 |
|               | ⩾40                              | 4         | 1.5 |
| 2             | Marital status                   |           |   |
|               | Married                          | 153       | 55.6|
|               | Single                           | 106       | 38.5|
|               | Divorced                         | 13        | 4.7 |
|               | Widowed                          | 3         | 1.1 |
| 3             | Ethnicity                        |           |   |
|               | Oromo                            | 191       | 69.5|
|               | Amhara                           | 55        | 20.0|
|               | Burji                            | 7         | 2.5 |
|               | Others                           | 22        | 8.0 |
| 4             | Qualification of healthcare workers |         |   |
|               | Diploma                          | 88        | 32.0|
|               | Degree                           | 167       | 60.7|
|               | Masters                          | 15        | 5.5 |
|               | specialist                       | 5         | 1.8 |
| 5             | Profession of healthcare workers |           |   |
|               | General practitioner             | 11        | 4.0 |
|               | Health officer                   | 39        | 14.2|
|               | Nurses                           | 98        | 35.6|
|               | Midwifery                        | 36        | 13.1|
|               | Laboratory                       | 38        | 13.8|
|               | Pharmacy                         | 39        | 14.2|
|               | Anesthesia                       | 7         | 2.5 |
|               | IESO (Integrated Emergency Surgical Officers) | 4 | 1.5 |
|               | Others                           | 3         | 1.1 |
| 6             | Religion                         |           |   |
|               | Orthodox                         | 73        | 26.5|
|               | Muslim                           | 45        | 16.4|
|               | Protestant                       | 127       | 46.2|
|               | Wakeffata                        | 25        | 9.1 |
|               | Others                           | 5         | 1.8 |
| 7             | Residence                        |           |   |
|               | Rural                            | 74        | 26.9|
|               | Urban                            | 201       | 73.1|
| 8             | Family size                      |           |   |
|               | 1                                | 76        | 27.6|
|               | 2–3                              | 98        | 35.6|
|               | 4–5                              | 66        | 24.0|
|               | ⩾6                               | 35        | 12.7|
| 9             | Monthly income                   |           |   |
|               | ⩽4000                            | 35        | 12.7|
|               | 4001–8000                        | 210       | 76.4|
|               | >8000                            | 30        | 10.9|
| Serial number | Variables                  | Depression | COR (95% CI) | p    | AOR (95% CI) | p     |
|---------------|---------------------------|------------|--------------|------|--------------|------|
|               |                           | Yes        | No           |      |              |      |
| 1             | Sex                       | Male       | 40           | 133  |              |      |
|               |                           | Female     | 19           | 83   | 0.76 (0.41–1.40) | 0.38 | 1.58 (0.82–3.02) | 0.17 |
| 2             | Age                       | 20–24      | 8            | 14   | 0.51 (0.15–1.71) | 0.28 | 0.36 (0.09–1.36) | 0.13 |
|               |                           | 25–29      | 23           | 99   | 3.41 (2.15–5.08) | 0.02 | 2.35 (1.12–3.95) | 0.04 |
|               |                           | 30–34      | 21           | 79   | 0.47 (0.17–1.26) | 0.13 | 0.35 (0.12–1.01) | 0.051|
|               |                           | ≥35        | 7            | 21   |              |      |                |      |
| 3             | Residence                 | Urban      | 14           | 60   | 1.24 (0.63–2.42) | 0.54 | 0.76 (0.37–1.55) | 0.45 |
|               |                           | Rural      | 45           | 156  |              |      |                |      |
| 4             | Marital status            | Married    | 120          | 33   | 0.61 (0.19–1.86) | 0.38 | 0.45 (0.14–1.51) | 0.19 |
|               |                           | Single     | 85           | 21   | 0.54 (0.17–1.73) | 0.30 | 0.34 (0.09–1.23) | 0.10 |
|               |                           | Divorced and widowed | 11   | 5    |              |      |                |      |
| 5             | Family size               | One person | 17           | 59   |              |      |                |      |
|               |                           | Two to three family members | 19   | 79   | 2.36 (2.16–4.84) | 0.02 | 0.83 (0.26–2.65) | 0.75 |
|               |                           | Four family members and above | 23   | 78   | 3.24 (1.09–5.63) | 0.00 | 3.56 (1.09–11.62) | 0.04 |
| 6             | Psychoactive drug use     | Yes        | 9            | 5    | 7.59 (2.44–23.65) | 0.00 | 1.75 (0.40–7.63) | 0.46 |
|               |                           | No         | 50           | 211  |              |      |                |      |
| 7             | Alcohol use               | Yes        | 31           | 43   | 4.45 (2.42–8.20) | 0.00 | 4.31 (1.76–10.55) | 0.001|
|               |                           | No         | 28           | 173  |              |      |                |      |
| 8             | Had medical illness       | Yes        | 27           | 32   | 9.28 (4.59–18.76) | 0.00 | 9.56 (3.71–24.59) | 0.00 |
|               |                           | No         | 18           | 198  |              |      |                |      |
| 9             | Previous history of       | Yes        | 11           | 27   | 1.60 (0.74–3.46) | 0.23 | 1.75 (0.73–4.17) | 0.21 |
|               | psychological distress?   | No         | 48           | 189  |              |      |                |      |
| 10            | Training on COVID-19      | Yes        | 17           | 146  | 0.19 (0.10–0.37) | 0.00 | 0.37 (0.17–0.81) | 0.01 |
|               |                           | No         | 42           | 70   |              |      |                |      |
| 11            | Previous outbreak          | Yes        | 12           | 66   | 0.58 (0.29–1.16) | 0.13 | 1.72 (0.768–3.84) | 0.19 |
|               | managements experience    | No         | 47           | 150  |              |      |                |      |
| 12            | Knowledge about COVID-19  | Good knowledge | 35   | 197  |              |      |                |      |
|               |                           | Poor knowledge | 24   | 19   | 7.54 (3.71–15.33) | 0.00 | 15.34 (6.32–37.21) | 0.00 |

COR: crude odds ratio; CI: confidence interval; AOR: adjusted odds ratio; COVID: coronavirus disease.
stressful working environment and develop more experiences and manage any uncomfortable situations.

According to this study’s finding, gender was no relationship with depression. But, the reports from other studies were inconsistent findings. A study report from 31 countries, females were at lower risk to develop depression than males,31 and China32 support the same finding. However, the reports from 30 countries, 34 Turkey,30 and an online Cross-Sectional Multicountry Study,35 females were more likely to develop depression symptoms than males. The inconsistent of the results might be attributed to the diversity of the assessment scale and the variations of incidence of positive cases. This study revealed that having four family members and above was 3.56 times more likely to develop depression symptoms due to COVID-19 compared with a person who lived lonely. The reasons may be person-to-person transmission occurs primarily via direct contact or through droplets spread by coughing or sneezing from an infected individual and fear of infection from many directions.36

Although work experience was not significant with depression in this study, it has a significant association with studies in 31 countries.31 Participants who had work experience of 3–5 years, and 6–10 years of age, were less likely to develop symptoms of depression, compared to a participant who had two and fewer years of work experience.28 The reason for the inconsistency may be due to the study design, sample size, and study configuration.

The study also indicates, HCWs who drunk alcohol were 4.31 times more likely to develop depression symptoms than counterparts. Drinking alcohol will worsen the level of depression and even alcohol decreases cognitive abilities. Alcohol addiction can cause a stigma that creates it troublesome for health professionals to seek treatment, for fear of losing their medical license. The medical disease was a statistically significant association with depression. This study is in line with the reports from India and Singapore,32 Turkey,30 Italy,37 Spain,38 Norway,39 and Huwan, China.40 According to Centers for Disease Control and Prevention (CDC) reports, adults of any age with medical illness may be at an increased risk for severe illness from the virus that causes COVID-19.41

According to this finding, the odd of having trained on COVID-19 would decrease the depression symptoms by 63% compared with none trained HCWs after controlling other factors. This is in line with a study done in the United Arab Emirates.42 Moreover, our findings suggest that the level of knowledge on the COVID-19 may have protective effects. The lack of knowledge about COVID-19 was 15.34 times more likely to develop depression than those who had good knowledge. This is consistent with previous studies finding in Cyprus, the United Arab Emirates, and a Web-based survey,42,43 that HCWs who had good knowledge reduced the level of depression. It seems the lack of knowledge could result in interruptions in the implementation of necessary precaution measures and personal protective equipment, which may increase the worry about COVID-19.

Generally, during this pandemic period, using different intervention methods is very important to reduce depression in HCWs. The most evidence-based treatment is cognitive behavior therapy (CBT), especially Internet-assisted CBT that can prevent the spread of infection during the pandemic and can provide online or smartphone-based psychoeducation on the virus outbreak, promote mental well-being, and initiate psychological intervention (e.g. CBT and mindfulness-based therapy (MBT)).44 Using Internet CBT is cost-effective45 and can treat psychiatric symptoms such as insomnia.46

This study was not without limitations. The demerits of this study were the cross-sectional study design was employed, which has limitations in establishing a causal relationship, so there is a need for longitudinal studies addressing these issues more appropriately. The responses provided were self-reported questionnaires to measure psychiatric symptoms and did not constitute a clinical diagnosis and may be subject to memory biases. The gold standard for establishing a psychiatric diagnosis included structured clinical interviews and functional neuroimaging.47,48 Despite these limitations, this study provided valuable information about the level of HCWs of depression due to COVID-19 and associated factors.

Conclusion

The prevalence of depressive symptoms among HCWs due to COVID-19 was high and significantly affect the HCWs. Independent variables associated with depression were age, family size, alcohol use, medical illness, having training on COVID-19, and lack of knowledge on COVID-19. Health planners and the West Guji zone health bureau must focus on the well-being of HCWs during the fighting for COVID-19. HCWs must avoid alcohol use for their health effects as well as to provide appropriate healthcare for their clients.

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Author contributions

Z.J.W., G.T.M., E.A.H., and W.G.W. have made substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; drafting the article or revising it critically for important intellectual content, and final approval of the version to be published.

Availability of data and materials

The data sets used and/or analyzed during this study are available from the corresponding author on reasonable request.

Consent to participate

Informed verbal consent was obtained from all respondents. All respondents were reassured about the confidentiality of their responses.
Their voluntary participation and the right to take part or terminate at any time they wanted were assured. The data collectors were trained by the principal investigators on how to keep the confidentiality and anonymity of the responses of the respondents in all aspects.

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
Ethical approval for this study was obtained from the Institutional Review Board of Bule Hora University (reference no. BHU/PRD/01/2020).

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Informed consent
An official letter was obtained from the research and publication directorate of Bule Hora University to the West Guji zone health departments. Explanation of the objective of the research was provided to the concerned personnel at each level. The zone health department wrote the letters to respective health facilities for cooperation and permission of conducting the study. Finally, data were collected after assuring the confidentiality nature of responses and obtaining written consent from the study participant. All the study participants were encouraged to participate in the study, and at the same time, they were also told that they have the right not to participate.

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Supplemental material
Supplemental material for this article is available online.

References
1. Bradley M. The Essential Guide to The Wuhan Virus (Symptoms, Transmission and Prevention). Corona Virus. 2020; 2.
2. Chen Y, Zhoua H and Zhoub Y. Prevalence of self-reported depression and anxiety among pediatric medical staff members during the COVID-19 outbreak in Guiyang, China. Psychiatry Res 2020; 288: 113005.
3. Tee M, Wang C, Tee C, et al. Impact of the COVID-19 pandemic on physical and mental health in lower and upper middle-income Asian countries: a comparison between the Philippines and China. Front Psychiatry 2020; 11: 568929.
4. Wang C, Chudzicka-Czupala A, Tee ML, et al. A chain mediation model on COVID-19 symptoms and mental health outcomes in Americans, Asians and Europeans. Sci Rep 2021; 11(1): 1–2.
5. Wang C, Pan R, Wan X, et al. Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. Int J Environ Res Publ Health 2020; 17(5): 1729.
6. Hao F, Tan W, Jiang L, et al. Do psychiatric patients experience more psychiatric symptoms during COVID-19 pandemic and lockdown? A case–control study with service and research implications for immunopsychiatry. Brain Behav Immun 2020; 87: 100–106.
7. Zhu Z, Xu S, Wang H, et al. COVID-19 in Wuhan: immediate psychological impact on 5062 health workers. medRxiv, https://www.medrxiv.org/content/10.1101/2020.02.20.20025338v2
8. WHO. Substantial investment needed to avert mental health crisis 14 May 2020 News release, https://www.who.int/news-room/detail/14-05-2020-substantial-investment-needed-to-avert-mental-health-crisis
9. Ahmad I and Rathore FA. Neurological manifestations and complications of COVID-19: a literature review. J Clin Neurosci 2020; 77: 8–12.
10. United Nations. Policy brief: COVID-19 and the need for action on mental health (13 May 2020), https://reliefweb.int/report/world/policy-brief-covid-19-and-need-action-mental-health-13-may-2020
11. Tran BX, Nguyen HT, Le HT, et al. Impact of COVID-19 on economic well-being and quality of life of the Vietnamese during the national social distancing. Front Psychol 2020; 11: 565153.
12. Le HT, Lai AJ, Sun J, et al. Anxiety and depression among people under the nationwide partial lockdown of Vietnam. Front Publ Health 2020; 8: 656.
13. IASC. Interim briefing note: addressing mental health and psychosocial aspects of COVID-19 outbreak version 1.5 February 2020, https://reliefweb.int/report/world/interim-briefing-note-addressing-mental-health-and-psychosocial-aspects-covid-19
14. Mekonen EG, Workneh BS, Ali MS, et al. The psychological impact of COVID-19 pandemic on graduating class students at the University of Gondar, northwest Ethiopia. Psychol Res Behav Manag 2021; 14: 109–122.
15. Aylie NS, Mekonen MA and Mekuria RM. The psychological impacts of COVID-19 pandemic among university students in Bench-Sheko Zone, South-west Ethiopia: a community-based cross-sectional study. Psychol Res Behav Manag 2020; 13: 813–821.
16. Depression anxiety increase three-fold in Ethiopia after COVID-19, https://ethiopiannmonitor.com/2020/05/14/depression-anxiety-increase-three-fold-in-ethiopia-after-covid-19/
17. Fauzi MF, Yusoff HM, Robat RM, et al. Doctors’ mental health in the midst of COVID-19 pandemic: the roles of work demands and recovery experiences. Int J Environ Res Publ Health 2020; 17(19): 7340.
18. Cuiyan W, Riyu P, Xiaoyang W, et al. A longitudinal study on the mental health of general population during the COVID-19 epidemic in China. Brain Behav Immun 2020; 87: 40–48.
19. Tee ML, Tee CA, Anlacan JP, et al. Psychological impact of COVID-19 pandemic in the Philippines. J Affect Dis 2020; 77: 379–391.
20. Wang C, Fardin MA, Shirazi M, et al. Mental health of the general population during the 2019 coronavirus disease (COVID-19) pandemic: a tale of two developing countries. Psychiatry Int 2021; 2(1): 71–84.

21. Wang C, Chudzicka-Czuapa A, Grabowski D, et al. The association between physical and mental health and face mask use during the COVID-19 pandemic: a comparison of two countries with different views and practices. Front Psychiatry 2020; 11: 569981.

22. Pappa S, Ntella V, Giannakas T, et al. Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID-19 pandemic: a systematic review and meta-analysis. Brain Behav Immun 2020; 88: 901–907.

23. Wang C, Tee M,Roy AE, et al. The impact of COVID-19 pandemic on physical and mental health of Asians: a study of seven middle-income countries in Asia. PLoS ONE 2021; 16(2): e0246824.

24. Chew NW, Lee GK, Tan BY, et al. A multinational, multicentre study on the psychological outcomes and associated physical symptoms amongst healthcare workers during COVID-19 outbreak. Brain Behav Immun 2020; 88: 559–565.

25. Tan BY, Chew NW, Lee GK, et al. Psychological impact of the COVID-19 pandemic on health care workers in Singapore. Ann Intern Med 2020; 173: 317–320.

26. Chen J, Liu X, Wang D, et al. Risk factors for depression and anxiety in healthcare workers deployed during the COVID-19 outbreak in China. Soc Psychiat Psych Epidemiol 2021; 56: 47–55.

27. Alshekaili M, Hassan W, Al Said N, et al. Factors associated with mental health outcomes across healthcare settings in Oman during COVID-19: frontline versus non-frontline healthcare workers. BMJ Open 2020; 10(10): e042030.

28. Yadeta TA, Bacea YD and Balis B. Health care workers depression and associated factors during COVID-19. Health Facility-based Study in Eastern Ethiopia, 2020, https://www.researchsquare.com/article/rs-135135/v1

29. Lai J, Ma S, Wang Y, et al. Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. JAMA Netw Open 2020; 3(3): e203976.

30. Şahin MK, Aker S, Şahin G, et al. Prevalence of depression, anxiety, distress and insomnia and related factors in healthcare workers during COVID-19 pandemic in Turkey. J Commun Health 2020; 45: 1168–1177.

31. Hay MN, Marzo RR, AlRifai A, et al. Immediate impact of COVID-19 on mental health and its associated factors among healthcare workers: A global perspective across 31 countries. J Glob Health 2020; 10(2): 020381.

32. Salari N, Khazaie H, Hosseiniyan-Far A, et al. The prevalence of stress, anxiety and depression within front-line healthcare workers caring for COVID-19 patients: a systematic review and meta-regression. Hum Res Health 2020; 18(1): 1–4.

33. Song X, Fu W, Liu X, et al. Mental health status of medical staff in emergency departments during the Coronavirus disease 2019 epidemic in China. Brain Behav Immun 2020; 88: 60–65.

34. Lim GY, Tam WW, Lu Y, et al. Prevalence of depression in the community from 30 countries between 1994 and 2014. Sci Rep 2018; 8(1): 1–0.

35. Al Omari O, Al Sabei S, Al Rawajfah O, et al. Prevalence and predictors of depression, anxiety, and stress among youth at the time of COVID-19: an online cross-sectional multicountry study. Depress Res Treat 2020; 2020: 8887727.

36. Centers for Disease Control and Prevention (CDC). How 2019-nCoV spreads: things to know about the COVID-19 pandemic. https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/how-covid-spreads.html CDC (Updated 7 January 2021).

37. Kang L, Ma S, Chen M, et al. Impact on mental health and perceptions of psychological care among medical and nursing staff in Wuhan during the 2019 novel coronavirus disease outbreak: a cross-sectional study. Brain Behav Immun 2020; 87: 11–17.

38. Romero-Rivas C and Rodriguez-Cuadrado S. Moral decision-making and mental health during the COVID-19 pandemic. PsyArXiv, 2020, https://osf.io/8whkg (accessed 9 June 2020).

39. Ebrahimi OV, Hoffart A and Johnson SU. The mental health impact of non-pharmacological interventions aimed at impeding viral transmission during the COVID-19 pandemic in a general adult population and the factors associated with adherence to these mitigation strategies. PsyArXiv, May 2020, https://osf.io/kjzsp (accessed 9 June 2020).

40. Zhang W, Wang K, Yin L, et al. Mental health and psychosocial problems of medical health workers during the COVID-19 epidemic in China. Psychother Psychosom 2020; 89(4): 242–250.

41. Centers for Disease Control and Prevention (CDC). People with certain medical conditions, https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/people-with-medical-conditions.html (accessed 29 December 2020).

42. Srikanth A and Shehab A. Knowledge and perception of COVID-19 among healthcare professionals in the United Arab Emirates: a cross-sectional online survey. New Emirates Med J 2020; 1: 22–25.

43. Roupa Z, Polychronis G, Latzourakis E, et al. Assessment of knowledge and perceptions of health workers regarding COVID-19: a cross-sectional study from Cyprus. J Commun Health 2020; 46: 251–258.

44. Ho CS, Chee CY and Ho RC. Mental health strategies to combat the psychological impact of COVID-19 beyond paranoia and panic. Ann Acad Med Singapore 2020; 87: 901–907.

45. Zhang MW and Ho RC. Moodle: the cost-effective solution for Internet cognitive behavioral therapy (I-CBT) interventions. Technol Health Care 2017; 25(1): 163–165.

46. Soh HL, Ho RC, Ho CS, et al. Efficacy of digital cognitive behavioral therapy for insomnia: a meta-analysis of randomized controlled trials. Sleep Med 2020; 75: 315–325.

47. Hussain SF, Yu R, Tang TB, et al. Validating a functional near-infrared spectroscopy diagnostic paradigm for major depressive disorder. Sci Rep 2020; 10(1): 9740.

48. Hussain SF, Tang TB, Yu R, et al. Cortical haemodynamic response measured by functional near infrared spectroscopy during a verbal fluency task in patients with major depression and borderline personality disorder. e-Biomed 2019; 51: 102586.