Depression, Anxiety and Stress Levels among Chronic Disease Patients During COVID-19 Pandemic in Dessie Town Hospitals, Ethiopia

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Abstract:

Introduction: Coronavirus disease 2019 was first detected in China in December 2019. In Ethiopia, depression, anxiety, and stress levels of chronic disease patients were not known during COVID-19. Thus, this study aimed to assess depression, anxiety, and stress levels of chronic disease patients in government and private hospitals of Dessie town during COVID-19.

Methods: Hospital-based cross-sectional study design was used. The Depression Anxiety and Stress Scale-21 was used to measure depression, anxiety, and stress of chronic disease patients during the current pandemic. Both binary and multivariate logistic regression analyses were performed to identify factors, and a significant association was declared at p-value < 0.05 in multivariate analysis.

Results and Discussion: The overall anxiety, depression, and stress level were 19.9%, 21.5%, and 17.7%, respectively. In multivariate analysis, older age, female gender, urban residency, duration of living with chronic diseases, and presence of comorbidities were associated with depression of chronic disease patients during the pandemic at p-value <0.05. Age, female gender, presence of comorbidities, and no social support were associated with anxiety. Urban residency, use of hand sanitizer, those who had respiratory manifestations, and travel history in the last two weeks were significantly associated with stress levels.

Conclusion: A significant number of chronic disease patients had depression, anxiety, and stress during the COVID-19 pandemic. Therefore, governmental and non-governmental organizations, health professionals, media, and hospital administrators should be involved to decrease the depression, anxiety, and stress of chronic disease patients during the pandemic. Moreover, we encourage researchers to conduct comparative longitudinal studies to assess depression, anxiety, and stress levels of chronic disease patients before and after the onset of the COVID-19 pandemic.

Keywords: Depression, Anxiety, Stress, Chronic disease patient, COVID-19, Dessie town.

1. INTRODUCTION

Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) is the etiology of COVID-19. This virus was first reported in China in December 2019, and it has been spreading globally. On March 11, 2020, WHO announced COVID-19 as a universal pandemic [1].

COVID-19 is mainly a respiratory disease that is manifested by cough, fever, dyspnea, fatigue, myalgia, headache, chills, and sore throat. Patients with symptoms of shortness of breath and anorexia may require intensive care units. At the time of admission, only 44% of patients infected with the novel coronavirus had a fever, but about 89% would be febrile during hospitalization [2 - 4].

This disease ranges from mild symptoms to severe diseases like Disseminated Intravascular Coagulation (DIC), Acute Respiratory Distress Syndrome (ARDS), renal failure, and...
Sex, occupation, residency, family size, marital status, and number of house rooms.

2.9. Data Collection Tool

Structured interviewer-administered questionnaires were used for data collection, which consists of three sections.

(1) Socio-demographic characteristics: Age, educational level, sex, occupation, residency, family size, marital status, and number of house room.

(2) Clinical characteristics: Type of chronic diseases, duration of chronic disease, presence of co-morbidities, respiratory manifestations in the last two weeks, travel history to other areas, having social support, member of community health insurance, use of face mask and hand sanitizer.

(3) Depression, anxiety, and stress level: DASS-21 was used.

2.2. Study Design and Period

A facility-based cross-sectional study was done from July 20 to August 5, 2020.

2.3. Source Population

All chronic disease clients who attended inpatient departments and outpatient clinics in Dessie town government and private hospitals were the source population.

2.4. Study Population

All chronic disease patients who attended selected Dessie town government and private hospitals during the study period were the study population.

2.5. Inclusion Criteria

All patients with chronic disease aged 18 years and above who visited government and private hospitals in Dessie town during the study period were included.

2.6. Exclusion Criteria

Critical ill and hearing impairment patients were excluded.

2.7. Sample Size Determination

It is calculated by using simple proportion formula \(n = \frac{(Z\ a/2)^2 \cdot P(1-P)}{d^2}\). A proportion of 50% was used because there were no published data on chronic diseases patients’ depression, anxiety, and stress level during the pandemic in our country up to the date of data collection of this study, 95% confidence level \((Z=1.96)\), 5% margin of error, and 10% non-response rate. Thus, the final sample size was 422.

2.8. Sampling Technique and Procedure

In Dessie town, there are five hospitals. Of those, the Dessie referral hospital and two private hospitals, namely Selam and Ethio general hospitals, were selected by using a simple random sampling technique. To determine the clients load in selected hospitals, the daily average flow of chronic disease patients at in-patient and out-patient clinics were estimated. Proportional allocation was made based on clients’ load on the selected facilities (295: Dessie referral hospital; 67: Ethio general hospital; 60: Selam general hospital). Finally, a systematic random sampling method was employed to select study participants.

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used to measure the level of depression, anxiety, and stress. Each subscale has seven items. Each question has 0 to 3 responses (0 = did not apply to me at all, 1 = applied to me to some degree or some of the time, 2 = applied to me to a considerable degree or a good part of time, 3 = applied to me very much or most of the time). The scores for depression, anxiety, and stress were calculated by summing each item. The DASS-21 score was multiplied by 2 to get the final score (DASS-42). Other researchers also use this multiplication to get DASS-42. Of DASS-21, question numbers 3, 5, 10, 13, 16, 17, and 21 were used to assess depression, and it was divided into normal (0–9), mild depression (10-13), moderate depression (14 - 20), severe depression (21 - 27), and extremely severe depression (28 - 42). Question numbers 2, 4, 7, 9, 15, 19, and 20 were used to measure anxiety, and it was divided as normal (0–7), mild anxiety (8–9), moderate anxiety (10–14), severe anxiety (15–19), and extremely severe anxiety (20 - 42). Moreover, question numbers 1, 6, 8, 11, 12, 14, and 18 formed stress subscale and divided into normal (0–14), mild stress (15–18), moderate stress (19-25), severe stress (26 - 33), and extremely severe stress (34 - 42). We used a reliable and valid tool to measure depression, anxiety, and stress levels. The internal consistency (Cronbach’s alpha) of each subscale was high (Depression subscale 0.72; Anxiety subscale 0.77; and Stress subscale 0.70). The overall score of all items also had high consistency (Cronbach’s alpha = 0.88) [33 - 35].

2.10. Data Collection Procedure and Quality Control

The data collection tool was translated from English to Amharic (the local language of the study area) and then back to English to check its consistency. Pre-test was conducted by taking 10% of the sample size in the non-selected hospital (Baty hospital). Training was given to data collectors and supervisors. The data were collected under regular supervision after giving training for data collectors. Data collection was done by wearing a face mask and by maintaining the physical distance of two meters.

2.11. Data Processing and Analysis

Epidata 3.1 was used for data entry, and SPSS version 23.0 was utilized for analysis. Descriptive statistics of continuous variables were presented by using mean and discrete variables by using percentages and tables. Binary logistic regression analysis was tested along with 95% CI to assess the degree of association between outcome and independent variables. Variables that had a p-value of <0.2 in bivariate analysis were entered into a multivariate model to control confounding variables. A significant association was declared at the p-value of <0.05 in multivariate analysis.

3. RESULTS

3.1. Depression, Anxiety and Stress Levels of Chronic Disease Patients During COVID-19 Pandemic

Overall, 21.5% (95% CI: 17.5-25.6) of chronic diseases patients had depression during the COVID-19 pandemic. Furthermore, during the pandemic, 19.9% (95% CI: 16.0-23.9) and 17.7% (95% CI: 14.1-21.1) of participants showed anxiety and stress, respectively (Table 1).

Table 1. Depression, anxiety and stress level of chronic disease patients during COVID-19 pandemic in Dessie town government and private hospitals, Northeast Ethiopia, 2020 (n=413).

| Depression Status       | Frequency | Percentage | 95% CI   |
|-------------------------|-----------|------------|----------|
| Normal (0-9)            | 324       | 78.5       | 74.4-82.5|
| Mild depression (10-13) | 42        | 10.2       | 7.4-13.3 |
| Moderate depression     | 41        | 9.9        | 6.9-12.6 |
| Severe depression (21-27)| 4         | 1.0        | 0.1-1.9  |
| Extremely Severe depression (28-42)| 2 | 0.5 | 0-1.2 |
| Overall depression (10-42) | 89       | 21.5       | 17.5-25.6|

| Anxiety Status          | Frequency | Percentage | 95% CI   |
|-------------------------|-----------|------------|----------|
| Normal (0-7)            | 331       | 80.1       | 76.1-84.0|
| Mild anxiety (8-9)      | 35        | 8.5        | 5.8-11.4 |
| Moderate anxiety (10-14) | 38       | 9.2        | 6.1-11.9 |
| Severe anxiety (15-19)  | 5         | 1.2        | 0.2-2.4  |
| Extremely severe anxiety (20-42)| 4 | 1.0 | 0.2-2.2 |
| Overall anxiety (8-42)  | 82        | 19.9       | 16.0-23.9|

| Stress Status           | Frequency | Percentage | 95% CI   |
|-------------------------|-----------|------------|----------|
| Normal (0-14)           | 340       | 82.3       | 78.9-85.9|
| Mild stress (15-18)     | 38        | 9.2        | 6.4-12.1 |
| Moderate stress (19-25) | 24        | 5.8        | 3.6-8.0  |
| Severe stress (26-33)   | 8         | 1.9        | 0.7-3.5  |
| Extremely severe stress (34-42)| 3 | 0.7 | 0-1.7 |
| Overall stress (15-42)  | 72        | 17.7       | 14.1-21.1|
### 3.2. Factors Associated with Depression of Chronic Disease Patients During COVID-19 Pandemic

In multivariate analysis, age $\geq$55 years (AOR=2.350; 95% CI: 1.102-5.009; p-value: 0.027), female gender (AOR =2.102; 95% CI: 1.141-3.872; p-value: 0.017), urban residency (AOR =2.352; 95% CI: 1.242-4.454; p-value: 0.009), living with chronic diseases for 5-10 years (AOR =2.451; 95% CI: 1.224-4.909; p-value: 0.011) and $>$10 years (AOR =3.064; 95% CI: 1.356-6.923; p-value: 0.007), and presence of additional comorbidities (AOR =2.311; 95% CI: 1.108-4.819; p-value: 0.025) were significantly associated with depression of chronic disease patients during COVID-19 (Table 2).

| Variables                        | Depression | OR(95% CI) | P-value |
|----------------------------------|------------|------------|---------|
|                                  | Yes N (%)  | No N (%)   | COR     | AOR      | P-value |
| Age in year                      |            |            |         |          |         |
| 18-34                            | 15(10.8)   | 124(89.2)  | 1       | 1        |         |
| 35-54                            | 28(21.9)   | 100(78.1)  | 2.315(1.172-4.570) | 1.408(0.632-3.137) | 0.403  |
| $\geq$55                         | 46(31.5)   | 100(68.5)  | 3.803(2.006-7.208) | 2.350(1.102-5.009) | 0.027  |
| Sex                              |            |            |         |          |         |
| Male                             | 30(15.2)   | 168(84.8)  | 1       | 1        |         |
| Female                           | 59(27.4)   | 156(72.6)  | 2.118(1.297-3.459) | 2.102(1.141-3.872) | 0.017  |
| Occupation                       |            |            |         |          |         |
| Student                          | 8(13.1)    | 53(86.9)   | 1       | 1        |         |
| Employed                         | 17(20.0)   | 68(80.0)   | 1.656(0.664-4.131) | 1.209(0.379-3.857) | 0.749  |
| House wife                       | 41(25.8)   | 118(74.2)  | 2.302(1.010-5.247) | 1.183(0.358-3.907) | 0.782  |
| Merchant                         | 1(4.8)     | 20(94.2)   | 0.331(0.039-2.820) | 0.369(0.037-3.638) | 0.393  |
| Farmer                           | 5(33.3)    | 10(66.7)   | 3.312(1.324-8.287) | 1.977(0.498-7.857) | 0.333  |
| Unemployed                       | 8(7.4)     | 3(92.6)    | 0.530(1.052-2.680) | 0.267(0.039-1.814) | 0.177  |
| Residency                        |            |            |         |          |         |
| Urban                            | 70(26.1)   | 198(73.9)  | 2.344(1.347-4.080) | 2.352(1.242-4.454) | 0.009  |
| Rural                            | 19(13.1)   | 126(86.9)  | 1       | 1        |         |
| Marital status                   |            |            |         |          |         |
| Not married                      | 14(16.3)   | 72(83.7)   | 1       | 1        |         |
| Married                          | 60(20.9)   | 227(79.1)  | 1.359(0.717-2.576) | 1.085(0.422-2.792) | 0.866  |
| Divorced                         | 7(46.7)    | 8(53.3)    | 4.500(1.404-14.423) | 3.085(0.731-13.011) | 0.125  |
| Widowed                          | 8(32.0)    | 17(68.0)   | 2.420(0.875-6.690) | 1.120(0.285-4.405) | 0.871  |
| Number of house room             |            |            |         |          |         |
| 1                                | 17(20.5)   | 66(79.5)   | 1.101(0.588-2.058) | 0.860(0.414-1.785) | 0.685  |
| 2                                | 28(28.6)   | 70(71.4)   | 1.709(0.988-2.955) | 1.425(0.681-2.983) | 0.347  |
| $\geq$3                         | 44(19.0)   | 188(81.0)  | 1       | 1        |         |
| Duration of chronic diseases in years |            |            |         |          |         |
| <5                               | 50(16.3)   | 257(83.7)  | 1       | 1        |         |
| 5-10                             | 21(32.8)   | 43(67.2)   | 2.510(1.373-4.589) | 2.451(1.224-4.909) | 0.011  |
| $>$10                            | 18(42.9)   | 24(57.1)   | 3.855(1.949-7.625) | 3.064(1.356-6.923) | 0.007  |
| Presence comorbidities           |            |            |         |          |         |
| Yes                              | 24(38.1)   | 39(61.9)   | 2.698(1.518-4.797) | 2.311(1.108-4.819) | 0.025  |
| No                               | 65(18.6)   | 285(81.4)  | 1       | 1        |         |
| Presence of respiratory symptoms in the last 2 weeks |            |            |         |          |         |
| Yes                              | 17(41.5)   | 24(58.5)   | 2.951(1.507-5.782) | 2.199(0.789-6.130) | 0.132  |
| No                               | 72(19.4)   | 300(80.6)  | 1       | 1        |         |
| Travel history to other areas in the last 2 weeks |            |            |         |          |         |
| Yes                              | 7(43.8)    | 9(56.3)    | 2.988(1.080-8.262) | 0.553(0.135-2.269) | 0.411  |
| No                               | 82(20.7)   | 315(79.3)  | 1       | 1        |         |
| Having social support            |            |            |         |          |         |
| Yes                              | 62(18.7)   | 270(81.3)  | 1       | 1        |         |
| No                               | 27(33.3)   | 54(66.7)   | 2.177(1.271-3.730) | 1.689(0.875-3.260) | 0.118  |

AOR: Adjusted odds ratio; COR: Crude odds ratio; N: Frequency; OR: odds ratio.

Table 2. Factors associated with depression of chronic disease patients during COVID-19 pandemic in Dessie town government and private hospitals, Northeast Ethiopia, 2020 (n=413).
3.3. Factors Associated with Anxiety of Chronic Disease Patients During COVID-19 Pandemic

In multivariate analysis, age group of 35-54 years (AOR=2.169; 95% CI: 1.033-4.554; p-value: 0.041) and ≥55 years (AOR=2.335; 95% CI: 1.151-4.736; p-value: 0.019) were more likely to have anxiety compared to those who had age 18-34 years. Females had two times higher anxiety (AOR=2.062; 95% CI: 1.177-3.613; p-value: 0.011) than males, and patients with the presence of additional comorbidities were three times more likely to have anxiety (AOR=2.809; 95% CI: 1.456-5.418; p-value: 0.002) as compared to those who had no other comorbidities. Moreover, patients who had no social support were two times more likely to have anxiety (AOR=2.041; 95% CI: 1.106-3.764; p-value: 0.022) compared to those who had social support (Table 3).

3.4. Factors Associated with the Stress of Chronic Disease Patients During COVID-19 Pandemic

In multivariate analysis, urban residency (AOR=2.041; 95% CI: 1.036-4.021; p-value: 0.039), presence of respiratory manifestations in the last 2 weeks (AOR=4.522; 95% CI: 1.638-12.482; p-value: 0.004), travel history to other areas in the last 2 weeks (AOR=4.070; 95% CI: 1.059-15.639; p-value: 0.041), and hand sanitizer use (AOR=2.218; 95% CI: 1.227-4.008; p-value: 0.008) were significantly associated with stress of chronic disease patients during the current pandemic (Table 4).

Table 3. Factors associated with anxiety of chronic disease patients during COVID-19 pandemic in Dessie town government and private hospitals, Northeast Ethiopia, 2020 (n=413).

| Variables                                | Anxiety | OR(95% CI) | P-value |
|------------------------------------------|---------|------------|---------|
|                                          | Yes N (%) | No N (%) | COR | AOR |
| Age in year                              |          |           |      |     |
| 18-34                                    | 16(11.5) | 123(88.5) | 1 | 1 |
| 35-54                                    | 29(22.7) | 99(77.3)  | 2.252(1.158-4.380) | 2.169(1.033-4.554) | 0.041 |
| ≥55                                      | 37(25.3) | 109(74.7) | 2.610(1.374-4.952) | 2.335(1.151-4.736) | 0.019 |
| Sex                                      |          |           |      |     |
| Male                                     | 28(14.1) | 170(85.9) | 1 | 1 |
| Female                                   | 54(25.1) | 161(74.9) | 2.036(1.229-3.373) | 2.062(1.177-3.613) | .011 |
| Marital status                           |          |           |      |     |
| Not married                              | 13(15.1) | 73(84.9)  | 1 | 1 |
| Married                                  | 54(18.8) | 233(81.2) | 1.301(0.673-2.518) | 1.003(0.475-2.118) | 0.993 |
| Divorced                                 | 6(0.0)   | 9(6.0)    | 3.744(1.139-12.301) | 2.673(0.739-9.671) | 0.134 |
| Widowed                                  | 9(3.6)   | 16(6.4)   | 3.159(1.153-8.651) | 1.880(0.607-5.829) | 0.274 |
| Duration of chronic diseases in years    |          |           |      |     |
| <5                                       | 56(18.2) | 251(81.8) | 1 | 1 |
| 5-10                                     | 12(18.8) | 52(81.3)  | 1.034(0.518-2.065) | 0.796(0.369-1.718) | 0.561 |
| >10                                      | 14(33.3) | 28(66.7)  | 2.241(1.109-4.331) | 1.405(0.629-3.141) | 0.407 |
| Presence comorbidities                   |          |           |      |     |
| Yes                                      | 25(39.7) | 38(60.3)  | 3.382(1.895-6.034) | 2.809(1.456-5.418) | 0.002 |
| No                                       | 57(16.3) | 293(83.7) | 1 | 1 |
| Presence of respiratory symptoms in the last 2 weeks | | | |
| Yes                                      | 15(36.6) | 26(63.4)  | 2.626(1.320-5.227) | 1.536(0.583-4.044) | 0.385 |
| No                                       | 67(18.0) | 305(82.0) | 1 | 1 |
| Travel history to other areas in the last 2 weeks | | | |
| Yes                                      | 7(43.8)  | 9(56.2)   | 3.339(1.205-9.253) | 2.576(0.611-10.858) | 0.197 |
| No                                       | 75(18.9) | 322(81.1) | 1 | 1 |
| Having social support                    |          |           |      |     |
| Yes                                      | 56(16.9) | 276(83.1) | 1 | 1 |
| No                                       | 26(32.1) | 55(67.9)  | 2.330(1.347-4.029) | 2.041(1.106-3.764) | 0.022 |
| Hand sanitizer use                       |          |           |      |     |
| Yes                                      | 28(25.5) | 82(74.5)  | 1.575(0.936-2.649) | 1.536(0.864-2.730) | 0.143 |
| No                                       | 54(17.8) | 249(82.2) | 1 | 1 |

AOR: Adjusted odds ratio; COR: Crude odds ratio; N: Frequency; OR: odds ratio.
Table 4. Factors associated with the stress of chronic disease patients during COVID-19 pandemic in Dessie town government and private hospitals, Northeast Ethiopia, 2020 (n=413)

| Variables                     | Stress | OR(95% CI) | P-value |
|-------------------------------|--------|------------|---------|
|                               | Yes N (%) | No N (%)  | COR     | AOR     |
| Age in year                   |         |            |         |         |
| 18-34                         | 19(13.7) | 120(86.3)  | 1       |         |
| 35-54                         | 30(23.4) | 98(76.6)   | 1.933(1.026-3.643) | 1.477(0.672-3.249) | 0.332 |
| ≥55                           | 24(16.4) | 122(83.6)  | 1.242(0.647-2.386) | 1.314(0.599-2.884) | 0.496 |
| Sex                           |         |            |         |         |
| Male                          | 27(13.6) | 171(86.4)  | 1       |         |
| Female                        | 46(21.4) | 169(78.6)  | 1.724(1.024-2.901) | 1.397(0.738-2.645) | 0.304 |
| Marital status                |         |            |         |         |
| Not married                   | 13(15.1) | 73(84.9)   | 1       |         |
| Married                       | 52(18.1) | 235(81.9)  | 1.243(0.641-2.499) | 0.722(0.290-1.792) | 0.482 |
| Divorced                      | 6(40.0)  | 9(60.0)    | 3.744(1.139-12.301) | 1.839(0.442-7.650) | 0.402 |
| Widowed                       | 2(8.0)   | 23(92.0)   | 0.488(0.103-2.325) | 0.292(0.050-1.688) | 0.169 |
| Occupation                    |         |            |         |         |
| Student                       | 8(13.1)  | 53(86.9)   | 1       |         |
| Employed                      | 17(20.0) | 68(80.0)   | 1.656(0.664-4.131) | 1.267(0.388-4.144) | 0.695 |
| House wife                    | 38(23.9) | 121(76.1)  | 2.081(0.909-4.762) | 1.449(0.447-4.192) | 0.536 |
| Merchant                      | 4(19.0)  | 17(81.0)   | 1.559(0.417-5.828) | 1.470(0.396-7.650) | 0.621 |
| Farmer                        | 4(6.7)   | 56(93.3)   | 0.473(0.135-1.664) | 0.231(0.042-1.275) | 0.093 |
| Unemployed                    | 2(7.4)   | 25(92.6)   | 0.530(0.105-2.680) | 0.422(0.072-2.461) | 0.337 |
| Residence                     |         |            |         |         |
| Urban                         | 58(21.6) | 210(78.4)  | 2.394(1.303-4.398) | 2.041(1.036-4.021) | 0.039 |
| Rural                         | 15(10.3) | 130(89.7)  | 1       |         |
| Family size                   |         |            |         |         |
| 1-3                           | 22(13.2) | 145(86.8)  | 1       |         |
| ≥4                            | 51(20.7) | 195(79.3)  | 1.724(1.000-2.970) | 1.775(0.943-3.342) | 0.076 |
| Presence comorbidities        |         |            |         |         |
| Yes                           | 17(27.0) | 46(73.0)   | 1.940(1.038-3.626) | 1.621(0.750-3.507) | 0.220 |
| No                            | 56(16.0) | 294(84.0)  | 1       |         |
| Presence of respiratory symptoms in the last 2 weeks |         |            |         |         |
| Yes                           | 15(36.6) | 26(63.4)   | 3.123(1.560-6.255) | 4.522(1.638-12.482) | 0.004 |
| No                            | 58(14.6) | 31(84.4)   | 1       |         |
| Travel history to other areas in the last 2 weeks |         |            |         |         |
| Yes                           | 7(45.8)  | 9(54.2)    | 3.901(1.403-10.844) | 4.070(1.059-15.639) | 0.041 |
| No                            | 66(16.6) | 331(83.4)  | 1       |         |
| Face mask use                 |         |            |         |         |
| Yes                           | 56(21.5) | 205(78.5)  | 2.169(1.209-3.892) | 1.842(0.956-3.549) | 0.068 |
| No                            | 17(11.2) | 135(88.8)  | 1       |         |
| Hand sanitizer use            |         |            |         |         |
| Yes                           | 33(30.0) | 77(70.0)   | 2.818(1.665-4.769) | 2.218(1.227-4.008) | 0.008 |
| No                            | 40(13.2) | 263(86.8)  | 1       |         |

AOR: Adjusted odds ratio; COR: Crude odds ratio; N: Frequency; OR: odds ratio.

4. DISCUSSION

Currently, COVID-19 is a major global health problem, including in Ethiopia. The current study investigated the depression, anxiety, and stress level of chronic disease patients. This finding could help inform policymakers, health professionals, and non-governmental organizations to alleviate the mental problems of chronic disease patients during the period of COVID-19.

In our study, 21.5% (95% CI: 17.5-25.6) of chronic disease patients had depression during the COVID-19 pandemic from mild to extremely severe cases. This finding was supported by studies conducted in China (20.1%) [25], UK (22.12%) [30], and Nigeria (23.5%) [36]. However, it was lower than that found in studies in China (37.1%) [27], (53.5%) [37], Japan (43.1%) [38], Nepal (34%) [39], India (38.9%) [31], Iraq (44.9%) [29] and Italy (32.8%) [32]. The finding is higher than that found in another study in China (17.17%) [40]. These
discrepancies might be due to the difference in COVID-19 burden in different settings, a time gap of studies in various settings and countries, and the presence of differences in perceived susceptibility towards the pandemic in various study areas.

With regard to anxiety, 19.9% (95% CI: 16.0-23.9) of patients with chronic disease had anxiety. This is in line with studies done in Italy (18.7%) [32] and UK (21.63%) [30]. However, this result is lower than the studies conducted in Nigeria (49.6%) [36], Spain (32.4%) [41], Iraq (47.16%) [29], India (43%) [31], Nepal (31%) [39], Japan (33.2%) [38] and China (29%) [27]. However, it is higher than a study done in some regions of China (6.33%) [40]. These discrepancies between this and other studies might be due to the difference in perceived severity and perceived susceptibility towards COVID-19 and time gaps of studies in various countries.

In our study, the overall stress from mild to extremely severe stress was 72 (17.7%) (95% CI: 14.1-21.1). This finding was similar with a study carried out in Iraq (17.5%) [29], but it is lower than studies conducted in Spain (37%) [41], India (35.7%) [31], China (32.1%) [24] and Italy (27.2%) [32]. This discrepancy could be related to the difference in the burden of the pandemic in different study areas, the time gap between studies, and the difference in socio-demographic profile.

Overall, our study revealed that depression, anxiety, and stress were common in chronic disease patients during the COVID-19 pandemic, which needs interventions by the government, local administrations, health care workers, and researchers as well as non-governmental organizations.

In our study, associated factors of depression, anxiety, and stress were also identified. Age ≥55 years were associated with depression symptoms as compared to age from 18-34 years. Age ≥55 years and 35-54 years were also significantly associated with the anxiety level of chronic disease patients as compared to age 18-34 years. This finding contradicts a study done in Japan where depressive symptoms and anxiety symptoms were higher for young and middle-aged respondents compared to older respondents [38]. A study done in China also revealed that young aged individuals (21-40 years) were more vulnerable to mental illnesses [27]. This discrepancy could be explained by the fact that older aged people in this study may have more economic problems as compared to Japan and China, that end up with higher depression and anxiety during COVID-19.

Female gender was significantly associated with anxiety and depression of chronic diseases patients during COVID-19, which was similar to studies conducted in China, Iraq, Italy, and Nepal [24, 29, 32, 39]. This might be related to gender-based violence and the economical influence on females which made them develop depression and anxiety over the COVID-19 burden. The finding was also supported by other studies in which females were more vulnerable to experiencing and developing post-traumatic symptoms than males [42].

Urban residency and the presence of comorbidities were significantly associated with depression of chronic disease patients. A study carried out in Turkey also revealed that the pandemic had a greater effect on urban dwellers and on those who had comorbidities [43]. Duration of living with chronic diseases 5-10 years and > 10 years were also significantly associated with depression of chronic disease patients during the current pandemic as compared to less than 5 years. This implies that as the duration of the disease becomes longer, the burden on mental health becomes high.

People having no social support were more likely to have anxiety compared to those with social support. This is similar to a study carried out in China where social support and anxiety were negatively correlated. This suggested that the anxiety level of patients having chronic diseases should be monitored during the pandemic [44].

The presence of respiratory manifestations in the past two weeks was significantly associated with the stress level of chronic disease patients during the current pandemic. This is in line with a study conducted on populations of Spain where significant positive associations were found between stress level and COVID-19 symptoms [41]. Travel history in the last 2 weeks and hand sanitizer use also had an association with stress levels. The possible reason might be that as people travel to other areas during the pandemic, they may over think about the transmission of the diseases during their journey, which might lead to stress. More stressed individuals might use hand sanitizer more frequently as they might think about the COVID-19 pandemic over and over again.

This study had limitations. Due to the cross-sectional nature of the study, it is difficult to conclude the prolonged effect of COVID-19. In addition, we tried to compare our findings with general population studies due to the availability of limited researches on patients with chronic diseases, depression, anxiety, and stress levels during the COVID-19 pandemic.

CONCLUSION

A noteworthy number of chronic disease patients had depression, anxiety, and stress during the COVID-19 pandemic. Age ≥55 years, being female, urban residency, living with chronic diseases for a longer duration, and presence of additional comorbidities were significantly associated with depression of patients during COVID-19. During the pandemic, older age, female gender, presence of comorbidities, and no social support were independently associated with anxiety of chronic disease patients. Furthermore, urban residency, hand sanitizer use, presence of respiratory manifestations, and travel history to other areas in the last two weeks were factors associated with stress of chronic disease patients during the pandemic. Therefore, governmental and non-governmental organizations, health professionals, media, and hospital administrators should be involved in decreasing the depression, anxiety, and stress of chronic disease patients during the pandemic. Since COVID-19 is still an ongoing public health problem, the need for mental health interventions throughout the remainder of the pandemic is crucial. Moreover, we encourage researchers to conduct comparative longitudinal studies to assess depression, anxiety, and stress level of chronic disease patients before and after the onset of the COVID-19 pandemic.
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