Research Article

Perceived Stress and Its Associated Factors during COVID-19 among Healthcare Providers in Ethiopia: A Cross-Sectional Study

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Background. Coronavirus causes serious health problems worldwide including increased mental health burden to the society at large scale and particularly the healthcare providers. Understanding the immediate mental health and psychological response of the healthcare providers after a public health emergency is important for implementing better prevention and response mechanisms to a disaster. *Objective.* This study aimed to assess the prevalence of perceived stress and risk factors of coronavirus disease 2019 among healthcare providers in Dilla, Southern Ethiopia. *Methods.* An institution-based cross-sectional study was conducted among 244 samples selected with the systematic random sampling technique from March to April 2020. Data collection was carried out with a validated perceived stress scale adapted from the World Health Organization. Data were coded and entered into Epi Info Version 7 and were exported and analyzed with SPSS version 20. Crude and adjusted OR were analyzed using logistic regression, and the level of significance of association was determined at P value <0.05. *Result.* The prevalence of perceived stress among participants was 126 (51.6%). Being at the age range of 25–31 years (AOR = 2.5, 95% CI, 1.12, 5.81), master's and above in their qualification (AOR = 6.0, 95% CI 1.59, 22.31), nurse professionals (AOR = 8.2, 95% CI 2.69, 24.74), and pharmacist professionals (AOR = 4.8, 95% CI, 1.25, 18.64) were variables found to have a strong statistically significant association with the perceived stress of coronavirus disease. *Conclusion.* More than half of the study participants were found to have perceived stress for coronavirus disease. Early screening and intervention of stress among frontline healthcare providers based on the findings are suggested.

1. Introduction

Coronavirus disease 2019 (COVID-19) is a mild-to-severe respiratory illness that is caused by a coronavirus (genus: *Betacoronavirus*), is transmitted chiefly by contact with infectious material (such as respiratory droplets), and is characterized, especially, by fever, cough, and shortness of breath and may progress to pneumonia and respiratory failure [1, 2]. Coronavirus disease (COVID-19) is a new strain that was first discovered in 2019 in Wuhan, China, and has not been previously identified in humans [3, 4]. It is distinct from SARS, MERS, and influenza [5, 6]. In the past two decades, more than 10, 000 cumulative cases, with mortality rates of 10% for SARS-CoV and 37% for MERS-CoV, happened worldwide [7–10].

The WHO declared COVID-19 a pandemic on March 11, 2020. Currently, COVID-19 has infected more than 18 million cases and claimed the lives of more than 600,000 people worldwide [11–13].

The first COVID-19 case confirmed in Addis Ababa, Ethiopia, was on March 31, 2020. The recent COVID-19 cases are around 43, and 2 deaths were reported [12, 14].

Due to the widespread disruptive effects of COVID-19, different countries have been taking different prevention and control measures such as quarantining, closing and suspension of transportations, avoiding public gatherings, and

even holding different public service works including education. Because of the abovementioned measures, students, workers, tourists, and others have now been prevented from accessing their training institutions, workplaces, and home [15, 16].

Psychological symptoms such as anxiety/stress, panic buying, fear and paranoia about attending community events, and reduced autonomy and concerns about income, job, security, and so on have already been observed in a population. Being at home can place children at an increased risk of, or increased exposure to, child protection incidents or make them witness to interpersonal violence if their home is not a safe place [17]. Coronavirus pandemic fears prompt the government to activate emergency response and extend travel ban [17].

In addition to the community members, healthcare providers are also at risk of higher psychological distress due to longer working hours and high risk of exposure to the virus. This may also lead to stress, anxiety, burnout, depressive symptoms, and the need for sick or stress leave, which would harm the capacity of the health system to provide services during the crisis [18]. Even though the psychological impact of the coronavirus disease (COVID-19) pandemic must be recognized alongside the physical symptoms, the global response is a simple public health strategy such as hand washing, quarantine, and social distancing [12, 19]. If left untreated, these psychological symptoms may have long-term health effects health workers and require treatment adding to the cost burden of managing the illness [20, 21].

To date, the Ethiopian government's focus has been on managing the medical needs of people during the pandemic, rather than providing resources to meet short- and long-term mental health implications. So, this paper aims to assess the psychological burdens of COVID-19 and recommended possible mitigating strategies. Therefore, it is vital to assess the magnitude of perceived stress and risk factors of coronavirus disease 2019 among healthcare providers in Dilla, Southern Ethiopia, 2020.

2. Methods and Materials

2.1. Study Design, Period, Setting, and Population.
The institution-based cross-sectional study design was conducted from March to April 2020 among healthcare providers of governmental health institutions in Dilla Town, which is found in the Gedeo Zone on the main road from Addis Ababa to Kenya, 360 km south of Addis Ababa and 90 km south of Hawassa (capital of SNNPR) and has a longitude and latitude of $6^0 24' 30'' N$ $38^\circ 18' 30'' E$ with an elevation of 1570 meters above sea level. There are four governmental health institutions in the study area, one of which is Dilla University referral hospital, while the others are health centers. There are about five hundred and fifty healthcare providers. The study population was healthcare providers who were working in governmental health institutions of Dilla town during the study period. All healthcare providers who were seriously ill and unable to communicate were not included in the study.

2.2. Sample Size and the Sampling Technique.
The sample size (n) was calculated based on a single population proportion formula, by assuming 95% confidence level, and the prevalence of perceived stress of COVID-19 among healthcare providers was not known, Therefore, a proportion of 50%, 95% confidence interval, and margin of error (d) = 5% were taken:

$$n = \frac{(Z\alpha/2)^2 \times p(1-p)}{d^2},$$

$$n = \frac{(1.96)^2 \times 0.50(1-0.5)}{0.05^2} = 384. \tag{1}$$

Since the source population is less than 10,000, the reduction formula was employed, giving a sample size of 244 with a 10% nonresponse rate. We used a systematic sampling technique with the proportion allocation system among each health center and one referral hospital based on the total number of healthcare providers in each institutions.

2.3. Data Collection Procedures and Instrument.
A structured questionnaire adapted from WHO validated for perceived stress was used to collect the data. The questionnaire contained sociodemographic characteristics (age, sex, profession, qualification, income, religion, marital status, ethnicity, and work experience). Data on perceived stress were collected with a perceived stress scale (PSS-10) which is a 10-item scale. The tool has a 5-point Likert response. Each item was scored with 0 = Never, 1 = Almost Never, 2 = Sometimes, 3 = Fairly Often, and 4 = Very Often, which was employed to evaluate each item. The total score ranged from 0 to 40 [22]. The reliability of PSS-10 was very high ranging from 0.71 to 0.86, which was validated in different settings, languages, and population [22–26].

2.4. Data Quality Assurance.
The pretest was conducted on 5% of the sample size. The training was given to the data collectors and supervisors on the data collection tool and sampling techniques. Supervision was held regularly during the data collection period by the researcher, coinvestigators, and supervisors. The data were cross checked for completeness and consistency daily.

2.5. Statistical Analysis and Processing.
Data were entered into Epi Info version 7 computer programs and transported to SPSS version 22 computer program for further analysis and cleaning. Descriptive statistics was used to summarize tables and figures, and statistical summary measures were used for presentation. The association of perceived stress-related variables and demographic characteristics were analyzed using chi-square, fisher's exact test, and binary logistic regression with odds ratio and 95% CI in the univariate analysis. Multivariate logistic regression analysis was carried out to find the association of each independent variable with the outcome variable. The model was checked for fitness with the R-squared value, where an R-squared value greater than 50% was considered as good. All variables with a P

value <0.20 in the univariate analysis were entered into the multivariate logistic regression model. Odds ratios (OR) and 95% confidence intervals were calculated. A P value of less than 0.05 was considered significant.

2.6. Ethical Clearance. Ethical clearance was obtained from the Institutional Review Board of Dilla University and Gedeo Zone health bureau. The purpose and importance of the study were explained to each participant before they proceed into actual activities. Confidentiality was maintained by an anonymous questionnaire, and informed consent was obtained from each participant.

3. Result

3.1. Sociodemographic Characteristics of the Respondents. A total of 244 participants were included in the study with a response rate of 100%. Among the respondents, the majority were males (161 (66%)), while the majority of the respondents were in the age range of 25–31 years (162 (66.4%)). Of the total participants, 124 (50.8%) of them were protestant religion followers, and 76 (31.1%) were Amhara in their ethnicity. The majority of the participants were single 140 (57.4%)

The qualification of participants indicated that 158 (64.8%) of them were degree level regarding their profession, and 100 (41.0%) of the participants were nurses. The majority of the respondents 130 (53.3) had working experiences in the range of 1–5 years, and the majority of the respondents' (96 (39.3%)) monthly income was ranging from 3000 to 5000 Ethiopian Birr (Table 1).

3.2. Perceived Stress of the Respondents. The majority of the respondents were very annoyed by things that happened outside very often, while some others felt well fairly often. On the other hand, the majority of the respondents were able to complete the important events in their life properly, while others could not cope with all the things happening outside (Table 2).

Perceived stress, among healthcare providers, was very high. The highest perceived stress score was observed among nurses, sixty-eight from hundred, while the smallest was seen among anaesthetists and other healthcare providers (three from ten and three from twelve), respectively (Figure 1).

The magnitude of perceived stress on COVID-19 among healthcare providers in Dilla town in Dilla, Southern Ethiopia, 2020.

The prevalence of perceived stress on COVID-19 among participants was found to be 126 (51.6%), with the respondents in the last month of their life.

Risk factors of perceived stress on COVID-19 among healthcare providers in Dilla town.

In bivariate, binary logistic analysis variables, sex, age, marital status, monthly income, qualification, profession, and work experiences, were found to have a P value less than 0.25. These variables fulfilled minimum requirements for further multivariate binary logistic regression.

TABLE 1: Sociodemographic characteristics of respondents in Dilla town government health institutions, Dilla, Southern Ethiopia, 2020.

Variable	Categories	Frequency	Percentage (%)
Sex	Female	83	34.00
	Male	161	66.00
Age	18–24	48	19.7
	25–31	162	66.4
	>31	34	13.9
Marital status	Single	140	57.4
	Married	90	36.9
	Divorced/widowed	14	5.7
Religion	Orthodox	100	41.0
	Muslim	16	6.6
	Protestant	124	50.8
	Catholic	4	1.6
Ethnicity	Gedeo	72	29.5
	Oromo	36	14.5
	Amhara	76	31.1
	Gurage	20	8.2
	Others*	40	16.4
Monthly income	<3000	50	20.5
	3000–5000	96	39.3
	5000–7000	50	20.5
	>7000	48	19.7
Qualification	Diploma	66	27.0
	Degree	158	64.8
	Master's and above	20	8.2
Profession	Medical doctor	27	11.1
	Nurse	100	41.0
	Health officer	15	6.1
	Midwifery	24	9.8
	Laboratory technology	24	9.8
	Pharmacist	23	9.4
	Others**	31	12.7
Work experience	<1 year	50	20.5
	1–5 years	130	53.3
	>5 years	64	26.2

*Others = Tigray, Kembata, Siltie, and Sidama; **others = anesthesia, environmental health, health education, occupational health, and psychiatry.

From multivariate binary logistic regression, only variables, namely, age in the range of 25–31 years, being a nurse, and being pharmacist, were statistically significant with perceived stress on COVID-19 at a P value less than 0.05.

The odds of having perceived stress on COVID-19 among respondents who were in the age range of 25–31 years was almost 3 times higher as compared to that in the age range of 18–24 years of respondents (AOR = 2.5, 95% CI, 1.12, 5.81). On the other hand, participants who are master's and above in their qualification were 6 times more likely to have perceived stress during COVID-19 as compared with those who are diploma in their qualification (AOR = 6.0, 95% CI, 1.59, 22.31).

In this study, participants who are nurses in their profession were almost 8 times more likely to have perceived stress on COVID-19 as compared with respondents who are doctors (AOR = 8.2, 95% CI 2.69, 24.74).
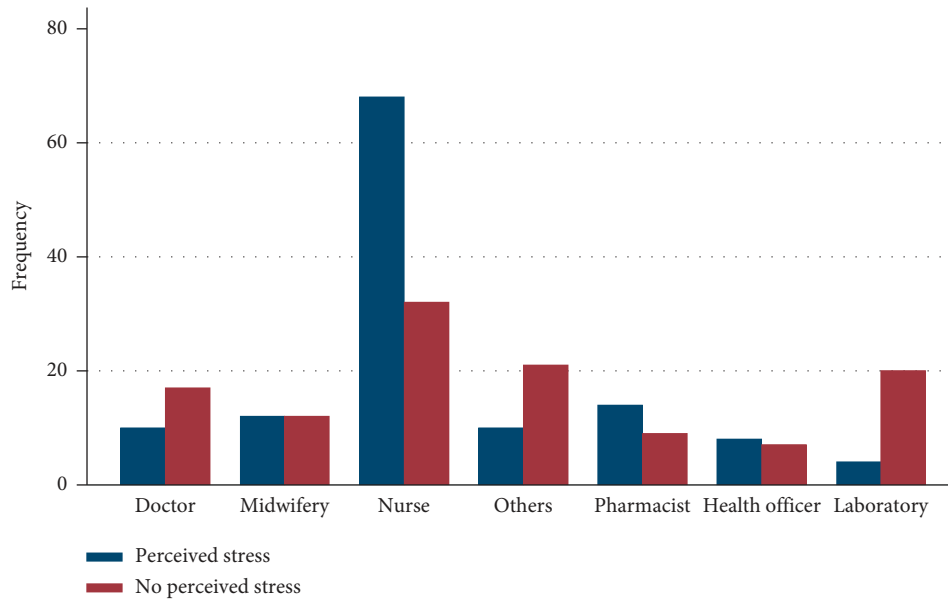
FIGURE 1: Perceived stress among healthcare providers of Dilla governmental health institutions, Southern Ethiopia, 2020.

TABLE 2: Perceived Stress Scale (PSS) among healthcare providers in Dilla town in Dilla, Southern Ethiopia, 2020.

Items	Never	Almost never	Sometimes	Fairly often	Very often	Total
Something unexpectedly	52 (21%)	32 (13%)	70 (29%)	54 (22%)	36 (15%)	244
Unable to control the important things in life	62 (25%)	40 (16%)	66 (27%)	56 (23%)	20 (8%)	244
Felt nervous and stressed	46 (19%)	42 (17%)	68 (29%)	58 (24%)	30 (12%)	244
Felt confident about your ability to handle your problems	44 (18%)	42 (17%)	72 (30%)	58 (24%)	28 (11%)	244
Felt that things were going your way	34 (14%)	30 (12%)	76 (31%)	76 (31%)	28 (11%)	244
Could not cope with all the things	44 (18%)	56 (23%)	74 (30%)	52 (21%)	18 (7%)	244
Able to control irritations in life	38 (16%)	28 (11%)	68 (29%)	72 (30%)	38 (16%)	244
Felt on top of things	32 (13%)	42 (17%)	54 (22%)	88 (36&)	28 (11%)	244
Angered by things outside	32 (13%)	42 (17%)	70 (29%)	58 (24%)	42 (17%)	244
Felt difficulties and could not overcome	48 (20&)	44 (18%)	64 (26%)	62 (25%)	26 (11%)	244

Participants who are pharmacists were also another factor associated with perceived stress on COVID-19. Participants who were pharmacists in their profession were 5 times more likely to have perceived stress on COVID-19 as compared with respondents who are medical doctors (AOR = 4.8 95% CI, 1.25, 18.64) (Table 3).

4. Discussion

This cross-sectional study had tried to determine the magnitude of perceived stress and associated risk factors among healthcare providers of Gedeo Zone governmental health institutions on COVID-19 using a perceived stress scale (PSS-10).

The majority of healthcare providers were predominantly males (161 (66.0%)). The overall prevalence of perceived stress among healthcare providers of Gedeo Zone governmental health institutions was found to be 51.6%. The finding of this study was in line with the study conducted in China by Wang et al. (53.8%) [27]. On the other hand, the findings of a study conducted in Wuhan, China, by Dai et al.

were lower as compared to those of this study (39.1% vs. 51.6%) [28]. The possible explanation might be due to the sampling size, sampling technique (convenience sampling), and different tools, while they used a general health questionnaire (GHQ-12).

In this study, the majority of the respondents were males (161 (66.0%)), in the age range of 25–31 years (162 (66.4%)) and single (140 (57.4%)). On the contrary, a study conducted in China revealed that the majority of respondents were female (67.3%), in the age range of 21.4 to 30.8 years (53.1%) and married (76.4%) [27]. The possible explanation for this difference might be due to the development of the country; the developed country involved women and marriage at a proper age due to the economic status of the people.

This study revealed that the majority of the respondents were nurses (100 (41.0%)). This finding was consistent with that of other studies conducted in China (2,343 (53.8%) [28] and 764 (60.8%) [29]). However, this study showed that the majority of healthcare providers' work experience was one to five years 130 (53.3%) unlike that in a study conducted in

TABLE 3: Bivariate and multivariate analysis of factors associated with perceived stress on COVID-19 among healthcare providers in Dilla town, Southern Ethiopia, 2020.

Variables		Perceived stress		COR (95% CI)	AOR (95% CI)
		Yes	No		
Sex of participants	Female	44	39	1.1 (0.64–1.85)	0.9 (0.47–1.67)
	Male	82	79	1	1
Age	18–24	16	32	1	1
	25–31	91	71	2.6 (1.3–5.04)	2.5 (1.12–5.81)*
	>31	19	15	2.5 (1.02–6.26)	1.7 (0.53–5.21)
Marital status	Single	68	72	1	1
	Married	48	42	1.2 (0.71–2.06)	1.0 (0.49–2.05)
	Divorced/widowed	10	4	2.7 (0.79–8.84)	2.7 (0.65–11.02)
Qualification	Diploma	33	33	1	1
	Degree	82	76	1.1 (0.61–1.92)	1.6 (0.77–3.20)
	Master's and above	11	9	1.2 (0.45–3.34)	6.0 (1.59–22.31)**
Profession of participants	Medical doctor	10	17	1.2 (0.42–3.66)	1.3 (0.35–4.69)
	Nurses	68	32	4.5 (1.88–10.57)	8.2 (2.69–24.74)**
	Health officer	8	7	2.4 (0.68–8.49)	3.2 (0.74–13.46)
	Midwifery	12	12	2.1 (0.70–6.30)	3.5 (0.92–13.16)
	Laboratory	4	20	0.4 (0.11–1.56)	0.4 (0.10–1.88)
	Pharmacist	14	9	3.3 (1.06–10.07)	4.8 (1.25–18.64)*
	Others[a]	10	21	1	1
Work experience	<1 year	20	30	0.4 (0.20–0.91)	0.9 (0.30–2.53)
	1–5 years	67	63	0.7 (0.37–1.25)	0.7 (0.32–1.56)
	>5 years	39	25	1	1

*P value is significant at $P < 0.05$; **P value is significant at $P < 0.01$; others[a] = anesthesia, environmental health, health education, occupational health, and psychiatry.

China which was six to ten years (1960 (45%) [28]). This discrepancy might be due to differences in the educational development system, economical status, sample size, and work experience rubrics.

The study revealed that age and profession were independent predictors of perceived stress. The odds of having perceived stress on COVID-19 among respondents who were in the age range of 25–31 years was 3 times more likely as compared to that in the age range of 18–24 years of respondents.

On the other hand, this study showed that participants who were nurses in their profession were 8 times more likely to have perceived stress on COVID-19 as compared to respondents who were doctors. This finding is in line with a study conducted in China on perceived stress on COVID-19 among healthcare workers [28]. The possible explanation might be nurses being frontline healthcare workers, directly engaged in diagnosis, treatment, and care of patients with COVID-19, and they are more as compared with other professions.

Participants who are pharmacists were also another factor associated with perceived stress on COVID-19. Participants who were pharmacists in their profession were 4 times more likely to have perceived stress on COVID-19 as compared with respondents who were doctors. The pharmacists are also involved directly in providing drugs for patients with COVID-19, and they are at high risk.

On the other hand, participants who were master's and above in their qualification were 6 times more likely to have perceived stress during COVID-19 as compared with

diploma in their qualification. This might be due to the fact that they conducted and explored different types of scientific researches about the virulent nature of the COVID-19 pandemic.

4.1. Limitations. The study was limited to assess barriers of preexisting mental illness and chronic medical condition.

5. Conclusions

In summary, this study revealed that more than half of healthcare providers were found to have perceived stress on COVID-19. Being at the age range of 25–31 years, master's and above in their qualification, nurse professionals, and pharmacist professionals were variables found to have a statistically significant association with perceived stress on COVID-19. Particularly, of great concern should be given to healthcare workers because they are at great risk of developing psychological problems. So, the findings suggest that routine screening of psychological problems and early intervention is highly recommended.

Abbreviations

AOR: Adjust odds ratio
CI: Confidence interval
COVID-19: Coronavirus disease 19
COR: Crude odds ratio
DU: Dilla University
Epi Info: Epidemiological information

GHQ: General health questionnaire
HCWs: Healthcare workers
MERS: Middle East respiratory syndrome
SARS: Severe acute respiratory syndrome
SNNPR: Southern Nations, Nationalities, and Peoples'
            Region
SPSS: Statistical Package for Social Science
PSS: Perceived stress scale
WHO: World Health Organization.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Ethical Approval

Ethical clearance was obtained from the Institutional Review Board (IRB) of Dilla University.

Consent

Written consent was obtained from each participant during data collection. All participants were well informed about the aims and purpose of the study, and those participants were informed that as the right is given to the study participants to refuse and stop or withdraw from participation at any time during data collection without loss of any entitlement.

Conflicts of Interest

The authors declare that there are no conflicts of interest.

Authors' Contributions

YA and SM conceived the research question, involved in data collection, analysis, and interpretation, and critically reviewed the manuscript. SY and BM participated during the proposal development, analysis, and interpretation of the data and contributed to manuscript preparation. All the authors read and approved the final manuscript.

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