




BMJ Open Psychological distress and associated factors among healthcare professionals in Ethiopia during the COVID-19 pandemic: a cross-sectional study

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ABSTRACT

Objectives The objective of the study was to assess psychological distress (depression, anxiety and stress) and associated factors among healthcare professionals working at the University of Gondar Comprehensive Specialized Hospital, Ethiopia.

Design Institution-based cross-sectional study.

Setting This study was conducted at the University of Gondar Comprehensive Specialized Hospital.

Participants Study participants were healthcare professionals from University of Gondar Comprehensive Specialized Hospital. They were selected for the study using a stratified sampling technique.

Measurement Data were collected using a self-administered questionnaire. The 21-item Depression, Anxiety and Stress Scale was used to assess the depression, anxiety and stress levels. Descriptive and analytical statistics were used to present the findings. To determine the predictor variables for depression, anxiety and stress, a binary logistic regression model was fitted. Finally, variables with p value <0.05 in the final model were declared as significantly associated with psychological distress.

Result Almost half (49.5) of the participants have psychological distress. The prevalence of depression, anxiety and stress during the COVID-19 pandemic among healthcare workers was 167 (42.7%), 201 (51.4%) and 242 (61.9%), respectively. In multivariable analysis, respondents found in the ages between 35 and 44; unmarried marital status; educational status with specialty, subspecialty and PhD holders; anaesthesia professionals; and healthcare professionals with known medical illness were significantly associated with depression. Unmarried marital status, anaesthesia professional, laboratory technologist and living with family were significantly associated with anxiety. Unmarried marital status; educational status with specialty, subspecialty and PhD holders; and anaesthesia professional were also statistically significant with stress.

Conclusion and recommendation The prevalence of depression, anxiety and stress during the COVID-19 pandemic among the Gondar University healthcare professionals was high. This could contribute to implementation of mitigation measures in a standardised and sustainable manner and emphasis should be given

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ This study focused on depression, anxiety and stress among healthcare professionals during the early time of the COVID-19 pandemic, which is important to develop a timely informed psychosocial intervention.
- ⇒ The fact that this study is devoted to healthcare professionals who are at higher risk of contracting the virus, working as front-line fighters of the pandemic, has strong policy implications to devise preventative as well as treatment strategies in Ethiopian hospitals.
- ⇒ The quality of evidence in the present study may be compromised for the reason that findings are derived from a cross-sectional survey, which gives no opportunity to infer the cause–effect relationship of variables of the research interest.
- ⇒ This study was done in a single institution, which limits the inference for external validity of findings.
- ⇒ In order to maintain the validity of data, clinician interviewer rating scales should have been applied during data collection. However, due to constraints in time and resources, self-reported questionnaire and screening tools were only used in the current study.

to this aspect of health even for future similar and unanticipated events.

BACKGROUND

Psychological distress is a common mental health problem in the community,¹ and it is a state of emotional suffering typically characterised by symptoms of depression, anxiety and stress.² Though there are many contributing factors for people to develop psychological distress, disease outbreaks and pandemics particularly tend to have a strong relationship among front-line healthcare workers (HCWs).³ Since the detection and report of the COVID-19 in December 2019,⁴ no single



country and no segment of society have been spared from the pandemic. The COVID-19 is a respiratory syndrome, among a larger family of RNA⁵ viruses, that has infected humans, causing unprecedented numbers of deaths and substantial psychological distress among the general public globally.^{6,7}

Pandemic situations require intense and immediate response and healthcare provision by front-line HCWs delivering care directly to patients. Cognisant of this, the WHO issued a COVID-19 guideline on mental health and psychological distress in an effort to support HCWs' mental and psychological well-being during this outbreak.^{6,8} The urgent response by the organisation was based on previous and current evidence on the magnitude of psychological distress due to disease outbreaks and pandemics among HCWs and the impact it imposed on them.

Several studies conducted during the severe acute respiratory syndrome (SARS) outbreak indicated a significant number of HCWs affected by psychological distress.^{6,9} Systematic review results indicated the prevalence of anxiety, depression, acute and post-traumatic stress disorder and burnout was high both during and after the SARS outbreaks.¹⁰ The long-term psychological and occupational effects were also reported to be markedly significant.⁵ Evidence from systematic review on the impact of epidemics and pandemics to Middle East respiratory syndrome (MERS), Ebola and COVID-19 indicated that depressive symptoms were reported among 27.5%–50.7% and severe anxiety symptoms in 45% of the HCWs. General psychiatric symptoms during outbreaks have a range of 17.3%–75.3%; high levels of stress related to directly working with people affected with the pandemic were reported in 18.1%–80.1%.³

In Ethiopia, the shock wave of information regarding COVID-19 since the first case was confirmed in March 2020 has been more than ever. Since the 1918 Spanish influenza pandemic locally known as Yehedar Besheta, which took the lives of 50 000 people, Ethiopia has seen no other pandemic.¹¹ After a century, Ethiopians are hosting COVID-19, a pandemic which affected every country in the world in a very rapid way. However, the psychological and behavioural responses of the HCWs in Ethiopia are not known and empirical evidence on the distribution of psychological distress across the front-line workers due to COVID-19 remains sparse. However, there is abundant evidence from studies conducted on the magnitude of psychological distress among HCWs in different regions of the world. A cross-sectional study conducted among Australian nurses using the Depression, Anxiety and Stress Scale (DASS) screening tool revealed that 32.4% had depression, 41.2% had anxiety and 41.2% had stress, while in Hong Kong, the prevalence of mild to severe depression, anxiety and stress among qualified nurses was 35.8%, 37.3% and 41.1%, respectively.^{12,13} Results from two cross-sectional studies conducted in India during the pandemic showed that high level of stress, depression and anxiety symptoms requiring treatment was found

to be 3.7%, 11.4% and 17.7%, respectively; the psychological distress with General Health Questionnaire-12 showed 80.6%.^{14,15} A systematic review and meta-analysis conducted in worldwide, found the prevalence of depression and anxiety among HCWs during the COVID-19 pandemic to be 23.2% and 22.8%, respectively.¹⁶ A study from China showed that about half (50.4%) of the HCWs reported symptoms of depression, 44.6% symptoms of anxiety and 71.5% distress.¹⁷ The study done in Singapore and India among healthcare providers using DASS-21 revealed the prevalence of anxiety in 142 (15.7%), depression in 96 (10.6%) and stress in 47 (5.2%) study participants.¹⁸ Based on the evidence found, there was a high magnitude of psychological distress such as depression, anxiety and stress among HCWs across the globe. However, in Ethiopia, there are limited data about the magnitude and associated factors of depression, anxiety and stress among healthcare providers. Despite its high impact on morbidity, mortality and productivity, there is paucity of evidence regarding the mental health of health workers during the demanding time of COVID-19 crisis. Therefore, this study was aimed at addressing this gap by providing evidence on the prevalence of psychological distress and factors associated with it among HCWs. This would help policy makers, healthcare managers and stakeholders to use the result as baseline data for planning and institute interventional strategies.

General objective

The objective of the study was to assess psychological distress (depression, anxiety and stress) and associated factors among healthcare professionals working at the University of Gondar Comprehensive Specialized Hospital, Ethiopia.

Specific objectives

- ▶ To determine the prevalence of psychological distress (depression, anxiety and stress) among healthcare providers.
- ▶ To identify factors associated with psychological distress (depression, anxiety and stress) among healthcare providers.

METHODS

Study period, design and setting

This cross-sectional study was conducted from 25 April to 30 June 2020 at the University of Gondar Comprehensive Specialized Hospital, which is located in Amhara National Regional State, northwest Ethiopia. According to the Central Statistical Agency, the University of Gondar Comprehensive Specialized Hospital served an estimated population of 5 million. The institution has an estimated number of 2110 staff, of which 1115 are health professionals and the remaining 995 are administrative staff. Among the HCWs in terms of their specific profession, 462 are nurses, 310 are physicians, 128 are midwives, 85 are laboratory technologists and 79 are pharmacists.

Eligibility criteria

Inclusion criteria

All healthcare professionals who were working at the University of Gondar Comprehensive Specialized Hospital were included.

Sample size determination and sampling procedure

All healthcare professionals working at the University of Gondar Specialized Comprehensive Hospital were considered as the study population. The sample size for this study was determined using a single population proportion formula by considering the following assumptions: by taking the prevalence of anxiety of 44.6%¹⁹ which was conducted in Wuhan, China, 95% level of confidence and 5% margin of error.

The formula for calculating the sample size was

$$n = \frac{(Z_{\alpha/2})^2 \times P(1-P)}{d^2} = \frac{(1.96)^2 \times 0.45(1-0.45)}{(0.05)^2}$$

$$n = 381$$

By adding 10% non-response rate, a total of 420 HCWs were included in the study.

Variables

The dependent (outcome) variables of the present study are depression, anxiety and stress identified in the form of binary outcome 'Yes/No'. The independent variables include sociodemographic characteristics of participants (sex, age, marital status, educational status, profession and place of residence), and clinical (known medical illness, history of known psychiatric illness, family history of psychiatric illness), psychosocial (the available social

support) and experiences of substance use (current and lifetime substance use).

Participant selection and data collection procedure

The source population for this study was all healthcare professionals who were working at the University of Gondar Comprehensive Specialized Hospital. The study population was healthcare professionals who were working in the institution during the data collection time. Therefore, they included into the sample and from whom information was obtained. Stratified random sampling technique was used to select study subjects. Initially, subjects were categorised into their respective professions. Then, proportional allocation was made among professionals. Then, from the same profession, subjects were randomly selected using simple random sampling proportional to their departments. Prior to data collection, from participants, a written informed consent was obtained. Each participant was informed about the objective of the study, procedures of selection and assurance of confidentiality, and their names were not registered to minimise social desirability bias and enhance anonymity.

HCWs were not forced to participate and received no monetary incentive and it was solely voluntary (figure 1).

Quality assurance mechanisms

The questionnaire items were first prepared in English language then translated into Amharic and back translated into English to maintain their content validity. The English version of this tool was prepared by two independent professionals (ie, one mental health professional and second language expert), and then back translated

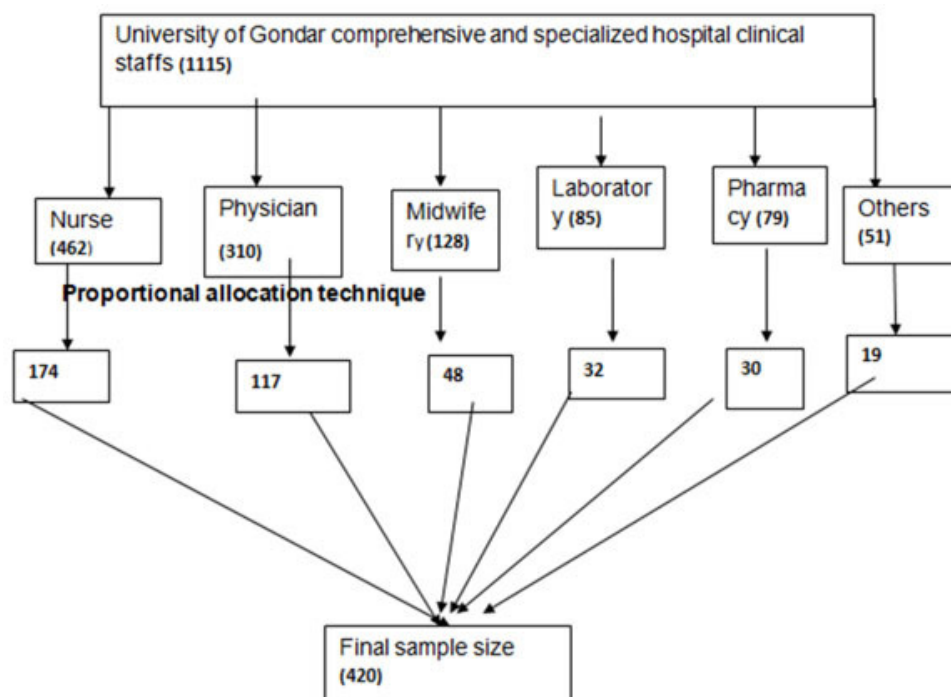


Figure 1 Schematic presentation of sampling procedure.

into Amharic by other two independent experts in order to maintain semantic validity.

Pretest was conducted on 5% of total sample size before 5 days of data collection from healthcare professionals in a health centre from Gondar town and necessary corrections were made. All data collectors and supervisors took part in the pretest to make appropriate amendments for the actual data collection.

Data management and analysis

After appropriate coding, data were entered into EpiData V.7 software and exported to SPSS V.20. Descriptive analyses (frequency, percentage, mean) were performed and presented using tables and figures. Binary logistic regression analysis was applied to determine the factors associated with anxiety, depression and stress. Variables with a p value <0.2 in the bivariable analysis were entered into the multivariable analysis. Both crude OR²⁰ and adjusted OR (AOR) with 95% CIs were estimated to show the strength of associations. Finally, a p value <0.05 in the multivariable logistic regression analysis was used to identify variables significantly associated with depression, anxiety and stress. In order to ensure assumption of logistic regression in the present study, the Hosmer and Lemeshow goodness-of-fit test was used.

Measurement tools

The data were collected using a structured and semistructured self-administered questionnaire. The questionnaire contained sociodemographic characteristics and clinical and behaviour-related characteristics.

Depression, anxiety and stress were assessed by the DASS-21. DASS-21 is a psychological screening instrument which is capable of differentiating symptoms of depression, anxiety and stress. It is a validated and reliable instrument with 21 items in three domains. Each domain comprises seven items assessing symptoms of depression, anxiety and stress. Participants were asked to indicate the presence of symptoms in each domain over the past week scoring from 0 (did not apply at all) to 3 (applied most of the time). Scores from each dimension were summed. Then, the final score was multiplied by 2 and then categorised according to the DASS manual as normal, mild, moderate, severe and extremely severe. Status of depression was defined as follows: participants with scores of ≤9 were normal, 10–13 were mild, 14–20 were moderate, 21–27 were severe and 28 and above were extremely severe. In the case of anxiety, participants with the score of ≤7 were considered normal, 8–9 were mild, 10–14 were moderate, 15–19 were severe and 20 and above were extremely severe. In the case of stress, participants with the score of ≤14 were considered normal, 15–18 were mild, 19–25 were moderate, 26–33 were severe and 34 and above were extremely severe.²¹ Therefore, participants who scored 10 and above were considered as having depression; participants who scored 8 and above were considered as having anxiety; and participants who scored 15 and above were categorised as having stress.

The internal consistency of DASS-21 was in the best range (Cronbach's $\alpha=0.81$, 0.89 and 0.78 for the subscales of depressive, anxiety²² and stress, respectively).

Oslo 3-item Social Support Scale (OSS-3) has been used in several studies to assess social support, thus studies confirming its feasibility and predictive validity. The sum of its scores ranging from 3 to 14. *Poor social support*: those who scored 3–8 in OSS-3. *Moderate social support*: those who scored 9–11 in OSS-3. *Strong social support*: those who scored 12–14.²³

Patient and public involvement

No patient and public were involved in this study.

RESULTS

Sociodemographic characteristics of the study participants

A total of 391 healthcare professionals were involved in the study with 93.1% response rate. Male respondents accounted for 242 (61.9%). The mean age of the respondents was 31.02 (SD±6.399) years. Majority of the respondents (298, 76.2%) were Orthodox Christian religion followers. About 299 (76.5%) of the study subjects have found first-degree level. Almost half of the participants (199, 50.9%) were married and 384 (98.2%) grew up in urban areas. Among the respondents, about 149 (38.1%) were nurses by profession (table 1).

Clinical, psychosocial and substance use characteristics of the respondents

Regarding clinical characteristics, among respondents, 28 (7.2%) had a history of known medical illness and 10 (2.6%) had a known asthma illness history. About 220 (56.3%) had poor social support (table 2).

Prevalence of depression, anxiety and stress during the COVID-19 pandemic among HCWs

The overall prevalence of psychological distress among healthcare professionals was 195 (49.5%). In this study, the prevalence of depression, anxiety and stress during the COVID-19 pandemic among healthcare professionals was 167 (42.7%), 201 (51.4%) and 242 (61.9%), respectively, using the DASS-21 tool (see figure 2).

Factors associated with depression during the COVID-19 pandemic among healthcare professionals

In the bivariable analysis, age, marital status, educational status, known medical illness history, profession, lifetime alcohol and khat use and current use of alcohol and khat were associated ($p<0.2$) with depression among healthcare professionals.

In the multivariable analysis, respondents found in the ages between 35 and 44; unmarried marital status; educational status with specialty, subspecialty and PhD holders; known medical illness history; and being anaesthesia professionals were significantly associated with depression.

The odds of developing depression among respondents found in the ages between 35 and 44 was 2.06 times

Table 1 Distribution of healthcare professionals by sociodemographic factors at Gondar University Comprehensive Specialized Hospital, 2020

Variables	Frequency (n=391)	%
Sex		
Male	242	61.9
Female	149	38.1
Ethnicity		
Amhara	340	87.0
Oromo	28	7.2
Southern Nations, Nationalities, and Peoples'	16	4.1
Tigre	7	1.8
Age (years)		
18–34	299	76.5
35–44	74	18.9
≥45	18	4.6
Religion		
Orthodox	298	76.2
Muslim	59	15.1
Protestant	29	7.4
Others	3	0.80
Educational status		
Diploma	20	5.1
Degree	299	76.5
Masters	55	14.1
Others*	17	4.3
Marital status		
Unmarried‡	192	49.1
Married/in union	199	50.9
Profession		
Nurse	149	38.1
Medicine	83	21.20
Pharmacy	36	9.2
Midwifery	50	12.80
Laboratory	26	6.6
Anaesthesia	12	3.1
Others†	35	9.00
Residence		
Urban	384	98.2
Rural	7	1.8
Living condition		
With family	263	67.3
Alone	128	32.7

Under Educational status, Others stands for specialist, subspecialist and PhD holders.

*Under educational status, Others stands for specialist, subspecialist and PhD holders.

†Under profession, Others stands for mental health, environmental and occupational safety and public health professionals.

‡Unmarried stands for single, divorced and widowed.

Table 2 Distribution of clinical, psychosocial and substance use characteristics of healthcare workers at Gondar University Comprehensive Specialized Hospital, 2020

Variables	Frequency (n=391)	%
Known medical illness history		
Yes	28	7.2
No	363	92.8
Known mental illness history		
Yes	6	1.5
No	385	98.5
Family history of mental illness		
Yes	1	0.3
No	390	99.7
Diagnosis of the illness		
Asthma	10	2.6
Diabetes mellitus	3	0.8
Cardiac	3	0.8
Hypertension	5	1.3
Others*	6	1.6
Social support		
Poor social support	220	56.3
Moderate social support	164	41.9
Strong social support	7	1.8
Lifetime use of alcohol		
Yes	147	37.6
No	244	62.4
Lifetime cigarette smoking		
Yes	18	4.6
No	373	95.4
Lifetime khat chewing		
Yes	20	5.1
No	371	94.9
Lifetime use of cannabis/marijuana		
Yes	14	3.6
No	377	96.4
Current use of alcohol		
Yes	114	29.2
No	277	70.8
Current use of cigarette		
Yes	17	4.4
No	374	95.6
Current use of khat		
Yes	19	4.9
No	372	95.1
Use of cannabis/marijuana		
Yes	11	2.8
No	380	97.2

*Others refers to: arthritis, obesity, oral health and irritable bowel syndrome

(AOR=2.06, 95% CI 1.12 to 3.79) higher than the respondents found in the ages between 18 and 34; the odds of developing depression among unmarried HCWs was 1.78 times (AOR=1.78, 95% CI 1.09 to 2.91) higher than those who were married; the odds of developing depression among HCWs who had educational status with specialty, subspecialty and PhD holders was 4.48 times (AOR=4.48, 95% CI 1.07 to 18.72) higher compared with master's holders; the probability of developing depression among anaesthetists was 8.67 times (AOR=8.67, 95% CI 1.83 to

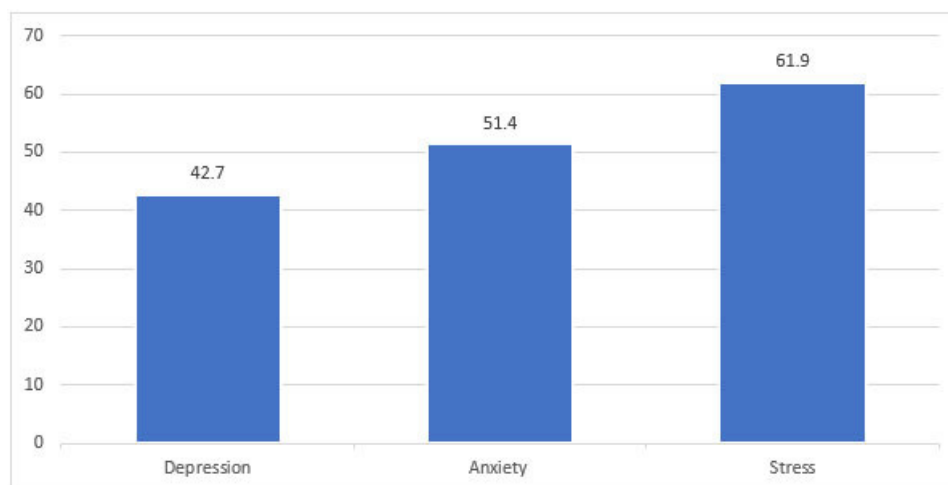


Figure 2 Prevalence of depression, anxiety and stress during the COVID-19 pandemic among healthcare professionals at the Gondar University Comprehensive Specialized Hospital, 2020.

41.03) higher than those who were pharmacists; and the odds of developing depression among those who had known medical history was 4.33 times higher compared with those who had no medical history (table 3).

Factors associated with anxiety during the COVID-19 pandemic among healthcare professionals

In the bivariable analysis, marital status, educational status, known medical illness history, profession, lifetime alcohol and khat use and current use of alcohol and khat were associated ($p < 0.2$) with anxiety among healthcare professionals.

In the multivariable analysis, unmarried marital status, being anaesthesia and laboratory technology professionals and living with family were significantly associated with anxiety.

The probability of developing anxiety among unmarried HCWs was 1.76 times (AOR=1.76, 95% CI 1.07 to 2.88) higher than the married ones. The odds of developing anxiety among laboratory technologists was 3.14 times (AOR=3.14, 95% CI 1.19 to 8.27) higher than the nursing professionals (AOR=3.14, 95% CI 1.19 to 8.27), whereas the probability of anaesthesia healthcare professionals developing anxiety was 7.65 times (AOR=7.65, 95% CI 1.55 to 37.81) higher than the nursing professionals, and the odds of developing anxiety among healthcare professionals who lived with their family was 1.87 times higher compared with those who lived alone (table 4).

Factors associated with stress during the COVID-19 pandemic among healthcare professionals

In the bivariable analysis, age, marital status, educational status, known medical illness history, profession, lifetime alcohol use and current use of alcohol were associated ($p < 0.2$) with stress among healthcare professionals.

In the multivariable analysis, unmarried marital status; educational status with specialty, subspecialty and PhD holders; and being anaesthesia professionals were significantly associated with stress.

The odds of stress among unmarried healthcare professionals was 1.79 times (AOR=1.79, 95% CI 1.11 to 2.90) higher than the married ones; the probability of stress among HCWs who had educational status with specialty, subspecialty and PhD holders was 5.78 times (AOR=5.78, 95% CI 1.07 to 31.25) higher compared with master's holders; and the odds of stress among anaesthesia professionals was 10.34 times (AOR=10.34, 95% CI 1.16 to 91.88) higher than those who were pharmacists (table 5).

DISCUSSION

Psychological distress is a common mental health problem among healthcare professionals who are working in the front line during disease outbreaks.² In this study, the prevalence of depression, anxiety and stress during the early stage of the COVID-19 pandemic among healthcare professionals was assessed. Among the HCWs, 42.7% (95% CI 37.3% to 47.8%) had depression, 51.4% (95% CI 46% to 57.1%) had anxiety and 61.9% (95% CI 57.5% to 66.8%) had stress.

The findings of the current study were in line with the systematic review of evidence on the impact of epidemics and pandemics during MERS, Ebola and COVID-19 among HCWs. It indicated that depressive symptoms were reported in 27.5%–50.7% and severe anxiety symptoms in 45% of the HCWs.³

However, the findings of the current study were higher than the study findings from Australia where 32.4% of the nurses reported depression, and 41.2% of the nurses reported both anxiety and stress. Similarly, the results of this study were higher than a study from Hong Kong conducted among nurses. In the later study, 35.8% of nurses reported depression, and 37.3% and 41.1% reported anxiety and stress, respectively.^{12 13} The difference might be due to sociocultural practice variation, and the other possible reason might be that there was high scarcity of personal protective equipment related to the

Table 3 Bivariable and multivariable analyses of factors associated with depression among healthcare professionals at Gondar University Comprehensive Specialized Hospital (n=391), 2020

Variables	Depression		OR (95% CI)	P value	AOR (95% CI)	P value
	Yes	No				
Age category						
18–34	123	176	1.00		1.00	
35–44	38	36	1.51 (0.82 to 2.31)		2.06 (1.12 to 3.79)	0.02
>44	6	12	0.75 (0.31 to 2.07)		0.91 (0.27 to 3.05)	
Marital status						
Married	70	129	1.00		1.00	
Unmarried*	97	95	1.88 (1.25 to 2.82)	0.02	1.78 (1.09 to 2.91)	0.02
Educational status						
Diploma	12	8	2.43 (0.85 to 6.92)		3.05 (0.84 to 11.23)	
Degree	121	178	1.10 (0.61 to 1.99)		1.43 (0.68 to 3.03)	
Master's	21	34	1.00		1.00	
Others†	13	4	5.26 (1.51 to 18.29)‡	0.009	4.48 (1.07 to 18.72)	0.04
Profession						
Nurse	55	94	1.52 (0.68 to 3.39)		1.42 (0.60 to 3.30)	
Medicine	44	39	2.93 (1.26 to 6.84)		1.98 (0.77 to 5.12)	
Pharmacy	10	26	1.00		1.00	
Midwifery	21	29	1.88 (0.75 to 4.73)		2 (0.76 to 5.31)	
Laboratory	15	11	3.55 (1.22 to 10.30)		3 (0.95 to 9.49)	
Anaesthesia	9	3	7.80 (1.75 to 34.83)	0.007	8.67 (1.83 to 41.03)	0.006
Others§	13	22	1.54 (0.57 to 4.18)		1.40 (0.46 to 4.28)	
Known medical illness history						
No	149	214	1.00		1.00	
Yes	18	10	2.59 (1.16 to 5.76)	0.02	4.33 (1.56 to 11.47)	0.005
Lifetime use of alcohol						
No	94	142	1.00		1.00	
Yes	69	78	1.34 (0.88 to 2.03)		0.64 (0.29 to 1.40)	
Lifetime khat chewing history						
No	149	214	1.00		1.00	
Yes	14	6	3.35 (1.26 to 8.92)		2.50 (0.43 to 14.64)	
Current use of alcohol						
No	102	164	1.00		1.00	
Yes	59	55	1.75 (1.11 to 2.69)		1.85 (0.82 to 4.20)	
Current use of khat						
No	147	213	1.00		1.00	
Yes	14	5	4.06 (1.43 to 11.51)		1.71 (0.32 to 9.19)	
Yes	79	35	1.59 (1.00 to 2.54)		1.60 (0.73 to 3.49)	

*Unmarried stands for single, divorced and widowed.

†Under Educational status, Others stands for specialist, subspecialist and PhD holders.

‡Significant association ($p < 0.05$).

§Under Profession, Others stands for mental health, environmental and occupational safety and public health professionals. AOR, adjusted OR.

county's economic level. Additionally, the study participants were nurses, but this study included all HCWs.

Another cross-sectional study conducted in India during the pandemic showed the prevalence of high levels of stress, depression and anxiety symptoms requiring treatment was found to be 3.7%, 11.4% and 17.7%, respectively,¹⁴ which was lower than the current study. The reason behind this result could be that they were only considered to have a high level of psychological distress

by excluding mild and moderate symptoms. The current study considered from mild to high level of psychological distress.

A systematic review and meta-analysis conducted implies that the pooled prevalence of depression and anxiety among HCWs during the COVID-19 pandemic was 23.2% and 22.8%, respectively¹⁶; it was lower than this study. The reason might be that it was a pooled prevalence and majority of the studies included in the systematic

**Table 4** Bivariable and multivariable analyses of factors associated with anxiety among healthcare professionals at Gondar University Comprehensive Specialized Hospital (n=391), 2020

Variables	Anxiety		OR (95% CI)	P value	AOR (95% CI)	P value	
	Yes	No					
Marital status							
Married	91	108	1.00		1.00		
Unmarried**	110	82	1.59 (1.07 to 2.37)	0.023	1.76 (1.07 to 2.88)†	0.026	
Educational status							
Diploma	12	8	1.53 (0.61 to 3.85)		1.75 (0.60 to 5.14)		
Degree	148	151	1.00		1.00		
Master's	28	27	1.06 (0.60 to 1.88)		0.79 (0.39 to 1.58)		
Others‡	13	4	3.32 (1.06 to 10.4)		3.04 (0.86 to 10.67)		
Profession							
Nurse	67	82	1.00		1.00		
Medicine	45	38	1.45 (0.85 to 2.49)		1.02 (0.54 to 1.92)		
Pharmacy	17	19	1.10 (0.53 to 2.27)		1.26 (0.59 to 2.72)		
Midwifery	24	26	1.13 (0.60 to 2.15)		1.26 (0.64 to 2.49)		
Laboratory	19	7	3.32 (1.32 to 8.38)	0.01	3.14 (1.19 to 8.27)†	0.015	
Anaesthesia	10	2	6.12 (1.30 to 28.89)	0.022	7.65 (1.55 to 37.81)†	0.03	
Others§	19	16	1.45 (0.69 to 3.04)		1.61 (0.68 to 3.81)		
Living condition	With family	143	120	1.44 (0.94 to 2.20)	0.09	1.87 (1.13 to 3.08)†	0.04
	Alone	58	70	1.00		1.00	
Known medical illness history	No	182	181	1.00		1.00	
	Yes	19	9	2.1 (0.93 to 4.76)		2.49 (0.96 to 6.47)	
Lifetime use of alcohol	No	113	123	1.00		1.00	
	Yes	83	64	1.41 (0.93 to 2.14)		0.99 (0.48 to 2.01)	
Lifetime khat chewing history	No	182	181	1.00		1.00	
	Yes	14	6	2.32 (0.87 to 6.17)		1.57 (0.26 to 9.52)	
Current use of alcohol	No	127	139	1.00		1.00	
	Yes	67	47	1.56 (1.00 to 2.43)		1.24 (0.57 to 2.71)	
Current use of khat	No	179	181	1.00		1.00	
	Yes	15	4	3.79 (1.24 to 11.65)		2.75 (0.47 to 16.14)	
	Yes	79	35	1.59 (1.00 to 2.54)		1.60 (0.73 to 3.49)	

*Unmarried stands for single, divorced and widowed.

†Significant association (p<0.05).

‡Under Educational status, Others stands for specialist, subspecialist and PhD holders.

§Under Profession, Others stands for mental health, environmental and occupational safety and public health professionals.

AOR, adjusted OR.

review were studies conducted from developed countries, plus, in here, there was scarcity of availability of personal protective materials. So, it may have a great impact on the prevalence. A study from China showed that about half (50.4%) of the HCWs reported symptoms of depression, 44.6% symptoms of anxiety and 71.5% distress¹⁷; this was in line with the current prevalence of anxiety and higher than the prevalence of depression and distress. The difference might be due to socioeconomic differences and the screening tool they used. The other possible reason could be that, here in Ethiopia, the pandemic posed a relatively low morbidity and mortality rate, compared with China.

The current study was higher than the study done in Singapore and India among healthcare providers; using DASS-21, the prevalence of anxiety was 15.7%, depression 10.6% and stress 5.2%.¹⁸ The possible explanation for this discrepancy may be sociodemographic characteristics and time of data collection difference.

Being unmarried was significantly associated with depression, anxiety and stress; this study was also in line with the study conducted in Egypt among physicians²⁴; one possible reason may be that they fear lack of support when they get the illness, and the other possible reason could be that there was misinformation on social media

Table 5 Bivariable and multivariable analyses of factors associated with stress among healthcare professionals at Gondar University Comprehensive Specialized Hospital (n=391), 2020

Variables	Stress		OR (95% CI)	P value	AOR (95% CI)	P value
	Yes	No				
Age category						
18–34	184	115	2.00 (0.77 to 5.22)		1.73 (0.57 to 5.22)	
35–44	50	24	2.60 (0.91 to 7.44)		3.24 (0.97 to 10.80)	
>44	8	10	1.00		1.00	
Marital status						
Married	108	91	1.00		1.00	
Unmarried**	134	58	1.95 (1.29 to 2.95)	0.002	1.79 (1.11 to 2.90)†	0.018
Educational status						
Diploma	15	5	2.69 (0.86 to 8.43)		2.82 (0.37 to 10.82)	
Degree	183	116	1.41 (0.79 to 2.52)		1.73 (0.84 to 3.55)	
Master's	29	26	1.00		1.00	
Others‡	15	2	6.72 (1.40 to 32.24)	0.017	5.78 (1.07 to 31.25)†	0.042
Profession						
Nurse	85	64	1.19 (0.57 to 2.47)		1.15 (0.53 to 2.51)	
Medicine	57	26	1.96 (0.88 to 4.37)		1.32 (0.55 to 3.21)	
Pharmacy	19	17	1.00		1.00	
Midwifery	30	20	1.34 (0.57 to 3.19)		1.20 (0.48 to 2.98)	
Laboratory	21	5	3.76 (1.16 to 12.16)		3.29 (0.96,11.28)	
Anaesthesia	11	1	9.84 (1.15 to 84.42)	0.037	10.34 (1.16 to 91.88)†	0.036
Others§	19	16	1.06 (0.42 to 2.70)		1.08 (0.38 to 3.03)	
Known medical illness history	No	221	142	1.00	1.00	
	Yes	21	7	1.93 (0.80 to 4.65)		2.77 (0.97 to 7.90)
Lifetime use of alcohol	No	140	96	1.00	1.00	
	Yes	97	50	1.33 (0.87 to 2.04)		0.87 (0.42 to 1.77)
Current use of alcohol	No	156	110	1.00	1.00	
	Yes	79	35	1.59 (1.00 to 2.54)		1.60 (0.73 to 3.49)

*Unmarried stands for single, divorced and widowed.

†Significant association ($p < 0.05$).

‡Under Educational status, Others stands for specialist, subspecialist and PhD holders.

§Under Profession, Others stands for mental health, environmental and occupational safety and public health professionals. AOR, adjusted OR.

like the illness could cause or predispose to infertility without any scientific evidence. HCWs who had educational status with specialty, subspecialty and PhD holders were significantly associated with depression and stress; the reason behind might be that they have relatively high duty based on their professional hierarchy. Being anaesthesia professionals was statistically associated with depression, anxiety and stress; the suggested reason may be the pandemic mostly affecting the airway system, and anaesthetists are the ones who are highly responsible for such kind of healthcare, particularly for patients who had severe form of the illness who needed airway support. In addition, most of the time, they spent their time giving care to critical intensive care unit patients and patients needing surgical care.

Strength and limitation of the study

This study focused on depression, anxiety and stress among healthcare professionals during the toughest time of the COVID-19 pandemic, which is important to develop a timely informed psychosocial intervention. The fact that this study is devoted to healthcare professionals who are at high risk for contracting the virus, working as a front-line fighter of the pandemic, has strong policy implications to devise preventative as well as treatment strategies in Ethiopian hospitals. The results of the current study could be used as a springboard to early prepare and take mitigation measures to the psychological well-being among healthcare providers when such public health emergencies occur in the future. The quality of the data may be compromised for the reason that findings



are derived from cross-sectional surveys, which gives no opportunity to infer the cause–effect relationships of variables of the research interest. This study is also done in a single institution, which limits the inference for external validity of the findings. In order to maintain the validity of data, professional interview rating scales should have been applied during data collection. However, due to constraints in time and resources, self-reported questionnaires and screening tools were only used in the current study.

CONCLUSION

The prevalence of depression, anxiety and stress during the early stage of the COVID-19 pandemic among healthcare professionals was high. Respondents found in the ages between 35 and 44; being unmarried; educational status with specialty, subspecialty and PhD holders; being anaesthesia professionals; and having known medical illness history were factors that are statistically significant with depression. Being unmarried, being anaesthesia and laboratory technology professionals and living with family were significantly associated with anxiety. Similarly, being unmarried; educational status with specialty, subspecialty and PhD holders; and being anaesthesia professionals were statistically significant with stress. This study will provide useful information about psychological distress in the hospital that could lead to more possible intervention. Therefore, it helps the policy makers in future planning, and also this study can be used as a baseline for further studies.

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Ethics approval Ethical clearance was obtained from the University of Gondar Department of Psychiatry Ethical Review Committee (reference number: psy/1221/2020). During the data collection process, the data collectors clearly communicated to the study participants. Participants were informed that they have

the right to refuse to fill the questionnaire or to terminate the process in any stage. They were informed that all the data obtained from them would be kept confidential by using code instead of any personal identifier like their names or phone number and are meant only for the purpose of the study.

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