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Perceived Stress Associated with COVID-19 Pandemic in Korem, Tigray, Ethiopia: Community Based Crossectional Study

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Abstract: *Background*: The Coronavirus disease 2019 (COVID-19) pandemic is a major health crisis affecting several nations, within millions of cases and more than half-million deaths globally. In addition to its high infectivity and fatality rates, it is associated with adverse mental health consequences. Despite this, little is known about stress due to this pandemic in the community of Africa, particularly in Ethiopia. Thus, this study aimed to assess perceived stress associated with COVID-19 in Korem, Tigray, Ethiopia. *Methods*: Community-based cross-sectional study was conducted from July 1-30/2020 among 422 participants. Simple random sampling technique was used to select study participants. Interviewer-administered data collection was done using a pretested and structured Perceived Stress Scale (PSS-10) questionnaire. Bivariable and multivariable logistic regression analyses were carried to identify associated factors. Finally, variable with P-value<0.05 was considered as statistically significant. *Result*: About 276 (65.4%) participants scored high perceived stress to COVID-19 pandemic. Being illiterate [AOR=5.1, 95% CI: (1.84, 13.9)], having a chronic disease [AOR=4.8, 95% CI: (1.8, 12.9)], being merchant [AOR=6.6, 95% CI:(2.05, 20.9)], not implementing preventive measures [AOR=3.7, 95% CI: (1.89, 7.34)], and not following policies and scientific evidence to COVID-19 [AOR=2.97 (1.59, 5.5)] were significantly associated factors. *Conclusion*: Two-thirds of the participants scored high perceived stress. Enhancing community awareness mainly on improving mental health and developing psychological resilience. Encouraging the community on practicing and implementing COVID-19 preventive and controlling measures, strengthen policies and scientific evidence, and addressing the riskiest populations is crucial to reducing the problem.

Keywords: Perceived Stress, Pandemic, COVID-19, Korem, Tigray, Ethiopia

1. Introduction

The novel coronavirus disease 2019 (COVID-19) is the most recent contagious respiratory infectious disease which has created a massive disaster in human life worldwide and reported first in Wuhan City, China in December 2019 and spread rapidly across the world [1]. It has been declared as an international public health emergency on January 30, 2020, by the World Health Organization [2]. This pandemic has a major health crisis affecting millions of cases and more than half-million deaths globally [3]. It have been also affecting people of the glob both physically and psychologically. Many people have been experienced stress, anxiety, depressive reactions, insomnia, denial, anger, and fear [4-6].

Globally the battle against physiological and psychological impact of COVID-19 is continuing [7]. With the widespread disruptive of its effect, different countries have been taking different prevention and control measures like quarantining, self-isolation closing and suspension of transportations, avoiding public gatherings, and even holding different public service works including education [8]. Due to this measure students, workers, tourists, and others have been now prevented from accessing their training institutions, workplaces, and homes [9]. The increase in loneliness and reduced social interaction are risk

factors for many mental disorders and the collective concerns may influence daily behaviors, economy and it can lead to more morbidity and mental health problems [7, 10].

Stress during an infectious disease pandemic and outbreak can include fear and worry about their health, worsening of chronic health problems, and worsening of mental health conditions [6]. It can also be aggravated by home confinement and loss of interpersonal communications [1]. Stressors like prolonged quarantine, fear of infection, frustration, inadequate supplies, inadequate information, financial loss, and stigma have resulted in long-lasting posttraumatic stress symptoms, confusion, and anger in the mass population [11].

Up to July, 28th 2020 about 16,341,920 cases and 650,805 deaths globally and about 726,105 cases and 12, 257 deaths were recorded in Africa [3]. In Ethiopia, the first COVID-19 case has been confirmed in Addis Ababa, on March 31, 2020. On July 28th, 2020 around 15,200 cases and 239 deaths were reported. Out of this number, about 70% (10,703 cases) were from the capital city, Adis Ababa. [12, 13].

Even though measures have been adopted to control the COVID-19 transmission in all parts of Ethiopia, the political instability and the economic consequences like unemployment and lack of access to necessary commodities in addition to the majority of the population are living in a very low economic status can increase the vulnerability to COVID-19 and stress. These issues may have multiple impacts on mental health across the populations, which necessitates the attention of global health. There is also a limited study in Ethiopia. Thus, this study aimed to assess perceived stress in Korem, Tigray, Ethiopia.

2. Methods

2.1. Study Area and Period

The study was conducted in Korem District which is one of the Districts in Tigray Regional State, Northern Ethiopia. It is located 619 km away from Adis Ababa, the capital city of Ethiopia. It is also 162 km away from Mekele, the capital city of Tigray regional state. The District has a total population of 34,576 out of this number, 16,804 (48.6%) were male and 17,772 (51.4%) were female [14]. The study was conducted from July 1-30/2020.

2.2. Study Design and Population

A community-based cross-sectional study was conducted. All people aged ≥18 years of Korem were the source population. All people aged ≥18 years old in the selected households constituted the study population. Those who were unable to communicate and severely ill due to medical problems were excluded.

2.3. Sample Size Calculation

The sample size was calculated using single population formula ($n = (Z_{a/2})^2\, p\,(1 - p)/d^2$), where z is the normal standard deviation set at 1.96, with a confidence level specified at 95% and a tolerable margin of error (d) at 5%, considering 10% nonresponse rate and prevalence (p) 51% from a previous similar study in Dilla, [15]. The final sample size for this study was 422.

2.4. Data Collection Tool and Procedure

A structured questionnaire for assessing perceived stress scale was used for data collection. It was translated by an expert into the local language (Tigrigna) and pretested on 21 respondents in Alamata (out of the study site). The questionnaire consisted of background and demographic information such as age, gender, educational level, marital status, employment status, and socioeconomic status. It also includes chronic disease status (diabetes, cerebrovascular diseases, heart diseases, and others), the practice of preventive measures, and considered the public health policies for preventing the spread of the disease consistent with scientific recommendations. Perceived Stress associated with COVID-19 was measured by 10 questions of Perceived Stress Scale (PSS-10) rated by a five-point Likert scale (never, almost never, sometimes, fairly often, and very often) was used to measure each question [16]. Question numbers 1, 2, 3, 6, 9, and 10 were scored from 0 to 4 respectively, while, questions 4, 5, 7, and 8 were scored reversely, from 4 to 0. The scores ranged between 0 and 40. Scores equal to or higher than 25 points were considered as high perceived stress. The reliability of the questionnaire was checked by calculating internal consistency with Cronbach alpha of 0.82 which is high internal consistency. Data were collected by six university students. Two public health officers and the principal investigator have supervised the data collection procedures. Two days of training was given to data collectors and supervisors on how to collect the data, ethical issues, confidentiality, COVID-19 preventive measures (on keeping social distance 2m, alcohol, sanitizer, mask, and glove use).

2.5. Data Processing and Analysis

The data were first coded, entered, and cleaned using the Epi-data version 4.1 statistical software version and then exported into SPSS version 22 for analysis. Descriptive statistical analyses such as frequencies, measures of central tendency, and measure of variability were used to describe the characteristics of participants. Information was presented using frequencies, narratives, summary measures, and tables. The bivariable analysis was carried out to see the association of each independent variable with perceived stress. Variables with p-value<0.25 in the bivariable analysis were taken into the multivariable analysis model to control confounders. Co-linearity test was carried out to see the correlation between independent variables using the standard error. A Hosmer-Lemeshow was checked to test model goodness of fit. The multivariable analysis was performed to control possible confounding factors. Odds ratios with 95% CI were reported to show the strength and direction of the associations. Finally, variables with a p-value of less than 0.05 ($p<0.05$) were considered statistically significant.

2.6. Ethical Consideration

Ethical clearance was secured before the data collection process begin. Informed, voluntary oral consent was obtained from each participant. Participants were informed participating in this study is up to their willingness and they can stop the interview at any time if there is any condition that is not suitable for them. All WHO preventive measures of COVID-19 (keeping social distance at least 2m, using a face mask, sanitizer or alcohol, glove, hand washing) were followed.

3. Results

3.1. Background Characteristics of the Participants

A total of 422 participants were interviewed making a response rate of 100%. The mean age of the participants was 38.6 (SD ±12) years old. About, 124 (29.4%) of participants were between the age of 20 and 29 years old and near to one-third, 128 (30.3%) were between the age of 30 and 39. More than half, 218 (51.7%) were males and about 251 (59.5%) participants were in a relationship currently. About 403 (95.5%) were Orthodox Christian followers and about 412 (97.6%) were Tigray in their ethnicity. Near to half, 208 (49.3) of participants' educational status were college and above. About half, 210 (49.8%) were government workers and one fourth, 109 (25.8%) of participants were merchants in their employment status. Near to half, 203 (48.1%) participants had low economic status and about 234 (55.5%) were living with children and about 79 (18.7%) participants reported that they are living with elders (age ≥60 years old). The majority, 379 (89.8%) had no history of travel, and about 71 (16.8) of participants have a chronic disease (Table 1).

Table 1. *Background and other related characteristics of participants in Korem, Tigray, Ethiopia, 2020 (N=422).*

Characteristics	Categories	Frequency	Percentages
Age (Year)	20-29	124	29.4
	30-39	128	30.4
	40-49	85	20.1
	≥50	85	20.1
Sex	Male	218	51.7
	Female	204	48.3
Marital Status	In relationship	251	59.5
	Not in relationship	171	40.5
Religion	Orthodox	403	95.5
	Muslim	19	4.5
Ethnicity	Tigray	412	97.6
	Amhara	10	2.4
Residence	Rural	77	18.2
	Urban	345	81.8
Educational Status	No formal education	67	15.9
	Primary and secondary	147	34.8
	College and above	208	49.3
Employment status	Government	210	49.8
	Merchant	109	25.8
	Others	103	24.4
Economic status	Low	203	48.1
	Medium	37	8.8
	High	182	43.1
With whom did they live	Alone	109	25.8
	With children (<18)	234	55.5
	With elders (≥60)	79	18.7
Travel history	Yes	43	10.2
	No	379	89.8
Have chronic disease	Yes	71	16.8
	No	351	83.2
Follow preventive measures	Yes	109	25.8
	No	313	74.2

3.2. Perceived Stress and Preventive Measures of the Participants to COVID-19

The prevalence of perceived stress to COVID-19 among participants was found to be 276 (65.4%, 95% CI: (60.8, 70)). Regarding the preventive measures, about 313 (74.2%) of participants did not use at least one preventive measure. Out of this number, about half, 215 (50.9%) did not keep their social distance, 297 (70.4%) did not use alcohol or sanitizer hand rub and about 357 (84.6%) did not use a face mask in a crowded area during their day to day activities.

In this study, near to half, 193 (45.7%) of the participants reported that they fairly often felt affected, 175 (41.5%) felt unable to control the important things in their life, 172 (42%) felt things are not going well, 146 (34.6%) felt difficult to control important things in their life, and about 204 (48.3%) felt that things are out of their control due to the COVID-19 pandemic (Table 2).

Table 2. *Perceived Stress Scale (PSS) among the community of Korem, Tigray, Ethiopia, 2020 (N=422).*

Items	Never	Almost Never	Sometimes	Fairly often	very often
Felt affected as if something serious happens unexpectedly	48	25	117	193	39
Felt that unable to control the important things in their life	68	38	68	175	73
Felt nervous and stressed	60	27	82	188	65
Felt confident about their ability to handle the problems	136	154	77	47	8
Felt that things are going well	174	167	52	27	2
Felt unable to cope with things they have to do to control the infection.	47	22	94	174	85
Felt that I can control the difficulties that could appear in my life due to the infection.	146	157	68	44	7
Felt that I have everything under control concerning the pandemic	127	153	81	51	10
Have been upset that things related to the pandemic are out of my control	45	23	79	204	71
Felt that the difficulties accumulated will unable to overcome them	56	32	43	175	116

3.3. Factors Associated with Perceived Stress to COVID-19 Pandemic

In the bivariate analysis, age, educational status, employment status, economic status, travel history, chronic disease status, Implementation of policies and scientific evidence, and following preventive measures to COVID-19 were significant factors associated with perceived stress. Whereas, in the final model (multivariate analysis), the result showed that being illiterate, being a merchant, having a chronic disease, not implementing policies and scientific evidence, and not following preventive measures to COVID-19 remained the main significant factors associated with perceived stress (Table 3).

Table 3. *Factors independently associated with perceived stress to COVID-19 pandemic in Korem, Tigray, Ethiopia, 2020 (N=422).*

Characteristics	Perceived Stress		COR (95% CI)	AOR (95% CI)
	Yes (%)	No (%)		
Age				
20-29	60 (48.4)	64 (51.6)	1	1
30-39	81 (63.3)	47 (36.7)	1.84 (1.1, 3.04)	1.14 (0.58, 2.24)
40-49	66 (77.7)	19 (22.3)	3.7 (1.99, 6.89)	2.17 (0.95, 4.79)
≥50	69 (81.2)	16 (18.8)	4.6 (2.4, 8.79)	1.26 (0.47, 3.35)
Educational status				
No formal education	61 (91)	6 (9)	13.3 (5.5, 32)	5.1 (1.84, 13.9) *
Primary and secondary school	125 (85)	22 (15)	7.45 (4.4, 12.7)	1.96 (0.95, 4.03)
College and above	90 (43.3)	118 (56.7)	1	1
Economic status				
Low	175 (86.2)	28 (13.8)	10.2 (6.2, 16.9)	0.79 (0.26, 2.4)
Medium	32 (86.5)	5 (13.5)	10.5 (3.89, 28.2)	3.15 (0.91, 10.9)
High	69 (37.9)	113 (62.1)	1	1
Employment status				
Government	89 (42.4)	121 (57.6)	1	1
Merchant	95 (87.2)	14 (12.8)	9.2 (4.9, 17.2)	6.6 (2.05, 20.9) *
Others	92 (89.3)	11 (10.7)	11.4 (5.75, 22.5)	8.3 (2.38, 28.7)
Travel history				
Yes	244 (64.4)	135 (35.6)	1.6 (0.79, 3.29)	1.1 (0.42, 2.84)
No	32 (74.4)	11 (25.6)	1	1
Chronic disease				
Yes	212 (60.4)	139 (39.6)	5.99 (2.67, 13.5)	4.8 (1.8, 12.9)*
No	64 (90.1)	7 (9.9)	1	1
Consider policies consistent with scientific evidence				
No	90 (46.9)	102 (53.1)	4.8 (3.1, 7.4)	2.97 (1.59, 5.5) *
Yes	186 (80.9)	44 (19.1)	1	1
Follow precautionary measures				
No	26 (23.9)	83 (76.1)	12.7 (7.5, 21.3)	3.7 (1.89, 7.34) **
Yes	250 (79.9)	63 (20.1)	1	1

*=p-value<0.05; **=p-value<0.001; AOR=adjusted odds ratio; CI=confidence interval.

4. Discussion

About 276 (65.4%, 95% CI: (60.8, 70)) participants scored high perceived stress associated with the COVID-19 pandemic. Being illiterate, being a merchant, having a chronic disease, not considering policies and scientific evidence, and not implementing COVID-19 preventive measures were significantly associated factors with perceived stress.

The finding of perceived stress in this study (65.4%) was higher than studies conducted in China (35%) [17], India (19.2%) [18], Colombia (15%) [16], Turkey (52.7%) [19], Dilla (51%) [15] and Bench-Sheko (41.6%) [20]. The discrepancy might be due to the variation in the study subjects in which some study focuses only on the quarantine area (study in India) and health care providers (study in Dilla) whereas, this study focused on the whole population. The variation could be due to the difference in the sampling method, for example, a study in Colombia used a convenient sampling method, and a study in Turkey was used a snowball method to select study participants. The difference could also be due to the data collection method and the tool used for assessing perceived stress. Some of the studies used a web-based data collection method whereas this study was used interview. This might be the possible reason for the difference in the prevalence of perceived stress in this study from other findings.

Those who were not learned formal education were five times higher to have perceived stress compared to those who learned college and above. This is consistent with the finding in Australia, and China [21, 22]. The possible reason could be due to illiterates might have less know-how on the disease process. But this is inconsistent with the finding in China [17] where stress was higher among more educated than illiterates. The possible explanation could be due to that educators can have access, knowledge, and information on the infectivity and fatality rate of the disease and this might increase the stress.

Being a merchant was about 6.6 times more likely to have

perceived stress as compared to government employers in this study. This is supported by the finding in China [23]. The possible explanation could be due to merchants can move from place to place which likely increases contact with many peoples and also there might be sharing of equipment within people that probably have to increase the chance of infecting by the disease. The other possible reason might also be due to occupational stress as well as the economic instability this may increase stress in merchants.

Those who did not implement policies and scientific evidence of WHO and the government about COVID-19 were three times more likely to perceived stress than those who implemented rules and scientific evidence. This is consistent with the finding in Turkey [19]. The reason could be implementing scientific evidence and polices increases preventive and controlling mechanisms and increase the trust in the community which might decrease fear and stress.

Having chronic diseases (diabetes, cerebrovascular diseases, heart diseases, and others) were significantly associated with perceived stress in this study. Those who have a chronic disease were 4.8 times more likely to have perceived stress compared to those who have not chronic disease. This is consistent with the finding in China, Turkey and Israel [24-26]. The possible explanation could be due to the information they heard from social media, health care providers, and others in which those who have chronic disease might be more vulnerable if infected by COVID-19. The chronic disease in addition to fearing being infected and hearing of the vulnerability to COVID-19 might increases stress.

In this study, those who did not practice preventive measures of COVID -19 were 3.7 times more likely to have stress compared to their counterpart. This is consistent with the finding in Turkey, and China [19, 27] where particular precautionary measure users were associated with lower levels of stress. The possible reason might be the only method of preventing and controlling measures of COVID-19 currently is hand washing, keeping social distance, using alcohol or sanitizer, and using a face mask. Practicing such preventive measures might increase their confidence not being attacked easily and decreasing the transmission of the disease this might decreases stress.

5. Conclusion

Overall, two-thirds of participants scored high perceived stress associated with the COVID-19 pandemic. Being illiterate, being a merchant, having a chronic disease, not considering policies and scientific evidence, and not practicing preventive measures of COVID-19 were significantly associated factors with perceived stress. Enhancing community awareness mainly on improving mental health and developing psychological resilience. Encourage the community on practicing and implementing COVID-19 preventive and controlling measures through an integrated way, strengthen policies and scientific evidence, and addressing the riskiest populations (chronic disease) is crucial to reducing the problem.

Abbreviations

COVID-19: Coronavirus Disease-2019
PPS: Perceived Stress Scale
WHO: World Health Organization

Conflicts of Interest

The authors declare that they have no competing interests.

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All costs of data collection and analysis were covered by the authors.

Availability of Data and Materials

The datasets used and/or analyzed are available on reasonable request.

Consent for Publication

Not applicable.

Ethical Approval and Consent to Participate

Before the data collection process, ethical clearance was secured. Voluntary, informed oral consent was obtained from each participant after explaining the purpose and benefits of the study. The study participants were informed that participating in this study is up to their willingness and they can stop the interview at any time. World Health Organization COVID-19 prevention measures were followed throughout the data collection process.

Authors' Contributions

GA was involved in the inception and design of the study, conducted data collection and entry, performed analysis and interpretation of data, wrote the report, and was a major contributor in writing the manuscript. TT supported on advising and revised the paper. All authors read and approved the final manuscript.

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