

The severity of mental health problems in healthcare professionals and its associated risk factors during COVID-19 pandemic

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Abstract: **Introduction:** This study assesses the severity of mental health problems in healthcare professionals (HCPs) and its associated risk factors during COVID-19 pandemic at a tertiary hospital in Harar, Eastern Ethiopia.

Methods: An institutional-based cross-sectional study was done from November 01 to 15, 2020. Data was collected by using a web-based self-administered questionnaire. Descriptive statistical analysis, cross tabs, and logistic regressions were utilized.

Results: Out of 238 HCPs, 54.6% of them had a mental health problem. The prevalence of depression, anxiety, and stress was 44.1%, 48.3%, and 29.0%, respectively. Cigarette smoking was the only factor associated with depression. Being female, a cigarette smoker, and previously diagnosed with COVID-19 were associated with anxiety, while cigarette smoking and previous COVID-19 suspect had a significant association with stress.

Conclusion: The burden of mental health problems among HCPs is high. The Federal Ministry of Health should incorporate psychosocial support for healthcare professionals during pandemics. This study highlights the need for developing policies to decrease mental health problems among HCPs during the COVID-19 pandemic.

Keywords: COVID-19; Ethiopia; Healthcare Professionals; Mental Health Problems; Tertiary Hospital

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1. Introduction

Coronavirus Disease 2019 (COVID-19) is a viral disease caused by a novel coronavirus (SARS-CoV-2). It was initially identified in China as a cluster of pneumonia (1,2). On March 11, 2020, World Health Organization (WHO) declared COVID-19 a pandemic disease (2,3). In Ethiopia, the outbreak of COVID-19 was officially recognized on 13 March 2020 (4).

During this COVID-19 pandemic, most people practice self-quarantine which might contribute to the development of psychological problems such as depression, stress, and anxiety (4–7). Healthcare professionals (HCPs) are at the front line in increasing the risk of developing infection (8). These HCPs became more susceptible to the emotional impact of the COVID-19 pandemic. The workload of HCPs with uneven working hours will also lead to the development of mental health problems. The psychological impact of the COVID-19 pandemic may vary from panic behavior to negative outcomes including suicidal behavior (2,3,9).

The mental health problem of COVID-19 must be recognized and managed, as the consequences are costly and they have the potential of impairing cognitive functioning and possibly work performance (8,10,11). HCPs who were quar-

antined and worked in severe acute respiratory syndrome (SARS) units or had family or friends infected with SARS, had a higher risk of psychological impact (12). Many studies revealed that HCPs having a comorbid illness, female gender, having a lifetime psychiatric disorder, living alone, and working in frontline positions were independently associated with worse psychiatric outcomes (12–14). Besides, the increment in the number of confirmed cases and deaths, work burden, and inadequate personal protective equipment (PPE) can contribute to the development of mental health problems of HCPs (11,15).

To address mental health problems, there is an urgent need for continual clinical examination and management (16). Alternative strategies to lessen the job burden in the healthcare setting must be devised by policymakers (17). Besides, the discovery of COVID-19 vaccines with the potential to curb the spread of the novel coronavirus, incidence, and deaths helped to reduce the work burden (18). Though, the mutating nature of the virus imposes difficulty on the development of the vaccine (19).

The global prevalence of anxiety, depression, and stress among HCPs was 40%, 37%, and 37% respectively (20). In China, 40.2% of HCPs had post-traumatic stress disorder (PTSD) symptoms (21); in Italy, 71.2% and 26.8% of HCPs de-

veloped anxiety and depression, respectively (22); in Singapore, 14.5%, 8.9%, 6.6% and 7.7% of HCPs screened positive for anxiety, depression, stress, and PTSD, respectively (14), and in Russia, 48.77% and 57.63% of HCPs got generalized anxiety disorder and depressive symptoms, respectively (23). In Ethiopia, there is limited information on mental health problems during the COVID-19 pandemic among HCPs. This study investigated the severity of mental health problems and risk factors during COVID-19 pandemic among HCPs working at a tertiary hospital in Harar, eastern Ethiopia.

2. Methods

2.1. Study area and period

This study was conducted in a tertiary hospital in Harar, i.e., Hiwot Fana comprehensive specialized hospital (HFCSH). Harar is the capital of the East Hararghe Zone and Harari region of Ethiopia. The city is located 526 kilometers from the national capital Addis Ababa. HFCSH is the only tertiary hospital in Harar, which is a referral and teaching hospital serving a population about six million. This teaching hospital has 700 HCPs and provides services to eastern part of Ethiopia. The study was conducted from November 01 to 15, 2020.

2.2. Study design and population

An institutional based cross-sectional study design was utilized. All HCPs who are permanently hired in HFCSH were included. However, HCPs who were diagnosed with a mental health problem (depression, anxiety, and stress) before COVID-19 and on follow-up during the study period were excluded.

2.3. Sample size determination and sampling techniques

The minimum number of samples required for this study was determined by using the single population proportion formula with the assumptions of 50% prevalence of mental health problems among HCPs, 95% confidence interval (CI), 5% margin of error, and 10% for non-response rate. Based on this assumption, the final sample size was 273. Systematic random sampling was used to select participants. The k value was determined by dividing the total number of HCPs by the sample size of the study. The first participant was selected by a lottery method from the list taken from the hospital Human resource, and then every other one was recruited into the study.

2.4. Data collection instruments and procedures

Data was collected by using a web-based self-administered questionnaire from all participants. The first part of the questionnaire was about the sociodemographic characteristics of the study participants. The second part was about the health information and behavioral factors of the study participants. The third part of the questionnaire used DASS-21 (depression, anxiety and stress scale-21 item) to determine the cur-

rent mental health status of respondents in response to the COVID-19 pandemic. It has 21 items scored (0–3) and three subscales (depression, anxiety and stress). Question items 21, 17, 16, 13, 10, 5 and 3 are items of the depression subscale. The total score of ≤ 9 is normal and >9 is considered as having depression (mild depression: 10–13, moderate depression: 14–20, severe depression: 21–27, and extremely severe depression: >28). Question items 20, 19, 15, 9, 7, 4 and 2 are items of the anxiety subscale. The total score of ≤ 7 is normal and >7 is considered as having anxiety (mild anxiety: 8–9, moderate anxiety: 10–14, severe anxiety: 15–19, and extremely severe anxiety >20). Question items 18, 14, 12, 11, 8, 6 and 1 are items of the stress subscale. The total score of ≤ 14 is normal and >14 is considered as having stress (mild stress: 15–18, moderate stress: 19–25, severe stress: 26–33, and extremely severe stress: >35) (24). After the preparation of the online data formats of the questionnaire by Google format, then it was sent to each respondent through Telegram, email address, and Messenger.

2.5. Data quality control

To ensure the quality of data, five percent of the total sample size was pretested in Jugal hospital before the actual data collection was done. The data collectors were trained before the process of data collection. Supervision and checking were made by the well-trained supervisor to ensure the completeness and the consistency of the data. All collected data was examined for completeness and consistency during data management, storage, and analysis to avoid duplication, and outliers. Double data entry was performed for data quality control.

2.6. Data processing and analysis

The collected data was entered into Epi-Data 3.1 and exported to SPSS 25.0 for analysis. Categorical variables are described as counts and percentages, and continuous variables as mean \pm standard deviations. Logistic regressions with a 95% confidence interval (CI) were employed for statistical significance. Univariable logistic regression was done to identify the crude odds ratio (COR); those variables, which were found to be significant were introduced into the final model for multivariable analysis to identify significant associated factors. Multicollinearity was tested using the variance inflation factor (VIF) test and the tolerance test. No multicollinearity problem was found. P -value <0.05 was used to declare association.

2.7. Ethical consideration

Ethical clearance for this study was obtained from the Institutional Health Research Ethics Review Committee (IHRERC), CHMS, Haramaya University, Ethiopia with an ethical approval number of IHRERC/236/2020. Online informed consent was obtained from each participant. Confidentiality of information was assured. The name of the participant was not included in the research tool to ensure the

privacy of the participant.

3. Results

A total of 238 HCPs working at HFCSH participated and completed the web-based self-administered questionnaire. In this study, the response rate was 87.2%.

3.1. Characteristics of study participants

Two-thirds of the respondents were male. The mean age of the participants was 28.6 ± 5.2 years. About 150 (63%) were single. The majority (78.6%) of respondents (187 persons) did not have a child and 137 (57.6%) were living alone. Forty-three (18.1%), 24 (10.1%) and 57 (23.9%) of respondents had the habit of chewing khat, smoking cigarettes and drinking alcohol, respectively. Nearly one-tenth of the study participants were previously diagnosed, and 71 (29.8%) were previously suspected with COVID-19. The majority (39.1%) of respondents (93 persons) were nurses and most (51.3%) of the participants (122 persons) worked at different wards. Only 10.5% of the study participants had previously diagnosed chronic medical illnesses. Of those, hypertension was the commonest (24%) (Table 1).

3.2. Prevalence of mental health problems

More than half (54.6%) of the respondents had mental health problems in response to COVID-19 pandemics. The prevalence of depression, anxiety, and stress was 44.1%, 48.3%, and 29.0%, respectively. Among the participants who experienced depression, anxiety, and stress, 41 (39.0%), 42 (36.5%), and 35 (50.7%) had moderate depression, moderate anxiety, and mild stress, respectively (Figure 1).

3.3. Factors associated with mental health problems

In univariable logistic regression, being male, single, having a child, cigarette smoking, and being previously diagnosed and suspected with COVID-19 were found to be associated with depression. However, in multivariable logistic regression, cigarette smoking was the only factor that was significantly associated with depression. The odds of developing depression among cigarette smoker HCPs were 4.44 as compared with those non-smokers HCPs (AOR=4.44, 95% CI:1.66,11.87) (Table 2).

The development of anxiety was associated with sex, cigarette smoking, previous diagnosis of COVID-19 and previous suspicion with COVID-19 in univariable analysis. While in multivariable analysis, sex, cigarette smoking, and previous diagnosis of COVID-19 were significantly associated with anxiety. The odds of having anxiety was higher among female HCPs compared with male HCPs (AOR=3.23, 95% CI:1.77,5.91). The odds of experiencing anxiety among cigarette smoker HCPs were 4.24 higher as compared with those non-smokers (AOR= 4.24, 95% CI: 1.53,11.76). The odds of developing anxiety were 5.16 times among HCPs who were previously diagnosed with COVID-19 as compared with

Table 1 Characteristics of study participants (N=238)

Variables	Frequency (%)
Age	
20-24	40 (16.8)
25-29	137 (57.6)
30-34	39 (16.4)
35-39	11 (4.6)
40-44	6 (2.5)
45-49	1 (0.4)
≥50	4 (1.7)
Sex	
Male	157 (66)
Female	81 (34)
Marital status	
Single	150 (63)
Married	88 (37)
Number of children	
No child	187 (78.6)
One child	28 (11.8)
Two and more	23 (9.7)
Living status	
Living alone	137 (57.6)
Living with parents	32 (13.4)
Living with spouse	36 (15.1)
Living with spouse and children	33 (13.9)
Family size	
One	135 (56.7)
Two	34 (14.3)
Three and more	69 (29.0)
Khat chewing	
Yes	43 (18.1)
No	195 (81.9)
Cigarette smoking	
Yes	24 (10.1)
No	214 (89.9)
Alcohol drinking	
Yes	57 (23.9)
No	181 (76.1)
Chronic medical illness	
Yes	25 (10.5)
No	213 (89.5)
Previously diagnosed with COVID-19	
Yes	24 (10.1)
No	214 (89.9)
Previously suspected with COVID-19	
Yes	71 (29.8)
No	167 (70.2)
Profession	
Consultant/senior physician	17 (7.1)
Resident	22 (9.2)
General physician	37 (15.5)
Medical intern	33 (13.9)
Nurse	93 (39.1)
Pharmacist	19 (8.0)
Medical laboratory technologist	17 (7.1)
Working department	
Ward	122 (51.3)
COVID-19 isolation and treatment center	40 (16.8)
Acute care (ER, ICU & OR)	34 (14.3)
Laboratory	11 (4.6)
Pharmacy	19 (8)
Outpatient department	12 (5)
Inpatient and outpatient pharmacy	19 (8.0)
Others	20 (8.4)

ICU: Intensive care unit; ER: Emergency room; OR: Operating room

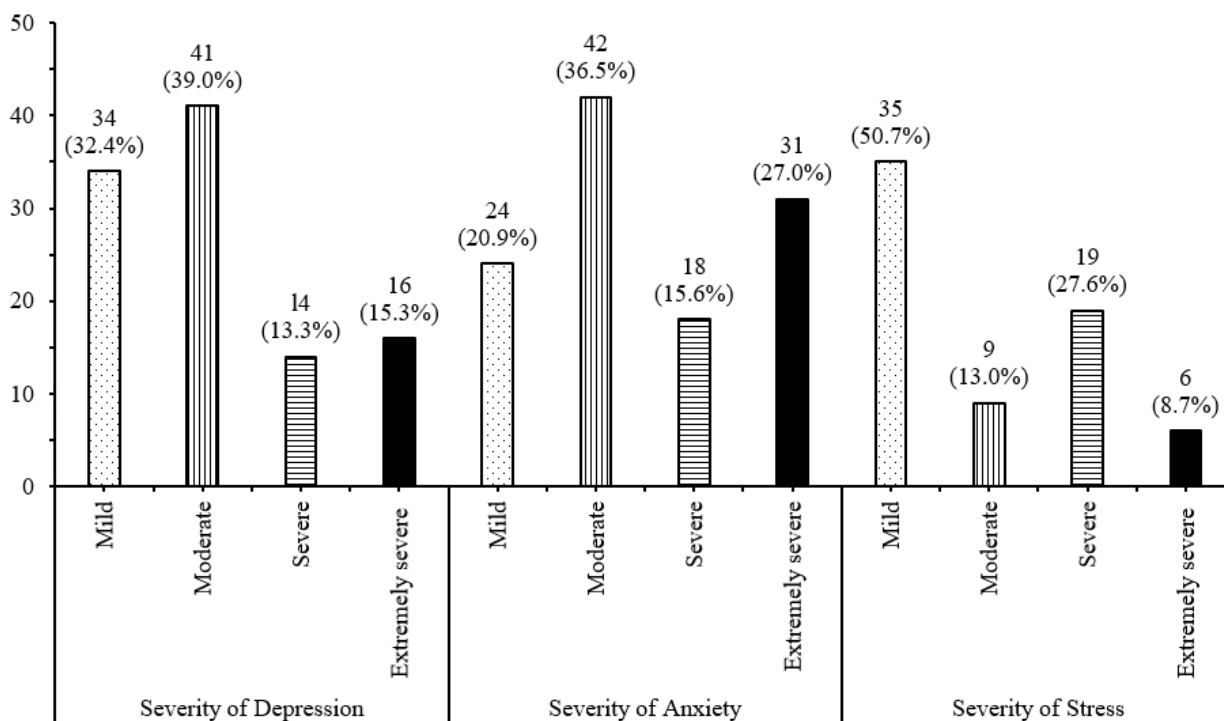


Figure 1 Severity of mental health problems among healthcare professionals participated in the study

those respondents who were not diagnosed (AOR=5.16, 95% CI:1.23,20.54) (Table 3).

Sex, cigarette smoking, previously diagnosed with COVID-19, previously suspected with COVID-19, and profession were associated with stress in univariable analysis. Whereas, only cigarette smoking and previously suspected with COVID-19 were significantly associated with stress in multivariable analysis. The odds of developing stress were higher among cigarette smoker HCPs compared with non-smoker HCPs (AOR=4.24, 95% CI:1.62,11.11). The odds of experiencing stress were higher among previously suspected COVID-19 HCPs compared with HCPs who were not (AOR= 2.55, 95% CI=1.12-5.83) (Table 4).

4. Discussion

This study was conducted to assess severity of mental health problems and associated factors during the COVID-19 pandemic among HCPs working at a tertiary hospital in Harar, Eastern Ethiopia. Findings from previous studies showed that the COVID-19 pandemic has several impacts on mental health, including stress, anxiety and depression (20,25,26). In this study, 130 (54.6%) of the respondents had mental health problems in response to COVID-19 pandemics.

This study observed a 44.1% prevalence of depression among HCPs, which is in line with other research finding in Ethiopia (45.7% to 46.3%) (27,28). Whereas, it was higher than the finding of research done in Ghana (21.1%) (8), China (13.6%) (21), and Singapore (8.9%) (14). But it was lower than the prevalence of depression in Poland (70.7%) (29), and Turkey (64.7%) (13). The possible reason for the discrepancy might

be due to low socio-economic status, lack of medication access, lower supply of personal protective equipment, and differences in the setting and time interval of the study during pandemic occurrence (10,30). The most prevalent depression sub-type in this study was moderate depression; (39%) whereas in a study conducted in Ghana, from depression sub-types, most (54.4%) had a mild form of depression (8). This study revealed that the prevalence of anxiety was 48.3%. It was comparable with the finding of studies done in Ethiopia (52%) (31), and Turkey (51.6%) (13). However, it was higher than the report of studies done in Singapore (10.8%) (14), China (13.9%) (21), and Ghana (27.8%) (8). Whereas, it was lower than the finding of studies done in Poland (64.4%) (29), and Italy (72.1%) (22). The possible reason for the discrepancy might be due to the same reasons mentioned above except for lack of medication access during pandemic occurrence (30), and use of different scoring methods like generalized anxiety disorder-7 (GAD-7) (32). The moderate anxiety sub-type was the most common in HCPs in this study (36.5%) which is also common in Ghana (8).

The prevalence of stress (29.0%) among HCPs in this study was similar to a cross-sectional study done on university students in Ethiopia (28.6%) (31). But it was higher than the finding of a study conducted among the general population during the COVID-19 pandemic in Ethiopia, in which 18% of respondents reported stress (7). This could be because health workers are more likely than the general population to contract COVID-19, as well as the stressful and demanding nature of the job. However, the prevalence of stress in this study was lower than the finding of studies done in Italy (34.3%)

Table 2 Factors associated with depression among healthcare professionals based-on univariable and multivariable logistic regression model

Variables	Depression		Univariable model		Multivariable model	
	Yes N (%)	No N (%)	COR (95% CI)	P	AOR (95% CI)	P
Sex						
Male	60 (58.3)	97 (71.9)	1.83 (1.06-3.15)	0.03	1.79 (0.98-3.24)	0.056
Female	43 (41.7)	38 (28.1)	1		1	
Marital status						
Married	47 (45.6)	41 (30.4)	1.92 (1.13-3.28)	0.02	0.51 (0.25-1.12)	0.095
Single	56 (54.4)	94 (69.6)	1	1		
Having child						
Yes	29 (28.2)	22 (16.3)	2.01 (1.07-3.77)	0.03	1.57 (0.66-3.75)	0.311
No	74 (71.8)	113 (83.7)	1		1	
Number of children						
One child	13 (12.6)	15 (11.1)	1			
Two and more	15 (14.6)	8 (5.9)	2.16 (0.7-6.73)	0.18		
Living status						
Living alone	56 (54.4)	81 (60.0)	1			
Living with parents	11 (10.7)	21 (15.6)	1.96 (0.91-4.24)	0.09		
Living with spouse	17 (16.5)	19 (14.1)	2.59 (0.95-7.07)	0.06		
Living with spouse and children	19 (18.4)	14 (10.4)	1.52 (0.59-3.93)	0.393		
Family size						
One	56 (54.4)	79 (58.5)	1			
Two	15 (14.6)	19 (14.1)	1.22 (0.68-2.19)	0.504		
Three and more	32 (31.1)	37 (27.4)	1.09 (0.48-2.50)	0.829		
Khat chewing						
Yes	20 (19.4)	23 (17.0)	1.17 (0.6-2.28)	0.64		
No	83 (80.6)	112 (83.0)	1			
Cigarette smoking						
Yes	17 (16.5)	7 (5.2)	3.62 (1.44-9.09)	<0.001	4.44 (1.66-11.87) *	0.003
No	86 (83.3)	128 (94.8)	1		1	
Alcohol drinking						
Yes	25 (24.3)	32 (23.7)	1.03 (0.57-1.88)	0.92		
No	78 (75.7)	103 (76.3)	1			
Medical illness						
Yes	16 (15.5)	10 (7.4)	2.3 (1.0-5.3)	0.05		
No	87 (84.5)	125 (92.6)	1			
Previously diagnosed with COVID-19						
Yes	18 (17.5)	6 (4.4)	4.55 (1.74-11.93)	0.004	2.64 (0.85-8.16)	0.092
No	85 (82.5)	129 (95.6)	1		1	
Previously suspected with COVID-19						
Yes	43 (41.7)	28 (20.7)	2.74 (1.55-4.85)	<0.001	1.98 (0.99-3.95)	
No	60 (58.3)	107 (79.3)	1		1	
Profession						
Physician	30 (29.1)	47 (34.8)	1.097 (0.38-3.19)	0.87		
Medical intern	19 (18.4)	14 (10.4)	0.52 (0.16-1.69)	0.27		
Nurse	41 (39.8)	51 (37.8)	0.87 (0.31-2.49)	0.80		
Pharmacist	6 (5.8)	13 (9.6)	1.52 (0.39-5.95)	0.55		
Medical laboratory technologist	7(6.8)	10 (7.4)	1			
Working department						
Wards	51 (49.5)	71 (52.6)	1			
COVID-19 isolation & treatment center	23 (22.3)	17 (12.6)	0.53 (0.26-1.09)	0.086		
Acute care (ICU, ER, OR)	15 (14.6)	19 (14.1)	0.91 (0.42-3.00)	0.81		
Outpatient department	14 (13.6)	28 (20.7)	1.44 (0.69-3.00)	0.334		

COR=Crude odds ratio; AOR=Adjusted odds ratio; CI=Confidence interval; ICU: Intensive care unit; ER: Emergency room; OR: Operating room

*Statistically significant

(22) and Turkey (41.2%) (13). This could be because these countries had a greater impact on the COVID-19 in health facilities that were already overburdened with COVID-19 patients requiring ward stay and intensive care unit admission.

This increased the risk of infection and created a stressful situation for the HCPs (33). In this study, from the stress subtype, most (50.7%) HCPs had a mild form of stress. Similarly, a study in Ghana showed that most had mild forms of stress

Table 3 Factors associated with anxiety among healthcare professionals based-on univariable and multivariable logistic regression model

Variables	Anxiety		Univariable model		Multivariable model	
	Yes	No	COR (95% CI)	P	AOR (95% CI)	P
	N (%)					
Sex						
Male	59 (52.2)	98 (78.4)	1		1	
Female	54 (47.8)	27 (21.6)	3.32 (1.89-5.84)	<0.001	3.23 (1.77-5.91) *	<0.001*
Marital status						
Married	64 (56.6)	86 (68.8)	0.59 (0.35-1.01)	0.05		
Single	49 (43.4)	39 (31.2)	1			
Having child						
Yes	30 (26.5)	21 (16.8)	1.79 (0.96-3.35)	0.07		
No	83 (73.5)	104 (83.2)	1			
Number of children						
One child	16 (55.2)	12 (54.5)	1			
Two and more	13 (44.3)	10 (45.5)	0.98 (0.32-2.97)	0.96		
Living status						
Living alone	65 (57.5)	72 (57.6)	1			
Living with parents	12 (10.6)	20 (16)	1.70 (0.78-3.70)	0.18		
Living with spouse	16 (14.2)	20 (16)	2.56 (0.94-6.97)	0.06		
Living with spouse and children	20 (17.7)	13 (10.4)	1.92 (0.74-5.02)	0.18		
Family size						
One	65 (57.5)	70 (56.0)	1			
Two	14 (12.4)	20 (16.0)	1.33 (0.62-2.84)	0.467		
Three and more	34 (30.1)	35 (28.0)	0.96 (0.53-1.71)	0.88		
Khat chewing						
Yes	23 (20.4)	20 (16.0)	1.34 (0.69-2.60)	0.38		
No	90 (79.6)	105 (84.0)	1			
Cigarette smoking						
Yes	18 (15.9)	6 (25.0)	3.76 (1.44-9.84)	0.004	4.24 (1.53-11.76) *	0.006*
No	95 (84.1)	119 (95.2)	1		1	
Alcohol drinking						
Yes	30 (26.3)	27 (21.6)	1.31 (0.72-2.38)	0.34		
No	83 (73.5)	98 (78.4)	1			
Medical illness						
Yes	15 (13.3)	11 (8.8)	1.59 (0.7-3.61)	0.23		
No	98 (86.7)	114 (91.2)	1			
Previously diagnosed with COVID-19 d						
Yes	21 (18.6)	3 (2.4)	9.28 (2.69-32.06)	<0.001	5.16 (1.23-20.54) *	0.002*
No	92 (81.4)	122 (97.6)	1		1	
Previously suspected with COVID-19						
Yes	47 (41.6)	24 (19.2)	3.0 (1.68-5.36)	0.007	1.57 (0.78-3.15)	0.206
No	66 (58.4)	101 (80.8)	1		1	
Profession						
Physician	33 (29.2)	44 (35.2)	0.93 (0.32-2.71)	0.90		
Medical intern	23 (20.4)	10 (8.0)	0.30 (0.09-1.03)	0.06		
Nurse	42 (37.2)	50 (40.0)	0.83 (0.29-2.38)	0.73		
Pharmacist	8 (7.1)	11 (8.8)	0.96 (0.26-3.63)	0.96		
Medical laboratory technologist	7 (6.2)	10 (8.0)	1			
Working department						
Wards	58 (51.3)	64 (51.2)	1			
COVID-19 isolation & treatment center	23 (20.4)	17 (1.6)	0.67 (0.33-1.38)	0.28		
Acute care (ICU, ER, OR)	19 (16.8)	15 (12.0)	0.72 (0.33- 1.54)	0.39		
Outpatient Department	13 (11.5)	29 (23.2)	2.02 (0.96-4.26)	0.064		

COR=Crude odds ratio; AOR=Adjusted odds ratio; CI=Confidence interval; ICU: Intensive care unit; ER: Emergency room; OR: Operating room
*Statistically significant

(8).

This study showed, depression was significantly associated with cigarette smoking, even though cigarette smokers were only 10.1% of the study participants. This finding was in line with a study done in Philippine(34), and Australia (35). This

might be explained by this reason that smokers are at higher risk of developing respiratory diseases like chronic bronchitis, lung cancer and chronic lung diseases. This lung condition might be worsened by SARS-CoV-2. Depression will be developed because of reduced serum dopamine hormone,

Table 4 Factors associated with stress among healthcare professionals based-on univariable and multivariable logistic regression model

Variables	Stress		Univariable model		Multivariable model	
	Yes N (%)	No	COR (95% CI)	P	AOR (95% CI)	P
Sex						
Male	38 (55.9)	119 (70.0)	1		1	
Female	30 (40.1)	51 (30.0)	1.84 (1.03-3.29)	0.04	1.69 (0.83-3.48)	0.151
Marital status						
Married	39 (57.3)	111 (65.3)	0.72 (0.4-1.27)	0.25		
Single	29 (42.6)	59 (34.7)	1			
Having child						
Yes	15 (22.1)	36 (21.2)	1.05 (0.53-2.08)	0.88		
No	53 (77.9)	134 (78.8)	1			
Number of children						
One child	7 (46.7)	21 (58.3)	1			
Two and more	8 (53.3)	15 (41.7)	1.6 (0.48-5.37)	0.45		
Living status						
Living alone	42 (61.8)	95 (55.9)	1			
Living with parents	6 (8.8)	26 (15.3)	0.98 (0.43-2.25)	0.97		
Living with spouse	10 (14.7)	26 (15.3)	1.88 (0.59-5.99)	0.28		
Living with spouse and children	10 (14.7)	23 (13.5)	1.13 (0.40-3.20)	0.82		
Family size						
One	42 (61.8)	93 (54.7)	1			
Two	9 (13.2)	25 (14.7)	1.25 (0.54-2.92)	0.60		
Three and more	17 (25.0)	52 (30.6)	1.38 (0.72-2.67)	0.93		
Khat chewing						
Yes	15 (22.1)	28 (16.5)	1.44 (0.71-2.9)	0.31		
No	53 (77.9)	142 (83.5)	1			
Cigarette smoking						
Yes	14 (20.6)	10 (5.9)	4.15 (1.74-9.88)	0.001	4.24 (1.62-11.11)*	0.003*
No	54 (79.4)	160 (94.1)	1		1	
Alcohol drinking						
Yes	16 (23.5)	41 (24.1)	0.97 (0.5-1.88)	0.92		
No	52 (76.5)	129 (75.9)	1			
Medical illness						
Yes	8 (11.8)	18 (10.6)	1.13 (0.46-2.73)	0.79		
No	60 (88.2)	152 (89.4)	1			
Previously diagnosed with COVID-19 d						
Yes	17 (51.0)	7 (4.1)	7.76 (3.05-19.77)	<0.001	2.87 (0.94-8.72)	0.063
No	51 (75.0)	163 (95.9)	1		1	
Previously suspected with COVID-19						
Yes	35 (51.5)	36 (21.2)	3.95 (2.16-7.2)	<0.001	2.55 (1.12-5.83) *	0.026*
No	33 (48.5)	134 (78.8)	1		1	
Profession						
Physician	24 (33.4)	53 (31.9)	0.29 (0.06-1.39)	0.12	3.07 (0.60-15.68)	0.78
Medical intern	17 (23.6)	16 (9.6)	0.13 (0.03-0.64)	0.012	2.69 (0.47-15.27)	0.264
Nurse	21 (29.2)	71 (42.8)	0.45 (0.09-2.13)	0.315	1.91 (0.39-9.41)	0.425
Pharmacist	5 (6.9)	14 (8.4)	0.5 (0.08-3.16)	0.544	2.29 (0.32-16.41)	0.41
Medical laboratory technologist	5 (6.9)	12 (7.2)	1		1	
Working department						
Wards	35 (5.15)	87 (51.2)	1			
COVID-19 isolation & treatment center	15 (22.1)	25 (14.7)	0.67 (0.32-1.42)	0.30		
Acute care (ICU, ER, OR)	12 (17.6)	22 (12.9)	0.74 (0.33-1.65)	0.46		
Outpatient department	6 (8.8)	36 (21.2)	2.41 (0.93-6.24)	0.07		

COR=Crude odds ratio; AOR=Adjusted odds ratio; CI=Confidence interval; ICU: Intensive care unit; ER: Emergency room; OR: Operating room
*Statistically significant

(which enhances happiness), by cigarette smoking (36). In the current study, female HCPs were having more anxiety than male HCPs. This was similar to the study done in Turkey (13), Ethiopia (37,38), and the UK (39). This gender difference could be caused by variations of serum level of estrogen

and progesterone during pregnancy, delivery, postpartum or menstrual cycle in females, which lead to an increment of anxiety occurrence in females than males (40). This study also showed odds of anxiety was higher in cigarette smokers than non-smokers. The studies done in Philippine(34) and

Australia (35) also showed the same results which might be explained by higher risk of developing respiratory diseases in smokers that might be worsened by SARS-CoV-2. In addition, reduced serum dopamine as a result of cigarette smoking should be considered (36). Previously diagnosed with COVID-19 was a risk factor for developing anxiety. This result is also similar to a study done in Saudi Arabia (41). The previous history of diagnosis of COVID-19 will lead to the HCPs anxiety, fear and bad experiences.

In this study cigarette smoking and previously suspected with COVID-19 were associated with the stress symptoms. This finding was in line with a study done in Ethiopia (34) and Australia (35).

This research has practical implications for developing an effective strategy for incorporating psychological support for health care professionals during pandemics that manage the toll on mental health in the face of a global health crisis.

5. Limitations

The possible limitation of the study was related to the study design. Since this is a cross-sectional study, we cannot predict a temporality of causality with outcomes. In addition, as an online survey, there may be some information bias.

6. Conclusion

The burden of mental health problems among HCPs is high. Cigarette smoking was the only factor that was associated with depression. Being female, cigarette smoker, and previously diagnosed with COVID-19 were associated with anxiety, and cigarette smoking and previous suspicion in COVID-19 had an association with stress. This study highlights the need for developing strategies to reduce mental health problems among HCPs in the study settings during the COVID-19 pandemics.

7. Declarations

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7.2. Authors' contribution

MG and ND contributed on conception and design of the work, acquisition, analysis and interpretation of the data, data curation, drafting the article, critically reviewing it for intellectual content, validation, and final approval of the version to be published. HT contributed on data curation, drafting the article, critically reviewing it for intellectual content, validation, and final approval of the version to be published.

7.3. Conflict of interest

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

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