

COVID-19 pandemic and self-reported symptoms of depression, anxiety, and stress among health care workers in Ethiopia

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Abstract

Background

The Coronavirus Diseases 2019 (COVID-19) pandemic has become a major problem in many of the world nations including Ethiopia. Moreover, it is a public health emergency of the community concern and poses a mental health problem to health care workers (HCWs). Therefore, this study aimed to assess the level of self-reporting symptoms of depression, anxiety, and stress during the COVID-19 pandemic among healthcare workers in Ethiopia.

Methods

An institutional-based cross-sectional study was conducted using an online survey from June 25, 2020, to July 25, 2020, in Ethiopia. The data were collected using a self-reported Depression, Anxiety, and Stress Scale (DASS-21). Data were cleaned, coded, and entered using Epi info version 7.5.1 and exported for analyzed to the Social Science package software Version 23 Statistical Package. Moreover, multiple logistic regression analysis was used to identify the associated factors at p-value less than 0.05.

Results

A total of 816 HCWs responded to self-reporting questions. From HCWs who screened positive for depression, anxiety, and stress; 60.3%, 78%, and 33.8% of them had scored moderate to extremely severe symptoms of depression, anxiety, and stress respectively. Females, HCWs who working in Oromiya Specialized Zone, medical laboratory professionals, and HCWs who have working in the COVID-19 treatment isolation department were significantly associated with depression, anxiety, and stress.

Conclusion

In this study, health care workers had reported a high prevalence of depression, anxiety, and stress symptoms. Female gender, Oromiya especial zone, medical laboratory professionals, and HCWs who have working in the COVID-19 treatment isolation centers were significantly associated with depression, anxiety, and stress. Psychological intervention for health care workers in central Ethiopia needs special attention.

Background

The COVID-19 pandemic is a world public health emergency and rapidly spread over the world, starting from Wuhan city on 31 Dec 2019 to many other countries (1). By July 30/2020 WHO reported that more than 10.2 million infection with 500,000 confirmed deaths worldwide, 97,508 infected cases and 3,020 deaths in the African, and 389 cases and 5 deaths in Ethiopia which is very worrying (2). The pandemic causing several mental health problems, economic impact, and social isolation that many health care workers encountered the situations (3). Along with this crisis, the ongoing COVID-19 pandemic is inducing fear, stress, anxiety and depression among health care workers(4).

Depression, anxiety, and stress can cause a wide range of impacts on health care workers during outbreaks of infection. Health care workers are likely to experience depression, anxiety, stress, fear of falling sick or dying themselves, feelings of helplessness, self-harmed or suicide, and stigma as a result of worrying about COVID-19 pandemic (5, 6).

A study conducted in Chinese and published by the Lancet showed that 73.4% of health workers on the frontline in the hospital suffered from extreme levels of stress, 50.7% had depressive orders, 44.7% had anxiety, and 36.1% insomnia (7). Again study done in China among healthcare workers treating patients exposed to COVID-19 show that 50.4% had symptoms of depression, 44.6% had anxiety, 34.0% had insomnia, and 71.5% had distress (8).

A study done in Singapore and India among HCW indicated that 5.3% screened positive for moderate to very-severe depression, 8.7% for moderate to extremely severe anxiety, 2.2% for moderate to extremely-severe stress (9). An existing literature review of the study done in India revealed that the symptoms of anxiety and depression ranged from 16 to 28% and 8% of self-reported stress are common psychological reactions to the COVID-19 pandemic and may be associated with sleep disturbed (10).

The severity of pandemic, devastating workload, low personal protection equipment, lack of specific drugs or vaccine, and feelings of being inadequately supported may contribute to the mental burden of healthcare workers. These effects of mental health problem influence health care workers on the clinical situation and exacerbate more exposure to the pandemic which could have long-term psychological implications (11).

As strategies to minimize the risk of transmission in the community, many countries locked down and implemented travel restrictions, compulsory quarantine, stay-at-home, and social/physical distancing measures. Again, the Ethiopian government has already declared an

emergency with compulsory physical distancing, quarantine, frequent hand washing, and reduced the capacity of public transportation by half as a policy to reduce transmission of the pandemic. Despite many efforts to reduce the COVID-19 pandemic, mental health problem, and psychological impact among healthcare providers has remained high. Health care workers on the front line who is directly involved in the diagnosis, treatment, and care of patients with COVID-19 are at risk of developing mental health symptoms. Therefore, this study aimed to assess the prevalence of self-reported symptoms of depression, anxiety, and stress among health care workers in Ethiopia.

METHODS

Study design, area, period and study population:

An institution-based cross-sectional study design was conducted in central Ethiopia (Addis Ababa, and Oromiya region (North Shoa, East Shoa, and West Shoa) from June 25/2020 to July 25/2020. All health care providers who are working in health care facilities in Ethiopia were included and health care workers who were on annual leave and critically ill were excluded from the study.

Sample size and sampling technique

The sample size was determined using Epi-info version 7.5.1 considering the power of 80%, with a 95% CI, 5% margin of error, assuming a 50% prevalence due to lack of previous study and 10% none response rate was assumed. After using design effect 2, the total sample size was 846. Samples were regionally stratified by their geographic location (Addis Ababa city, and Oromiya region). Addis Ababa was most severely affected; more health care facilities in Addis Ababa were randomly sampled. A total of 12 health care facilities from Addis Ababa (8 COVID-19 isolation treatment centers, and 4 governmental hospitals), and 12 health care facilities from Oromia regional state (2 hospitals and 1 COVID-19 treatment isolation center from each of North Shoa, West Shoa, and East Shoa Zone of Oromiya region and 3 COVID-19 isolation treatment center from Oromiya especial zone of Oromiya region). Two department clusters were taken from each hospital (20 clusters), and 14 clusters of COVID-19 treatment centers. A total of 24 health facilities (10 hospitals and 14 COVID-19 treatment centers) were involved. All health care workers working in clustered departments were invited online surveys through e-mail and telegram groups voluntarily which coordinated by data managers.

Data collection tools and procedure

The questionnaires were completed in Afan Oromo and Amharic through an online survey platform. The questionnaire was prepared in English language and translated to Afan Oromo and Amharic language and back-translated to the English language by language experts to check its consistency. The demographic data were self-reported by healthcare workers, including age, sex, marital status, educational status, profession, working unit, and year of experience. Participants were asked whether they were taking online training about the COVID-19 provided by the Ethiopian Ministry of Health website. The participants also asked about the availability of personal protective equipments. The outcome of depression, anxiety, and stress for all participants were measured using Depression, Anxiety, and Stress Scale (DASS-21) measurement tools. Questions 3, 5, 10, 13, 16, 17 and 21 formed for the depression subscale. The total depression subscale score was divided into normal (0–9), mild depression (10–13), moderate depression (14–20), severe depression (21–27), and extremely severe depression (28 and above). Questions 2, 4, 7, 9, 15, 19, and 20 formed the anxiety subscale. The total anxiety subscale score was divided into normal (0–7), mild anxiety (8–9), moderate anxiety (10–14), severe anxiety (15–19), and extremely severe anxiety (20 and above). Questions 1, 6, 8, 11, 12, 14, and 18 formed the stress subscale. The total stress subscale score was divided into normal (0–14), mild stress (15–18), moderate stress (19–25), severe stress (26–33), and extremely severe stress (34 and above). To calculate the final score, it was multiplied by 2 (12). It was validated in African countries; it has a reliability of "Cronbach's alpha values of 0.81, 0.89 and 0.78 for the subscales of depressive, anxiety and stress respectively" (12).

Data processing and analysis

Data were coded, edited, cleaned, and entered into Epi-info version 7.5.1 and transported to SPSS version 23. The descriptive data analysis was done and presented in table, and graphs. The outcome cut off point for binary logistic regression was above 9, 7 and 14 for depression, anxiety and stress respectively. The analytic part was analyzed, odds ratio with their 95% confidence interval, and two-tailed P-value was calculated to identify the presence and strength of the association. Variables with P value ≤ 0.2 in the binary analysis were included in a multivariable logistic regression analysis to control the confounding effect among the variables. Statistical significance was declared if P-value < 0.05 .

Ethical consideration

Ethical clearance was obtained from the Salale University ethical review committee. After thoroughly discussing, the ultimate purpose and method of the study, and, informed verbal consent was obtained from each respondent. The respondents were informed that their inclusion

in the study is voluntary and they were free to withdraw from the study if they were not willing to participate. If any question they do not want to answer they have the right to do so. To ensure the confidentiality of respondents, their names were excluded from the questionnaire. The confidentiality of the respondents was kept in a password locked computer.

Results

In this study, 846 health care workers asked to participate, 816 respondents (96.5%) completed the survey online. Majority 376(46.1%) of respondents have participated from the Addis Ababa location and all participants were living in urban areas. A total of 244(29.9%) participants were frontline health care workers that directly involved in diagnosing, caring, or treating of patients with COVID-19 or suspected. Most of the participants were male 540 (66.2%), were aged 26 to 30 years 308 (37.7%), were married 476(58.3%), and had an educational level of second degree or undergraduate 332(40.7%). Nurses 236(28.9%) were the majority of healthcare workers and 340(41.7%) of participants had 5–10 years of working experience. More than two-thirds of study participants had trained online about COVID-19 infection prevention and 580(71.1%) of health care workers had a shortage of personal protective equipments (Table 1).

Table 1
Socio-demographic characteristics of healthcare workers in Central Ethiopia,
from June 25/2020 to July 25/2020 (n = 816).

Variables	Number of participants	Percent
Age		
20–25	140	17.2
26–30	308	37.7
31–35	196	24.0
36–40	100	12.3
>40	72	8.8
Sex		
Male	540	66.2
Female	276	33.8
Marital status		
Single	340	41.7
Married	476	58.3
Region/location		
Addis Ababa	376	46.1
Oromiya especial zone	112	13.7
East Shoa	156	19.1
North Shoa	96	11.8
West Shoa	76	9.3
Educational status		
Diploma	296	36.3
BSc/MD	332	40.7
MSc/specialty	188	23.0
Profession		
Nurses	236	28.9
Physicians	136	16.7
Midwives	192	23.5
Medical laboratory	68	8.3
Health officer	96	11.8
Pharmacy	88	10.8
Working unit/department		
COVID-19 isolation center	244	29.9
Emergency	88	10.8
Surgical	116	14.2
Medical	128	15.7
Outpatient department	104	12.7
Laboratory	62	7.6

Variables	Number of participants	Percent
Pharmacy	74	9.1
Year of experience		
< 5 Year	268	32.8
5–10 years	340	41.7
> 10 years	208	25.5
Taking online training about COVID-19		
No	268	32.8
Yes	548	67.2
PPE availability		
No	580	71.1
Yes	236	28.9

The prevalence of depression, anxiety and stress

From 640 healthcare workers who screened positive for depression, 60.3% (492) of them were scored moderate to extremely severe depression. Of the 668 healthcare workers who screened positive for anxiety, 78% (636) of them revealed moderate to extremely severe anxiety. Regarding stress, 33.8% (276) of healthcare workers had moderate to extremely severe stress who screened positive for stress (Fig. 1).

Factors associated with depression, anxiety and stress

Table 2 documented bivariable and multivariable logistic regression. In multivariable logistic regression analysis illustrated that after controlling for confounders, being a female, HCWs who work in the Oromiya Especial Zone, medical laboratory professionals, and those HCWs who working in COVID-19 treatment isolation centers were associated with self-reporting symptoms of depression, anxiety, and distress.

Females [AOR = 2.01; 95% CI, (1.25,3.23)], HCWs who working in Oromiya Special region [AOR = 3.94; 95% CI, (1.94,8.09)], medical laboratory professionals [AOR = 4.69; 95% CI, (2.81,9.17)] and HCWs who working in the COVID-19 isolation department [AOR = 2.14; 95% CI, (1.05,4.39)] had significantly higher odds of having depression compared to males, HCWs who working central Oromiya, pharmacy professionals and pharmacy department (Table 2).

Those HCWs who working in Oromiya special region [AOR = 1.85; 95% CI, (1.14,2.99)], being females [AOR = 1.91;95% CI, (1.27,2.86)], medical laboratory professionals [AOR = 2.75; 95% CI, (1.78,4.79)] and HCWs who working in the COVID-19 treatment isolation department [AOR = 3.49; 95% CI, (2.24,6.97)] had significantly higher odds of having anxiety as compared to HCWs who working central Oromiya region, being males, pharmacy professionals, and pharmacy department (Table 2).

Being females [AOR = 2.08; 95% CI, (1.33, 3.24)], HCWs who working in Oromiya especial region [AOR = 2.14; 95% CI, (1.28, 3.59)], medical laboratory professionals [AOR = 1.63; 95% CI, (1.27, 2.47)] and HCWs who working in the COVID-19 isolation department [AOR = 2.38; 95% CI, (1.18, 4.79)] had higher odds of having stress as compared to their counterparts. Age and marital status were also significantly associated with depression, anxiety, and stress (Table 2).

Table 2
Factors (crude and adjusted odds ratios, confidence intervals) associated with depression, anxiety and stress among HCWs in Central Ethiopia, from June 25/2020 to July 25/2020 (n = 816).

Variables	Depression		Anxiety		Stress	
	COR(95% CI)	AOR (95% CI)	COR(95% CI)	AOR(95% CI)	COR(95% CI)	AOR(95% CI)
Age						
18–25	1	1	1	1	1	1
26–30	0.35(0.23,0.54)	0.32(0.18,0.57)*	0.51(0.34,0.77)	0.45(0.39,1.07)	0.24(0.14,0.39)	0.24(0.13,0.43)*
31–35	0.77(0.50,1.21)	0.60(0.83,3.08)	0.70(0.44,1.09)	0.65(0.77,2.38)	0.25(0.15,0.43)	0.20(0.10,0.38)*
36–40	0.42(0.34,0.74)	0.30(0.23,1.13)	0.29(0.17,0.50)	0.20(0.27,1.07)	0.16(0.09,0.29)	0.10(0.05,0.22)*
> 40	1.07(0.60,1.89)	0.97(0.53,3.01)	0.65(0.37,1.17)	0.51(0.44,1.90)	0.26(0.14,0.49)	0.16(0.07,0.36)*
Sex						
Male	1	1	1	1	1	1
Female	2.38(1.75,3.24)	2.01(1.25,3.23)*	2.14(1.59,2.89)	1.91(1.27,2.86)*	2.88(2.09,3.95)	2.08(1.33,3.24)*
Marital status						
Single	1	1	1	1	1	1
Married	3.55(2.53,4.99)	3.53(2.15,5.80)*	1.08(0.82,1.43)	0.83(0.57,1.21)	3.33(1.75,3.10)	3.15(2.25,5.05)*
Location						
Addis Ababa	4.72(2.07,10.66)	3.83(1.35,7.49)*	1.67(1.15,2.40)	0.78(0.38,1.60)	3.66(2.50,5.36)	1.65(0.78,3.58)
Oromiya especial zone	4.20(2.76,12.87)	3.94(1.94,8.09)*	2.57(1.73,3.81)	1.85(1.14,2.99)*	3.96(2.64,5.95)	2.14(1.28,3.59)*
Central Oromiya	1	1		1	1	1
Educational status						
Diploma	1.57(1.04,2.38)	0.51(0.24,1.09)	1.38(0.96,1.99)	1.23(0.90,2.62)*	1.46(1.01,2.10)	1.12(0.62,2.02)
BSC/MD	1.67(1.11,2.50)	0.36(0.17,0.74)*	1.70(1.18,2.44)	1.34(0.80,2.24)	2.71(1.88,3.93)	1.48(0.83,2.63)
MSC/MPH/Specialty		1		1	1	1
Profession						
Nurses	3.31(1.82,6.03)	3.28(1.90,8.33)*	1.42(0.87,2.33)	1.40(0.97,3.32)	1.22(0.74,1.99)	0.87(0.46,1.64)
Physicians	1.86(0.97,3.61)	2.22(0.99,5.00)	1.35(0.79,2.31)	1.29(0.86,3.29)	0.94(0.55,1.61)	0.76(0.38,1.53)
Midwives	0.90(0.46,1.74)	0.87(0.36,2.10)	1.20(0.72,1.99)	1.11(0.66,2.60)	0.71(0.43,1.17)	0.64(0.32,1.29)
Medical laboratory	5.80(3.09,14.91)	4.69(2.81,9.17)*	2.88(1.48,5.63)	2.75(1.78,4.79)*	2.71(1.35,5.45)	1.63(1.27,2.47)*
Health officer	0.90(0.42,1.93)	0.78(0.46,2.99)	1.20(0.67,2.14)	1.15(0.62,2.49)	2.50(1.34,4.67)	2.31(0.21,5.65)
Pharmacy	1	1		1	1	1
Working Unit/department						
COVID-19 isolation centers	2.77(1.44,5.36)	2.14(1.05,4.39)*	4.55(2.33,9.93)	3.49(2.24,6.97)*	3.52(1.65,5.94)	2.38(1.18,4.79)*
Emergency	1.44(0.76,0.75)	0.29(0.10,0.87)*	1.49(0.79,2.79)	1.19(0.49,2.87)	2.53(1.31,3.86)	1.08(0.43,2.73)
Surgical	0.38(0.19,0.77)	0.07(0.02,0.21)*	0.60(0.33,1.08)	0.43(0.22,0.85)*	0.77(0.43,1.38)	0.43(0.21,1.89)
Medical	0.95(0.51,1.75)	0.47(0.21,1.06)	1.42(0.79,2.53)	1.13(0.60,2.13)	1.39(0.78,2.46)	0.80(0.41,1.54)

*Refers significant association (p-value < 0.05)

Variables	Depression		Anxiety		Stress	
	COR(95% CI)	AOR (95% CI)	COR(95% CI)	AOR(95% CI)	COR(95% CI)	AOR(95% CI)
OPD	2.08(1.12,3.87)	0.33(0.11,0.97)*	1.61(0.87,2.96)	1.19(0.51,2.79)	3.16(1.66,4.02)	1.48(0.59,3.69)
Laboratory	0.73(0.34,0.53)	0.27(0.09,0.79)*	2.08(1.02,4.24)	1.43(0.65,3.16)	1.99(0.99,4.01)	1.15(0.49,2.69)
Pharmacy	1	1	1	1	1	1
Year of experience						
< 5 Year	3.41(2.26,5.19)	2.45(1.37,4.36)*	1.33(0.92,1.93)	0.93(0.59,1.46)	1.16(0.80,1.67)	0.69(0.42,1.12)
5–10 years	2.56(1.02,2.37)	2.49(1.40,4.41)*	0.61(0.43,0.87)	0.54(0.42,0.98)*	0.91(0.64,1.29)	0.82(0.26,2.12)
> 10 years	1	1	1	1	1	1
Online training COVID						
No	0.75(0.54,1.04)	0.64(0.36,3.69)	1.57(1.12,2.02)	1.50(1.74,3.79)*	0.71(0.53,0.96)	0.83(0.56,1.24)
Yes	1	1	1	1	1	1
PPE available						
No	0.60(0.43,0.82)	0.55(0.34,0.90)*	1.13(0.83,1.52)	0.60(0.39,0.92)	0.92(0.68,1.25)	1.26(0.81,1.95)
Yes	1	1	1	1	1	1
*Refers significant association (p-value < 0.05)						

Discussion

This cross-sectional survey revealed a high prevalence of mental health symptoms among health care workers who involved patient care during COVID-19 in central Ethiopia. Overall, 60.3%, 78%, and 33.8% of the study participants were self-reported symptoms of depression, anxiety, and stress respectively. This study was found higher than the study conducted among healthcare workers in China that showed 50.7% of symptoms of depression, 44.7% of anxiety, and 73.4% of stress(7). Again, our study was higher than the result in Iraq that revealed 45% of depression, 47% of anxiety, and 18% of stress (13). This difference may be due to high fear of COVID-19 with a lack of personal protective equipment that indicated 71.1% of respondents report limited personal protective material in our study. In resourced countries like China this is not much concern as low resourced counties.

Most age categories have a risk of developing stress symptoms and the age category of 26 to 30 had significantly associated with depression when compared to the age category of 18 to 25. This result was in line with the study done in China(14). As age advanced, there is a higher burden of the family, which influences the symptoms of mental health status, as they are more likely to worry about their families(15). Married healthcare workers had also a higher odds ratio of depression and stress. This can be explained by when pandemic disease happened with severe morbidity and mortality that high-risk transmission to their family, health care workers might have more stress, and depression.

In this study, depression, anxiety, and stress were higher in women, showing that the mental health status during the COVID-19 pandemic highly significant in women. This is in line with the study report done in Turkey (16) and that confirmed female gender has been identified as potentially exposed to symptoms of mental health problems after the happening of pandemics(17). A study from China found that women have three-folds higher anxiety, depression, and stress than in men during the COVID-19 pandemic(18).

In this study, we found that healthcare workers who have working in Addis Ababa and Oromiya especial zone were significantly associated with symptoms of depression, anxiety, and stress. This may be because Addis Ababa and Oromiya especial zone have a higher incidence of the COVID-19 infected patients and increasing every day than other central Oromiya regions. Regarding professional attributes, compared with pharmacists, medical laboratory professionals had a higher risk of depression, anxiety, and stress, whereas nurses had a higher risk of depression symptoms. This may be due to medical laboratory technologists/technicians and nurses have higher exposure to blood-contacting, workload, and stay in the ward a long time and provide direct nursing practice to patients respectively. This was reported in the studies in done China(19, 20). This situation may be influenced in their mental health status symptoms of depression, anxiety, and stress.

The study result shows that healthcare workers who had working in the COVID-19 treatment center had a higher risk of symptoms of depression, anxiety, and stress. This result was similar to the study conducted in China(8). Again, healthcare workers who have working in the emergency department, surgical department, outpatient department, and the laboratory department had significantly associated with self-reporting symptoms of depression. This was observed in the studies reported in Fujian, China (20), China (14), and Landon, United Kingdom (6). This can also be explained by the high-risk exposure area of the working department.

In this study, healthcare workers who have working experience of less than 10 years had a higher risk of depression and anxiety symptoms. This explained by those health care workers who have low experience in their working environment during a disease outbreak might have a higher fear of contagion, depression, and anxiety. Additionally, the study participants who have no training had higher anxiety. During the occurrence of outbreak disease, training regarding the prevention and control mechanisms, personal protection methods, the severity of the disease, transmission method and in addition to psychological intervention should be provided in time for health care workers (20, 21). In This study, we found 71.1% of health care workers reported a shortage of personal protective equipment which has significantly associated with symptoms of depression. Ensuring staff protection from the COVID-19 pandemic is very essential to have a better capacity for disease prevention and mental health outcome that targeted to minimize the fear of the pandemic (21). A systematic review and meta-analysis study found that having personal protective medical equipment, following preventive actions and timely informed about the COVID-19 are among protective factors (19).

Limitation of the study

This study has several limitations; first, as a cross-sectional nature of the study, it does not show a causal relationship. Second, the study restricted only in the central Ethiopia, which cannot generalizable for the other region of Ethiopia. Third, to minimize the spread of the COVID-19 infection, all study participants in the working department were taken, which may have a selection bias.

Conclusion

In this study of health care workers in central Ethiopia, health care workers had reported a high prevalence of symptoms of depression, anxiety, and stress. Female gender, Oromiya especial zone, medical laboratory professionals, and HCWs who have working in the COVID-19 treatment isolation centers were significantly associated with depression, anxiety, and stress. Caring for health care workers is a significant element of public health actions for controlling the COVID-19 epidemic and focus should be concentrated for the mental well-being of health care workers during the COVID-19 pandemic. Psychological intervention for health care workers in central Ethiopia needs special attention.

Abbreviations

AOR- Adjusted Odds Ratio, CI- Confidence Interval, COVID-19-Corona Virus Disease-2019, DASS-21-Depression, Anxiety and Stress Scale, HCWs-health care workers, SPSS- Statistical Package for Social Science, WHO- World Health Organization.

Declarations

Ethics approval and consent to participate

Ethical clearance was obtained from the Salale University ethical review committee. After thoroughly discussing, the ultimate purpose and method of the study, and, informed verbal consent was obtained from each respondent. The respondents were informed that their inclusion in the study is voluntary and they were free to withdraw from the study if they were not willing to participate. If any question they do not want to answer they have the right to do so. To ensure the confidentiality of respondents, their names were excluded from the questionnaire. The confidentiality of the respondents was kept in a password locked computer.

Consent for publication

Not applicable.

Availability of data and material

The data for this study are cannot be made publically available at the present time.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

All authors contributed to data analysis, drafting or revising the article, gave final approval of the version to be published and agreed to be accountable for all aspects of the work.

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Figures

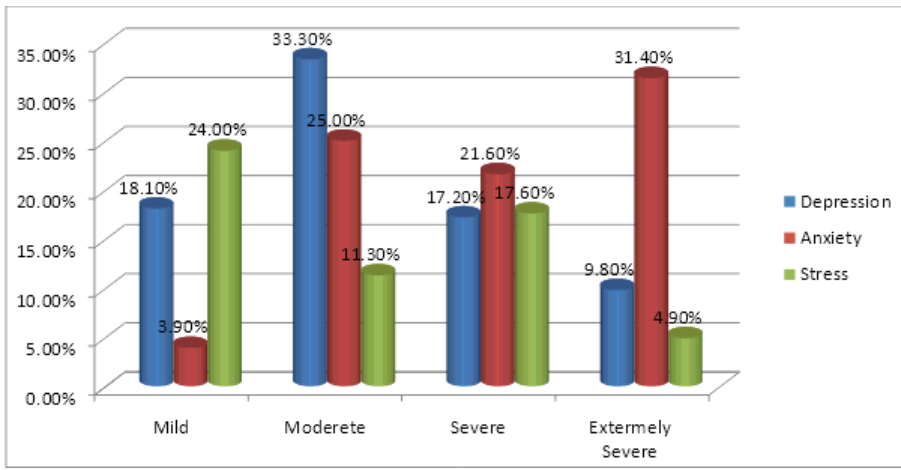


Figure 1

The prevalence of depression, anxiety and stress among health care workers in central Ethiopia, from June 25/2020 to July 25/2020 (n=816).