Anxiety and depression symptoms in older adults during coronavirus disease 2019 pandemic: A community-based cross-sectional study

Kemal Jemal¹, Tinsae Abeya Geleta², Berhanu Senbeta Deriba² and Mukemil Awol³

Abstract

Objectives: The coronavirus disease 2019 pandemic has caused high morbidity and mortality in older adults over the world. Because the coronavirus disease 2019 pandemic greatly affects older adults who have a preexisting health condition, they are generally susceptible to a high incidence of severe symptoms of anxiety and depression. Therefore, we aimed to assess the prevalence of anxiety and depression symptoms in older adults during the coronavirus disease 2019 pandemic.

Methods: Community-based cross-sectional study was completed in August 2020. Standardized and pretested General Anxiety Disorder–7 and Geriatric Depression Scale were used to screen the symptoms of anxiety and depression, respectively. Data were entered into EpiData (version 4.3.2) and transferred to SPSS (version 24) for further analysis. Bivariate and multivariate logistic regression analyses were carried out to determine the significantly associated variables with a 95% confidence interval at $p < 0.05$.

Results: Of the total older adults interviewed, 68.7% had developed symptoms of anxiety and 59.9% had symptoms of depression during the coronavirus disease 2019 pandemic. Female participants, having a chronic disease and poor knowledge of the coronavirus disease 2019 pandemic, were significantly associated with anxiety symptoms. Age category of 81 to 90 and above 90, lack of social support, and having a chronic disease were significantly associated with symptoms of depression.

Conclusion: The symptoms of anxiety and depression among older adults in the North Shoa Zone during coronavirus disease 2019 were higher than before the coronavirus disease 2019 happened. The results were evidence points for developing a psychological intervention to tackle the older adults’ mental health needs in the community during and after the coronavirus disease 2019 pandemic.

Keywords

Coronavirus disease 2019, anxiety, depression, older adults, Ethiopia

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Introduction

One year ago, a new disease of unknown etiology appeared in Wuhan, China, which was later rapidly identified as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2),¹ causing severe respiratory illness and declared as a pandemic on 30 January 2020 by the World Health Organization (WHO). The pandemic causes high morbidity and mortality over the world, particularly the older population, and persons who have chronic diseases are generally susceptible to a high incidence of severe disease and mortality from the coronavirus disease 2019 (COVID-19).²

The COVID-19 pandemic increases day to day, affecting older adults, and leads to serious health complications.
Around the world, more than 26.2 million infections with 870,700 confirmed deaths were reported by the WHO globally since 30 August 2020. In Africa, a total of 132,508 infected cases and 15,020 deaths have been reported. In Ethiopia specifically, an alarming total of 52,131 cases and 809 deaths have occurred as of 30 August 2020. In addition, the study conducted in Ethiopia found that older adults whose age 60 years and above have been highly affected by the COVID-19 pandemic, and 80% of admitted COVID-19 patients in the intensive care unit have died with a case fatality rate of 22.2%.5

For the most part, older adults with preexisting conditions are isolated from social support, which may increase the incidence and severity of depression and anxiety symptoms among this portion of the population.5 The WHO6 states that in many countries, older adults are facing several mental illnesses due to the high challenges of the COVID-19 pandemic. Older adults are at a higher risk of developing severe illness of COVID-19, with a fatality rate of 5.6% among 60 to 69 years and 18% above 80 years that makes them more anxious and depressed.7,8

The COVID-19 pandemic has also made a significant impact on older adults causing anxiety, adjustment disorders, depression, panic, chronic stress, and insomnia.9 In addition, it leads to social isolation, limited interaction with each other as home quarantine, and a serious public health concern due to their bio-psycho-social vulnerabilities.2

The study conducted in China found that anxiety and depression among older adults (above 60 years old) are more obvious, which was women experiencing more anxiety and depression than men.10 Also, another study done in Sweden among the older adults during the COVID-19 pandemic indicated that the majority of older adults had worried about their health condition during the COVID-19 pandemic, feeling depressed, having trouble sleeping, having difficulty concentratating, and worrying about economic downturns.11

A few studies have identified the clinical characteristic and natural course of the COVID-19 pandemic in the hospital setting in Ethiopia among older adults.12,13 However, older adults are the most vulnerable section of the population for mental problems during the COVID-19 pandemic.14 For the reason that the older adults have an underlying health condition, may have dementia or cognitive decline, may become more anxious, angry, stressed, agitated and may have withdrawn as home quarantine, and lack of accessible health facilities and dissatisfaction with health care services.15 Moreover, in Ethiopia, the COVID-19 infection affects all age groups, but the majority of deaths have been recorded among older adults greater than or equal to 60 years,4 which accelerate the cause of stressor for symptoms of anxiety and depression.16,17 In addition, the lockdown measures imposed during COVID-19 may have affected older adults living in the study area as they are financially incapable and supported by volunteers that might be an additional burden for mental problems.

There is a lack of detailed descriptions of the mental health problem of the COVID-19 pandemic in community-based older adults living in Sub-Saharan countries, particularly in Ethiopia. This finding was used for critical making decisions for the development of mental health intervention that capacitates older adults living in the community during and after the COVID-19 pandemic. Therefore, we aimed to assess the prevalence of depression and anxiety symptoms in older adults during the COVID-19 pandemic in Ethiopia.

Methods

Study design, area, and period

A community-based cross-sectional study was conducted in August 2020 in Debre Libanos District, North Shoa Zone of Oromia Regional State. The zone’s capital city is Fiche, located at a distance of 112 km from Addis Ababa in the north direction. North Shoa Zone has a total population of more than 1.6 million, where 820,595 are male and 818,992 are female. Eighty-eight percent (1,447,330) of the North Shoa population live in rural areas, and 12% (192,105) live in urban areas. North Shoa contained a higher number of older adults due to the presence of Debre Libanos monastery (Gedam), which consists of more than one-fourth (26.3%) of the population, aged above 60 years old. The North Shoa Zone has two general hospitals and three district hospitals, 65 health centers, and 297 health posts.

Study population

The study population was an older adult population whose age greater than or equal to 60 years and who have been living in the Debre Libanos District for more than 1 year. Those who are not eligible or critically ill and have hearing problems were excluded from the study. The definition of old age depends on various contexts of countries’ settings to determine the old age cut point. The United Nations uses 60 years to define old age and recommends the age range of 50 to 65 years to be used as a cutoff point by countries.18 In Ethiopia, the cut points of old age are started in 60 years.19

Sample size determination and sampling technique

The sample size required for this study was calculated using the formula to determine a single population proportion. Due to a lack of the previous study, we use a proportion of 50% and a 95% confidence interval (CI) with a 5% margin of error. The final sample size was 423. A Debre Libanos District was purposely selected due to the high number of geriatrics in the district, which contains 10 rural Kebeles (the least local administration) and one town. Each list of the household folder was obtained from
health extension workers in each Kebele, and then a list of the household was prepared. After that, from the list of households, 50% of the households were selected by the lottery method. Finally, every household in the selected Kebele was visited for an elderly interview.

**Study variables**

The outcome variables for this study were anxiety and depression. Anxiety was measured using the General Anxiety Disorder–7 (GAD-7) scale. It contains a seven-item self-reported questionnaire that is planned to screen the symptoms of anxiety. The sum score of GAD-7 is accepted with a cutoff point greater than or equal to 5.\(^{20}\) It was validated in Kenya with Cronbach’s alpha = 0.82 and intraclass correlation coefficient = 0.70.\(^{21}\) In Ethiopia, different studies used the GAD-7 tool converting into the local languages, Amharic and Afan Oromo.\(^{22–24}\) It was also reliable in our pretested study with Cronbach’s alpha = 0.75.

The other outcome variable was depression, which was measured with a Geriatric Depression Scale (GDS) that contains 15 items of questions. The question is self-reporting on how the person felt during the last week of his or her life, and the study participants were asked to answer them as “yes” or “no.” Each bold answer indicated depression (“yes” or “no”) counts one point and zeros the other. The sum is accepted as a total depression score with a cutoff point greater than or equal to 5. The scores to be obtained from the scale are between 0 and 15.\(^{25}\) Even though the GDS was not validated in Ethiopia, several studies were conducted using translated GDS into Afan Oromo and Amharic languages.\(^{26,27}\) The GDS was validated in another country among older adults were satisfactory with (Cronbach’s α = .80) and test–retest reliability (r = .73).\(^{28}\) In addition, we checked the suitability of GDS in the pretest of this study with Cronbach’s alpha = 0.84.

**Independent variables**

The independent variables included in this study were sociodemographic characteristics (age, gender, marital status, education, number of children, place of residence, and living status), source of income, family support, social support, chronic disease, substance use, knowledge of COVID-19, attitude toward COVID-19, preparedness, and response to COVID-19 pandemic. Social support was measured using the three-item Oslo Social Support Scale, with scores of 3 to 8 were categorized as poor social support and score above 9 was categorized as strong social support.\(^{29}\) In this study, it was reliable in pretested with Cronbach’s alpha = 0.68. Current substance use was defined as using at least one of the specified substances (alcohol, khat, tobacco, and coffee/caffeine) in the past 3 months.

The outcome of knowledge, attitude, preparedness, and response to the COVID-19 pandemic was measured using 12, 10, 11, and 16 questions, respectively. Taking the mean scores as a cutoff point, the outcomes were calculated after testing each outcome result’s normality distribution. The scores greater than the mean score were considered knowledgeable, positive attitude, good preparedness, and good response. Below the mean scores were considered not knowledgeable, negative attitude, poor preparedness, and poor responses to the COVID-19 pandemic.\(^{30}\) In this study, the questionnaires’ reliability was checked in a pretested questionnaire with Cronbach’s alpha 0.73 for knowledge, 0.85 for attitude, 0.86 for preparedness, and 0.79 for responses.

**Data collection tools and procedure**

The data were collected using a standardized and pre-tested questionnaire by face-to-face calling at each household. Ten nurses (BSc) data collectors and five supervisors were recruited for data collection and supervision. The questionnaire was developed from different literature that was initially written in the English language,\(^{20,25,29–33}\) and translated to Afan Oromo and Amharic languages and back-translated to the English language by language experts to check its consistency. The questionnaire contains different components: sociodemographic characteristics, living status, family support, social support, comorbidity and substance use, knowledge about COVID-19, attitude toward COVID-19, preparedness toward COVID-19, response to the COVID-19, depression, and anxiety (see Supplemental material).

Data collectors and supervisors were trained for 5 days on the purpose of the study, details of the questionnaire, interviewing techniques, the importance of privacy, and ensuring the respondents’ confidentiality. In addition to data collection training, the prevention technique of the COVID-19 pandemic with personal protective equipment was provided for data collectors and supervisors.

The pretest was done on 5% (21 samples) in Girar Jarso District other than the study area having the same sociodemographic characteristics of older adults. Close supervision at the end of every data collection was made; the questionnaire was reviewed and checked for completeness, accuracy, and consistency by the supervisor and principal investigator to take timely corrective measures. Accordingly, after discussion with data collectors and supervisors, modification was done before actual data collection.

**Data processing and analysis**

Data were coded, edited, cleaned, and entered into EpiData (version) 4.3.2 and transported to SPSS (version 24). The descriptive data analysis was done and presented in frequency, summary statistics, and table. Bivariate and multivariate logistic regression analyses were carried out, and variables with a \(p \leq 0.2\) in the bivariate analysis were
included in a multivariable logistic regression analysis to control the confounding effect variables. The model fitness was checked using the Hosmer and Lemeshow goodness-of-fit model, and the model was fitted at $p = 0.795$ for anxiety and $p = 0.638$ for depression. Finally, statistical significance was declared if $p < 0.05$.

**Ethical consideration**

The study protocol, methods, and consent form were approved by the Salale University Ethical Review Committee on 24 July 2020 Re. No. 025/2020. After thoroughly discussing the study’s ultimate purpose and method, written consent was sought from the North Shoa Zonal Health Bureau/Woreda Department. We have obtained written informed consent from participants below 90 years as they have the decisional capacity. Assent was obtained from parents/guardians for participants above 90 years old. The respondents were informed that their inclusion in the study is voluntary, and they are free to withdraw from the study if they are not willing to participate. If they do not want to answer any question, 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.

**Results**

In this study, a total of 409 participants participated with response rates of 96.7% with none response rate of 3.3% that failed to respond satisfactory items response. The mean age of the study participants was 75.13 (± standard deviation (SD) = 9.38) years, with the most age category of 60 to 70 (45.0%). The majority of study participants were male (51.3%), married (37.7%), not having formal education (70.4%), living in the rural (71.9%), and living with their family (53.5%) (Table 1).

Table 2 documented that more than two-thirds of the older adults had no social support, and one-fourth of older participants had chronic diseases. Greater than one-third (36.9%) of older adults had gained COVID-19 information from news media (TV and radio), and 38.6% of older participants currently consumed alcohol. About 62.3% and 53.3% of the older adults had good responses and preparedness toward the COVID-19 pandemic, respectively. Conversely, 57.0% and 46.0% of the older adults had poor knowledge and a negative attitude toward the COVID-19 pandemic.

This study indicated that 68.7% (281) with 95% CI = (64.4–73.6) of older adults had anxiety symptoms and 31.3% (128) with 95% CI = (26.4–35.6) of the study participants had no anxiety symptoms. On the contrary, the prevalence of depressed older adults was 59.9% (245) with 95% CI = (55.5–64.2), and 40.1% (164) with 95% CI = (35.8–44.5) of older adults had no depression symptoms (Figure 1).

### Table 1. Sociodemographic and socioeconomic characteristics in older adults during COVID-19 at North Shoa Zone, Debre Libanos District, Oromia region, Ethiopia, 2020 (N = 409).

| Variables                              | n    | %   |
|----------------------------------------|------|-----|
| **Age**                                |      |     |
| 60–70                                  | 184  | 45.0|
| 71–80                                  | 125  | 30.6|
| 81–90                                  | 71   | 17.4|
| >90                                    | 29   | 7.0 |
| **Sex**                                |      |     |
| Male                                   | 210  | 51.3|
| Female                                 | 199  | 48.7|
| **Marital status**                     |      |     |
| Single                                 | 82   | 20.0|
| Married                                | 154  | 37.7|
| Widowed                                | 113  | 27.6|
| Divorced                               | 60   | 14.7|
| **Educational status**                 |      |     |
| No formal education                    | 288  | 70.4|
| Has formal education                   | 121  | 29.6|
| **Number of children**                 |      |     |
| No children                            | 95   | 23.2|
| One child                              | 40   | 9.8 |
| Two children                           | 77   | 18.8|
| More than three children               | 197  | 48.2|
| **Source of income**                   |      |     |
| Retirement                             | 17   | 4.2 |
| Helped by family                       | 74   | 18.1|
| Farmer                                 | 122  | 29.8|
| Merchant                               | 20   | 4.9 |
| Supported by NGO                       | 135  | 33.0|
| No income                              | 41   | 10.0|
| **Place of residence**                 |      |     |
| Urban                                  | 70   | 17.1|
| Rural                                  | 294  | 71.9|
| Rehabilitation center                  | 45   | 11.0|
| **Living status**                      |      |     |
| Alone                                  | 190  | 46.5|
| With family                            | 219  | 53.5|

COVID-19: coronavirus disease 2019; NGO: nongovernmental organization.

**Factors associated with anxiety and depression**

Variables that fulfilled the criteria of $p < 0.2$ were included in multivariable logistic regression. Older adults who have no children, who were helped by family, who live alone, who current substance use (alcohol, tobacco, and caffeine), who have a poor response for COVID-19, and who have poor preparedness for COVID-19 were adjusted in multivariable logistic regression for symptoms of anxiety (Table 3).

In addition, study participants who have no formal education, who are married participants, who have one child, who live alone, who have no social support, and who habituate current substance use (alcohol) were adjusted in multivariable logistic regression for symptoms of depression (Table 4).
Female participants were 1.40 times more likely to have anxiety than male participants (adjusted odds ratio (AOR) = 1.40, 95% CI = (1.06–2.94)). The older adults who have the chronic disease were two times more likely to have anxiety compared to those who did not have the chronic disease (AOR = 2.18; 95% CI = (1.23–4.31)). The study participants who have poor knowledge of the COVID-19 pandemic were two times more likely to have anxiety than a good knowledge of the COVID-19 pandemic (AOR = 1.73; 95% CI = (1.06–2.82)) (Table 3).

Again, the study participants whose age category 81 to 90 were three times more likely to have depression than the age category of 60 to 70 (AOR = 3.43; 95% CI = (1.65–7.13)). Older adults whose age category greater than 90 years were two times more likely to develop symptoms of depression than the age category of 60 to 70 (AOR = 2.91; 95% CI = (1.03–8.24)). The older adults who have the chronic disease were two times more likely to have symptoms of depression compared to those who have no chronic diseases (AOR = 1.90; 95% CI = (1.07–3.38)), and older adults who have no social support were also associated with symptoms of depression (Table 4).

**Discussion**

The COVID-19 pandemic has been exposing people to anxiety and depression, especially at-risk groups like older adults. We found a higher depression and anxiety in older adults during the COVID-19 pandemic in the North Shoa Zone compared to the study done in Ethiopia before the COVID-19 pandemic.26 This finding also identified factors associated with anxiety and depression that are important for potential intervention targeted at psychological distress, anxiety, and depression for the community older adults in low-resource countries.

Of the study participants, 59.9% had depression symptoms, which was higher than studies conducted during the COVID-19 pandemic in Germany (14.3%), 35 Spain (25.3%), 36 China (37.1%), 37 and London, the United Kingdom (12.8%)38 that older adults had symptoms of depression. On the contrary, our result is lower than the study done in Greece that 81.6% of older adults reported symptoms of depression.39 Various conditions may aggravate the symptoms of depression, including loneliness, reduced social connectivity, coexisting illness with increasing age,40 fear of high morbidity and mortality of the COVID-19 infections,40 and isolated at home and poor exposure to the health care system.41 The deference may be also due to differences in instrument and study area, and lack of adequate social support environment during COVID-19 in our findings.

The impact of the COVID-19 pandemic on older adults induced anxiety symptoms, which positively affect physical health, increase agitation, and lead to suicidal ideation and attempt.42,43 We found that 68.7% of the study participants had self-reported symptoms of anxiety. It is higher than the study conducted in Germany (44.9%), 35 Spain (15.9%), 36

### Table 2. Variables related to older adults during COVID-19 at North Shoa Zone, Debre Libanos District, Oromia region, Ethiopia, 2020 (N = 409).

| Variables                                      | n   | %   |
|------------------------------------------------|-----|-----|
| Social support environment available           |     |     |
| No                                             | 274 | 67.0|
| Yes                                            | 135 | 33.0|
| Are you currently ill?                         |     |     |
| No                                             | 259 | 63.3|
| Yes                                            | 150 | 36.7|
| Having chronic disease                         |     |     |
| No                                             | 303 | 74.1|
| Yes                                            | 106 | 25.9|
| Current substance use                          |     |     |
| Alcohol                                        | 158 | 38.6|
| Tobacco                                        | 23  | 5.6 |
| Coffee/caffeine                                | 63  | 15.4|
| No current substance                           | 165 | 40.4|
| Source of information about COVID-19            |     |     |
| News media                                     | 151 | 36.9|
| (TV and radio)                                 | 96  | 23.5|
| Social media                                   | 75  | 18.3|
| Family or friends                              | 87  | 21.3|
| Health care providers                          |     |     |
| COVID-19 response                              |     |     |
| Poor response                                  | 154 | 37.7|
| Good response                                  | 255 | 62.3|
| COVID-19 preparedness                          |     |     |
| Poor preparedness                              | 191 | 46.7|
| Good preparedness                              | 218 | 53.3|
| COVID-19 knowledge                             |     |     |
| Poor knowledge                                 | 233 | 57.0|
| Good knowledge                                 | 176 | 43.0|
| Attitude toward COVID-19                       |     |     |
| Negative attitude                              | 188 | 46.0|
| Positive attitude                              | 221 | 54.0|

COVID-19: coronavirus disease 2019.

![Figure 1](image-url)
Conversely, the study in Greece found higher prevalence (84.5%) than our study findings.39 The reason for the discrepancy is explained by the difference in screening tools and study area that Europe and other developed countries are more affected by the COVID-19 pandemic.3

Table 3. Factors associated with symptoms of anxiety in older adults during COVID-19 at North Shoa Zone, Debre Libanos District, Oromia region, Ethiopia, 2020 (N = 409).

| Variables                        | Anxiety | Crude OR (95% CI) | p     | Adjusted OR (95% CI) | p     |
|----------------------------------|---------|-------------------|-------|----------------------|-------|
|                                  | Yes     | No                |       |                      |       |
| Sex                              |         |                   |       |                      |       |
| Male                             | 135     | 75                |       |                      |       |
| Female                           | 146     | 53                | 1.53 (1.00–2.34) | 0.048* | 1.40 (1.06–2.94) | 0.029* |
| Marital status                   |         |                   |       |                      |       |
| Single                           | 182     | 73                |       |                      |       |
| Married                          | 99      | 55                | 0.72 (0.47–1.11) | 0.135  | 0.55 (0.29–1.04) | 0.066  |
| Educational status               |         |                   |       |                      |       |
| No formal education              | 206     | 82                | 1.54 (0.98–2.41) | 0.058  | 1.16 (0.67–2.02) | 0.602  |
| Formal education                 | 75      | 46                |       |                      |       |
| Number of children               |         |                   |       |                      |       |
| No children                      | 44      | 51                | 0.25 (0.15–0.42) | 0.001* | 0.20 (0.15–1.49) | 0.065  |
| One child                        | 26      | 14                | 0.53 (0.25–1.11) | 0.093  | 0.50 (0.30–1.95) | 0.758  |
| Two children                     | 58      | 19                | 0.88 (0.47–1.63) | 0.679  | 0.83 (0.54–2.25) | 0.835  |
| More than three children         | 153     | 44                |       |                      |       |
| Source of income                 |         |                   |       |                      |       |
| Retirement                       | 11      | 6                 |       |                      |       |
| Helped by family                 | 66      | 8                 | 4.50 (1.31–15.49) | 0.017* | 1.96 (0.46–8.30) | 0.347  |
| Farmer                           | 98      | 24                | 2.23 (0.75–6.63) | 0.150  | 1.79 (0.48–4.13) | 0.377  |
| Merchant                         | 14      | 6                 | 1.27 (0.32–5.06) | 0.732  | 1.23 (0.25–3.79) | 0.792  |
| Supported by NGO                 | 66      | 69                | 0.52 (0.18–1.49) | 0.225  | 0.47 (0.20–2.50) | 0.657  |
| No income                        | 26      | 15                | 0.95 (0.29–3.08) | 0.926  | 0.90 (0.28–4.70) | 0.529  |
| Living status                    |         |                   |       |                      |       |
| Alone                            | 106     | 84                | 0.32 (0.20–0.49) | 0.001* | 0.29 (0.31–1.23) | 0.292  |
| With family/relatives            | 175     | 44                |       |                      |       |
| Social support                   |         |                   |       |                      |       |
| No                               | 181     | 93                | 0.68 (0.43–1.08) | 0.101  | 0.50 (0.28–1.64) | 0.126  |
| Yes                              | 100     | 35                |       |                      |       |
| Chronic illness                  |         |                   |       |                      |       |
| No                               | 189     | 114               |       |                      |       |
| Yes                              | 92      | 14                | 3.96 (2.16–7.28) | 0.001* | 2.18 (1.23–4.31) | 0.009* |
| Current substance use            |         |                   |       |                      |       |
| Alcohol                          | 122     | 36                | 2.62 (1.62–4.25) | 0.001* | 1.48 (0.78–2.82) | 0.251  |
| Tobacco                          | 19      | 4                 | 3.68 (1.20–11.29) | 0.023* | 1.96 (0.53–7.27) | 0.308  |
| Caffeine                         | 47      | 16                | 2.27 (1.19–4.34) | 0.013* | 1.86 (0.88–3.94) | 0.152  |
| No current substance use         | 93      | 72                |       |                      |       |
| COVID-19 response                |         |                   |       |                      |       |
| Poor response                    | 91      | 63                | 0.49 (0.32–0.76) | 0.001* | 0.45 (0.35–1.03) | 0.065  |
| Good response                    | 190     | 65                |       |                      |       |
| COVID-19 preparedness            |         |                   |       |                      |       |
| Poor preparedness                | 118     | 73                | 0.55 (0.36–0.83) | 0.005* | 0.50 (0.57–1.70) | 0.996  |
| Good preparedness                | 163     | 55                |       |                      |       |
| COVID-19 knowledge               |         |                   |       |                      |       |
| Poor knowledge                   | 175     | 58                | 1.99 (1.31–3.04) | 0.001* | 1.73 (1.06–2.82) | 0.029* |
| Good knowledge                   | 106     | 70                |       |                      |       |

COVID-19: coronavirus disease 2019; OR: odds ratio; CI: confidence interval; NGO: nongovernmental organization. I = reference; the Hosmer–Lemeshow test = 0.795.

*p < 0.05 (in bivariate and multivariate logistic regression analyses).
This study demonstrates that more than half of older adults had good COVID-19 preparedness (53.3%) and good response to COVID-19 prevention (62.3%). The current COVID-19 pandemic represents a major threat to older adults due to their coexisting health condition, having declined immunity, and high risk of infectious exposures. Because of this fact, the majority of older adults had better preparedness and response for the prevention of the COVID-19 pandemic. Even though the older adults responded for the prevention of COVID-19 infection according to WHO recommendation, this finding is lower than the studies conducted in the United States, Iran, and China. This difference may be explained that, in our study area, most of the older adults have been supported financially by different volunteers and nongovernmental organizations, which might be limited during lockdown to have enough support for COVID-19 preparedness and prevention measures.

### Table 4. Factors associated with symptoms of depression in older adults during COVID-19 at North Shoa Zone, Debre Libanos District, Oromia region, Ethiopia, 2020 (N = 409).

| Variables                      | Depression (95% CI) | Crude OR (95% CI) | p   | Adjusted OR (95% CI) | p   |
|--------------------------------|---------------------|-------------------|-----|----------------------|-----|
|                                | Yes                 | No                |     |                      |     |
| Age                            |                     |                   |     |                      |     |
| 60–70                          | 88                  | 96                | I   | I                    | I   |
| 71–80                          | 76                  | 49                | 1.69 (1.07–2.68) | 0.025* | 1.54 (0.93–2.58) | 0.097 |
| 81–90                          | 58                  | 13                | 4.87 (2.50–9.49) | 0.001* | 3.43 (1.65–7.13) | 0.001* |
| >90                            | 23                  | 6                 | 4.18 (1.63–10.75) | 0.003* | 2.91 (1.03–8.24) | 0.045* |
| Marital status                 |                     |                   |     |                      |     |
| Single                         | 179                 | 76                | I   | I                    | I   |
| Married                        | 66                  | 88                | 0.32 (0.21–0.48) | 0.001* | 0.63 (0.36–1.12) | 0.116 |
| Educational status             |                     |                   |     |                      |     |
| No formal education            | 183                 | 105               | 1.66 (1.08–2.55) | 0.021* | 1.27 (0.75–2.15) | 0.378 |
| Formal education               | 62                  | 59                | I   | I                    | I   |
| Number of children             |                     |                   |     |                      |     |
| No children                    | 62                  | 33                | 1.58 (0.95–2.62) | 0.077 | 0.76 (0.35–1.65) | 0.488 |
| One child                      | 30                  | 10                | 2.52 (1.17–5.44) | 0.018* | 1.76 (0.71–4.33) | 0.221 |
| Two children                   | 46                  | 31                | 1.25 (0.73–2.13) | 0.417 | 1.02 (0.55–1.91) | 0.944 |
| More than three children       | 107                 | 90                | I   | I                    | I   |
| Source of income               |                     |                   |     |                      |     |
| Retirement                     | 10                  | 7                 | I   | I                    | I   |
| Helped by family               | 55                  | 19                | 2.03 (0.68–6.07) | 0.207 | 1.31 (0.37–4.67) | 0.678 |
| Farmer                         | 51                  | 71                | 0.50 (0.18–1.41) | 0.191 | 0.72 (0.22–2.40) | 0.594 |
| Merchant                       | 7                   | 13                | 0.38 (0.10–1.43) | 0.151 | 0.37 (0.09–1.66) | 0.198 |
| Supported by NGO               | 93                  | 42                | 1.55 (0.55–4.35) | 0.405 | 1.44 (0.46–4.58) | 0.528 |
| No income                      | 29                  | 12                | 1.69 (0.52–5.49) | 0.381 | 1.08 (0.29–4.08) | 0.909 |
| Living status                  |                     |                   |     |                      |     |
| Alone                          | 131                 | 59                | 2.05 (1.36–3.07) | 0.001* | 1.53 (0.80–2.91) | 0.088 |
| With family/relatives          | 114                 | 105               | I   | I                    | I   |
| Social support                 |                     |                   |     |                      |     |
| No                             | 145                 | 129               | 0.39 (0.25–0.62) | 0.001* | 0.35 (0.36–0.97) | 0.045* |
| Yes                            | 100                 | 35                | I   | I                    | I   |
| Chronic illness                |                     |                   |     |                      |     |
| No                             | 169                 | 134               | I   | I                    | I   |
| Yes                            | 76                  | 30                | 2.01 (1.24–3.25) | 0.004* | 1.90 (1.07–3.38) | 0.030* |
| Current substance use          |                     |                   |     |                      |     |
| Alcohol                        | 86                  | 72                | 0.49 (0.31–0.78) | 0.002* | 0.88 (0.48–1.60) | 0.676 |
| Tobacco                        | 15                  | 8                 | 0.77 (0.31–1.93) | 0.577 | 0.70 (0.38–3.71) | 0.774 |
| Caffeine                       | 36                  | 27                | 0.55 (0.30–1.00) | 0.263 | 0.43 (0.22–1.85) | 0.115 |
| No current substance use       | 117                 | 48                | I   | I                    | I   |

COVID-19: coronavirus disease 2019; OR: odds ratio; CI: confidence interval; NGO: nongovernmental organization. I = reference; the Hosmer–Lemeshow test = 0.638. *p < 0.05 (in bivariate and multivariate logistic regression analyses).
In this study, the majority (57.0%) of older adults had poor knowledge of the COVID-19 pandemic, and having poor knowledge was significantly associated with symptoms of anxiety. This study result is higher than the study reported in China that revealed 41.8% of the study participants had below the level of cut points. Converse, 54.0% of older adults had a positive attitude toward the COVID-19 pandemic, which was lower than the study reported in China (86.7%). This difference may be explained by the difference in the study area—Instruments used and the study participants' knowledge and perception of the COVID-19 pandemic in our study area.

We found that advanced age (age category of 81–90 and above 90) was more likely to develop symptoms of depression. It is comparable with the study conducted in the United Kingdom and Vietnam, which reported as the age of elders increases, the level of depression symptoms also increases. A study conducted in China also indicated that with increasing age, depression and anxiety also increase. This is because as the age increases, the risk of coping with COVID-19 decreases and makes the older adults worry more and lead to depression.

In this study, female participants were more significantly associated with symptoms of anxiety compared to male participants. A study conducted in Germany, in which female study participants reported higher mental burden, is comparable with other studies, in which the prevalence of anxiety is higher in women than men. Women are more susceptible to suffering anxiety symptoms or posttraumatic stress disorder following a stressful event. Study documented that lack of support, being loneliness, living alone, and alcohol consumption were contributors to differences between men and women that reported aggravation of anxiety symptoms.

In our study, one-fourth (25.9%) of older adults have chronic diseases that were significantly associated with symptoms of anxiety and depression. It is in line with other studies in which medical history and chronic illnesses were positively associated with increased symptoms of anxiety and depression. This might be due to people who have chronic diseases and are also suffering from poor health may feel more vulnerable to a new disease, which confuses them and in turn causes symptoms of anxiety and depression during the COVID-19 pandemic.

In addition, more than two-thirds of study participants had no social support. The presence of social support is very important for improving loneliness and good progress of medication adherence that can reduce symptoms of anxiety and depression. We found that older adults who have no social support were significantly associated with symptoms of depression. It is comparable with the study results in China that found people who had less social support were more likely to develop symptoms of depression. The reason behind this fact is that social isolation and loneliness were associated with worse mental health outcomes that lead to symptoms of stress, anxiety, and depression.

**Limitation of the study**

This study was limited to the Debre Libanos District, which cannot be generalizable to the rest of the regions of Ethiopia, and the lack of temporality ascertainment due to its cross-sectional nature. The limited number of published articles during the COVID-19 pandemic regarding anxiety and depression among older adults in the low-resource countries had made the discussion challenging.

**Conclusion**

The symptoms of anxiety and depression among the older adult population during COVID-19 were high. Female participants, having a chronic disease and having poor knowledge of the COVID-19 pandemic, were significantly associated with anxiety symptoms. Age category of 81 to 90 and above 90, lack of social support, and having the chronic disease were significantly associated with symptoms of depression. The higher prevalence of anxiety and depression and associated factors in older adults were evidence points for developing a psychological intervention to tackle the older adults’ mental health needs during the COVID-19 pandemic. The Ethiopian Ministry of Health should give attention to strengthening the mental health gap through health extension workers for older adults who live in the community during and after the COVID-19 pandemic.

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**Author contributions**

K.J. conceived the study, involved in the study design and report writing, and reviewed, analyzed, and drafted the article. B.S.D., T.A.G., and M.A. contributed to data analysis and report writing, drafted the manuscript, gave final approval of the version to be published, and agreed to be accountable for all aspects of the work.

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Availability of data and material

The datasets generated and/or analyzed during the current study are not publicly available. The sharing of data was not included in the approval from the ethics committee but is available from the corresponding author on a reasonable request.

Ethical approval and consent to participate

The study protocol, methods and consent form were approved by the Salale University Ethical Review Committee on 24 July 2020 Re. No. 025/2020. After thoroughly discussing the study’s ultimate purpose and method, written consent was sought from the North Shoa Zonal Health Bureau/Woreda Department. We have obtained written informed consent from participants below 90 years as they have the decisional capacity. Assent was obtained from parents/guardians for participants above 90 years old. The respondents were informed that their inclusion in the study is voluntary, and they are free to withdraw from the study if they are not willing to participate. If they do not want to answer any question, 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.

ORCID iDs

Kemal Jemal https://orcid.org/0000-0001-8922-1827
Berhanu Senbeta Deriba https://orcid.org/0000-0002-4282-1427

Supplemental material

Supplemental material for this article is available online.

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