



Research article

The prevalence of depression and anxiety among cardiovascular patients at University of Gondar specialized hospital using beck's depression inventory II and beck anxiety inventory: A cross-sectional study

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ABSTRACT

Psychosocial issues are leading factor as well as consequences of cardiovascular disease. Identifying factors associated with depression facilitate service quality improvement for inpatients. This study assessed the prevalence and identified associated factors with depression and anxiety among patients with cardio vascular disease.

Method: An institution-based cross-sectional study was conducted with a convenience sample of 370 stable adult patients from June 1 to July 30, 2020 among cardiovascular disease patients at the University of Gondar Specialized Hospital Ethiopia. Data were collected by using structured questionnaires. Data analyses were conducted using SPSS version 21. The statistical significance declared at p-value <0.05.

Result: In this study, among 370 Cardiovascular diseases patients, 228 (61.6 %) suffer from anxiety, and 53.51 % (198) suffer with depression. There was a significant mean difference in the level of depression and anxiety between male and female Cardiovascular diseases patients. The females' scores of depression (mean = 28, p < 0.01) and anxiety (mean = 25.3, p < 0.01) were more than that of males 'scores of depression (mean = 15.1, p < 0.01) and anxiety (mean = 12.3, p < 0.01). Cardiovascular diseases patients aged greater than 60 years have the highest rate of prevalence of depression in all age group. Being in the age category of greater than 60 years was 1.16 (0.57–2.32) times more likely to have depression than the age category of 18–24 years. Depression and anxiety were significantly associated with being woman, widowed, being single, unable to read and write, and possess mental disorders history.

1. Introduction

Cardiovascular diseases (CVDs) are the most prevalent disorder that causes 17.9 million deaths globally in 2017, accounts 32 % of worldwide fatalities. The most common CVD were hypertension (47 %), cerebrovascular accident or ischemic stroke (16 %), cardiac failure (11 %), ischemic heart disease (7 %), and rheumatic heart disease (5 %) [1,2]. Depression affects more than 300 million people

Abbreviations: CVDs, Cardiovascular diseases; BDI, Beck Depression Inventory; BAI, Beck Anxiety Inventory.

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around the globe and proposed to be the leading cause of ill health and disability in 2030. In a similar way, anxiety also affected about 272 million people. About half of patients affected with depression are also affected with an anxiety disorder. Anxiety and depression are common mental disorders in CVD patients. About 15–30 % CVD patients diagnosed with depression. The American Heart Association suggests routine diagnosis of depression in patients with Heart disease [3]. Many CVD patients usually face tough experience such as somatic symptoms, decrease quality of life, and role impairment, which make them to get depressed [2,3]. The rates of depression in CVD patients are three times greater than in the general population. Besides, depression and anxiety worsen the prognosis and quality of life, increase readmission to Hospital, and mortality in patients with CVD [4].

Mental health disorders affect the course of CVD prognosis. Persistent depression cause permanent brain damage, aggravate heart failure, increase hospital readmission, and affect the quality of life. Depression increases hospital-admitted patients' mortality [4,5]. Integrating mental health into CVD treatment is vital in developing countries, where the prevalence of anxiety and depression is high. In the World Mental Health data, the association of CVD with mental disorders was 2.1 for depression and 2.2 for anxiety symptoms [6]. Unaddressed mental care needs may be a crucial obstacle for better treatment of CVD patients, while CVD remains the major cause of mortality and morbidity [4]. Depressive and anxiety disorders are prevalent in hospital-admitted patients. Approximately, 95.4 % of patients with ischemic heart disease showed either depression or anxiety symptoms. A patient with anxiety for a long time is associated with an increased risk of myocardial infarction. Anxiety affects drug adherence in CVD patients and limits treatment option, worsens the prognosis, and increases mortality [7]. Depressed persons practice less healthy habits, so they are exposed to risk factors such as not following a prescribed diet and not visiting a physician than individual without depression and anxiety. Depression reported as a risk factor for poor drug adherence and CVD outcomes [2,6]. A study done in Nepal, the prevalence of depression and anxiety among patients with coronary artery disease was 23.8 % and 27.4 % respectively [8]. Another study undertaken in Greece showed that 24.7 % and 32.6 % of heart failure patients had a moderate and high level of anxiety, respectively [9]. A study done in Ethiopia revealed that the prevalence of depression and anxiety symptoms among hypertension patients was 27.2 and 32.7 %, respectively [10]. Other studies undertaken in Pakistan displayed that the prevalence of depression and anxiety among Heart failure patients was 55 % and 57 %, respectively [11]. In a study undertaken in Spain and Saudi Arabia showed that the prevalence of depression among heart failure patients was 48.5 % and 52.4 %, respectively [12,13]. Being female, being divorced, age >60 years, and being in a surgical ward has significant associations with depression and anxiety symptoms [14]. Depression and anxiety have a significant effect on the outcome of chronic diseases like diabetes, CVD, cancer, and obesity [15]. So, it is vital to evaluate its prevalence and implement interventions to minimize these disorders. However, there is not enough data on the prevalence of anxiety and depression and associated factor among CVD in developing countries. This is also similar to Ethiopia, where mental disorders mostly are not diagnosed and treated, despite their high burden. Therefore, the major objective of this study was to evaluate the prevalence of depression and anxiety among hospitalized CVD patients, along with a risk factor analysis with respect to their socio-demographic properties such as age, gender, place of residence, educational status, marital status and presence of pre-existing co-morbid disease.

2. Methods

2.1. Research design and period

This descriptive quantitative institution-based cross-sectional study was done on patients with CVD who were admitted to the University of Gondar comprehensive specialized referral hospital from 23 April to May 23, 2021. A total of 370 CVD patients were selected through a convenience sampling technique.

2.2. Study area

Gondar town is found in the Amhara region, North West, Ethiopia. It is the most populous zone of the region, and Gondar town classified in 12 sub-cities is the center of central Gondar zone. Based on data from the Central Statistical Agency in 2007, Gondar town has a total population of 206,987 of whom 98,085 are men and 108,904 are women. University of Gondar comprehensive specialized referral Hospital is a governmental healthcare institution located in the city. It is the first and the oldest hospital of the country. It was established in 1954 G C. currently, the hospital renders service for patients in the country. It provides services for 15 million populations living in north-West Ethiopia. The cardiac clinics provide service for the patient with CVDs.

2.3. Target population

The target population of this study is all patients with CVD who are attending treatment in a referral hospital. According to the available data from the cardiac unit of the specialized hospital, monthly, the clinic hosts about 400–500 CVD patients. The total number of CVD patients (both in and out) attending treatment in the year 2020 was 4900 (male = 2750 & female = 2150). So, the number of the target population was 4900 (male = 2750 female = 2150).

2.4. Participants

Participants of this study were patients with CVD who were accessed for follow-up at the cardiac clinic during the study period. A total of 370 patients with CVD participated in the study. Moreover, participants were selected based on the following criteria.

2.5. Inclusion and exclusion criteria

All CVD patients who were 18–80 years of age who attended treatment at the University of Gondar specialized referral Hospital from April to May 2021. CVD patients volunteer to participate in the study. Participants with a history of psychiatric problems, who were seriously ill, had intellectual impairments, unable to respond to the questions, and were unable to hear were excluded from the study.

2.6. Sample size determination

The total number of the target population is 4900. Hence, to decide the sample size from the target population, the study uses the sampling size determined with a precision level of ± 5 .

$$n = \frac{N}{1 + N(e^2)}$$

where N = the total number of the target population, n = the required sample size, e = maximum variability or margin of error 5 % (0.05). Thus, $N = 4900$ $e = 0.05$.

$$n = \frac{4900}{1 + 4900(0.05)^2} = \frac{4900}{1 + 4900(0.0025)} = \frac{4900}{13.25} = 370$$

2.7. Sampling technique and procedures

In this study convenience sampling techniques were used. Hence, patients who met the eligibility criteria and were available in the study period were taken until the sample size was met.

2.8. Variables of the study

In this study, the socio-demographic property of participants, which include sex, age, educational level, and marital status, were considered as the independent variables of the study. The selected psychological constructs, depression, and anxiety were treated as the dependent variables of the study.

2.9. Data collection instruments

The data collection tool was a questionnaire that has questions related to patient demographics, depression, and anxiety diagnostic tools. In this study, two types of pre-established standardized depression and anxiety diagnostic tools used to collect the data.

2.10. Measurement of depression and anxiety

Depression was measured using the Beck Depression Inventory (BDI-II), the most commonly used self-rating scale to screen depression and predict its severity in clinical or non-clinical environments with better reliability and validity. BDI has 21-item multiple-choice about how the subject has been feeling in the last week reflecting cognitive, affective, and somatic components of depression. Each question has four possible answers ranging from 0 to 3, with higher scores showing higher levels of depression. It helps to measure depressive symptoms and is a gold standard for screening depression in adults older than 13 years and more. The maximum total score for all 21 items is 63. BDI scores were categorized into minimal or absent depression (0–13), mild depression [14–19], moderate [20–28], and severe depression (29–63). Those patients who scored moderate and severe were considered to have depression [16]. Analyses of BDI-II results were undertaken in a dichotomous variable as “depressed” versus “not depressed” and the severity rated as minimal or no depression, mild, moderate, and severe. Cut-off point was done based on the sample. BDI measures mood, pessimism, self-dissatisfaction, guilt, self-dislike, self-accusation, suicidal thoughts, crying, irritability, social withdrawal, insomnia, fatigue, appetite, weight loss, bodily preoccupation, and loss of libido.

The Beck Anxiety Inventory (BAI) is a 21-item self-report tool used to assess the severity of anxiety in adults. Each question describes a common symptom of anxiety. The study participants were informed to report bothersome symptoms in the past week using a 4-point Likert scale ranging from Not at all (0) to Severely [3]. All items summed to provide the total score range from 0 to 63. A score of 0–7, 8–15, 16–25, and 26–63 were labeled as minimal, mild, moderate, and severe levels of anxiety, respectively. The BAI has good psychometric properties with test-retest reliability ($r = 0.75$), and internal consistency of ($\alpha = 0.92$) [16]. The presence of anxiety and depression symptoms in this study was defined as a cut-off point >21 during BAI and BDI scale screening, respectively.

2.11. Data quality control

Before the main study begin, the quality of the study done via pilot testing. Specifically, inter-item consistency (reliability) was checked by calculating Cronbach’s Alpha (α) for each scale. Besides, the validity and the inter-scale correlations were computed using Pearson correlation. The pilot testing was done by using data collected from 55 CVD patients who were accessed before the main data

collection. The confirmed Cronbach's Alpha (α) = 0.84 for BDI-II whereas, Cronbach's Alpha (α) = 0.81 for BAI. This shows that all scales have acceptable internal consistency with less likelihood of item redundancy.

2.12. Data processing and analysis

The data was entered into the computer by using Epi-data version 3.1 and finally exported to SPSS version 21 for analysis. Descriptive statistics (Frequency, Mean, and Standard Deviation) were used to examine the prevalence of the outcome variables in the study area. Independent *t*-test and one-way ANOVA were employed to see if there were associations of anxiety and depressive symptoms among CVD patients across socio-demographic variables (sex, age, educational level, and marital status). The strength of association was measured using the adjusted odds ratio with a 95 % CI, and *P*-value less than 0.05 was considered significant.

2.13. Ethical considerations

Ethical clearance of the study was obtained from the Institutional Review Board of the University of Gondar on a Ref. No SOS/273/2021. Permission to collect data from patients was also obtained from the University of Gondar Comprehensive Specialized Referral Hospital. Informed consent was taken from all respondents after informing the purpose and importance of the study. The confidentiality of the study subjects' responses was ensured. Besides, an explanation was given to the respondents about their right to withdraw from the study if they felt discomfort.

3. Results

3.1. Socio-demographic characteristics of respondents

In this study, a total of 370 adult patients diagnosed with CVD were interviewed with a response rate of 100 %. As presented in Table 1, 188 (51 %) of the subjects were male, and 182 (49 %) were female. Concerning respondents' age, 81 (22 %) of the total respondents were in the age range of 20–35 years, 99 (27 %) of the respondents were in the age range of 36–46, 97 (26 %) were in the age range of 47–60 years and 93 (25 %) of the respondents were above the age of 60 years. Concerning the educational level, illiterate respondents accounted for 97 (26 %), 86(23 %) completed the primary level, 92 (25 %) complemented the secondary level, and 95 (26 %) of the respondents had college diploma, and above. Concerning marital status, 126 (34 %) of the respondents were unmarried, 128 (35 %) participants were married, and 116 (31 %) of the respondents were divorced. About 55.67 % of the participants were rural area residents.

Three hundred seventy participants completed the interview. Out of the participants with depression 16 % ($n = 58$), 31 % ($n = 114$), 41 % ($n = 152$), and 12 % ($n = 46$) showed minimal, mild, moderate, and severe depression, respectively as presented in Fig. 1.

Using the BDI scale with a cut-off point greater than 21 displayed that the prevalence of depression was 53.51 % ($n = 198$) with a 95 % CI (50.31, 56.83). Out of the participants with anxiety 15 % ($n = 58$), 23 % ($n = 85$), 50 % ($n = 185$), and 12 % ($n = 43$) displayed mild, moderate, moderately severe, and severe anxiety symptoms respectively. Based on the BAI questionnaire cut-off point, 61.6 % ($n = 228$) of patients suffer from anxiety with a 95 % CI (56.31, 64.83).

3.2. Depression and anxiety in different independent variable among CVD patients

The prevalence of CVD patients who experienced depression was highest among those aged more than 60 years and lowest among those aged 20–35 years. As presented in Table 2, there were significant mean differences in the level of depression and anxiety between

Table 1
Socio-Demographic characteristics of respondents in Gondar University comprehensive specialized referral hospital.

| Characteristics | | Frequency | Percentage |
|--------------------|-------------------------|-----------|------------|
| Sex | M | 188 | 51 |
| | F | 182 | 49 |
| Age | 20–35 years | 81 | 22 |
| | 36–46 years | 99 | 27 |
| | 47–60 years | 97 | 26 |
| | Above 60 years | 93 | 25 |
| Educational Status | Illiterate | 97 | 26 |
| | Primary level | 86 | 23 |
| | Secondary level | 92 | 25 |
| | College diploma & above | 95 | 26 |
| Marital Status | Unmarried | 126 | 34 |
| | Married | 128 | 35 |
| | Divorced | 116 | 31 |
| Residency | Rural | 206 | 55.67 |
| | Urban | 164 | 44.33 |

The prevalence of depression and anxiety among CVD patients.

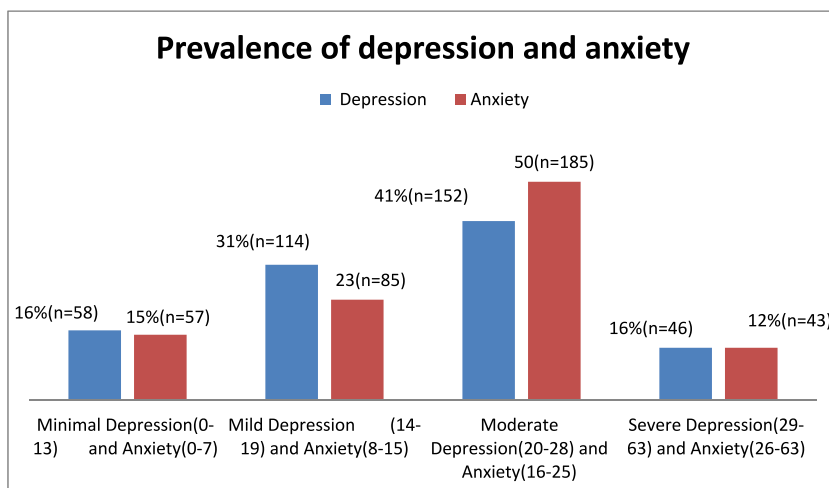


Fig. 1. Prevalence of depression and anxiety among patients with cardio vascular disease.

male and female CVD patients. The females' scores of depression ($M = 28, p < 0.01$) and anxiety ($M = 25.3, p < 0.01$) were higher than that of males' scores of depression ($M = 15.1, p < 0.01$) and anxiety ($M = 12.3, p < 0.01$).

There was a significant mean difference in the level of depression ($p < 0.01$) and anxiety ($p < 0.01$) among respondents having different age categories as shown in Table 2. Specifically, respondents in the 20–35 years group have significant differences from respondents who are in the age range of 47–60 years and above 60 years. Similarly, respondents in the age group of 36–46 were found to have a significant difference from respondents in the age range of 47–60 years and above 60 years.

The study showed significant mean differences of ($P < 0.01$) depression and anxiety among respondents across educational status. Patients with illiterate and primary education levels showed higher mean scores than CVD Patients with a secondary, college diploma, and above education status. In addition, CVD patients who are illiterate have significant differences from those who have secondary and college diploma and above. In addition, respondents with a primary education level have significant differences from those who have a secondary level and college diploma and above educational status. There are significant mean differences ($p < 0.01$) reported in

Table 2
Comparing depression and anxiety among cardio vascular patients.

| Variables | | Depression | Anxiety |
|--------------------|------------------------|-----------------------------------|-----------------------------------|
| | | M ± SEM | M ± SEM |
| Age Category | 20-35 (n = 81) | 8.9 ± 5.2 | 9.4 ± 3.9 |
| | 36-46 (n = 99) | 10.3 ± 3.5 | 10.8 ± 3.2 |
| | 47-60 (n = 97) | 24.5 ± 1.8 ^{a,1,b,2} | 20.4 ± 3.2 ^{a,1,b,2} |
| | >60 (n = 93) | 31.4 ± 3.5 ^{a,1,b,1} | 29.4 ± 1.7 ^{a,1,b,1} |
| Gender | Male (188) | 15.1 ± 3.2 | 12.3 ± 2.3 |
| | Female (182) | 28 ± 1.6 ^{d,1} | 25.3 ± 2.5 ^{d,1} |
| Educational status | Illiterate (n = 97) | 31.2 ± 3.7 | 25.4 ± 2.9 |
| | Primary (n = 86) | 26.6 ± 1.8 | 21.1 ± 3.2 |
| | Secondary (n = 92) | 17.5 ± 2.1 ^{e,1,f,1} | 12.4 ± 2.9 ^{e,1,f,1} |
| | Diploma above (n = 95) | 10.4 ± 3.4 ^{e,1,b,1,g,1} | 10.4 ± 3.4 ^{e,1,f,1,g,1} |
| Marital Status | Married (n = 128) | 23.2 ± 1.8 | 19.1 ± 4.2 |
| | Unmarried (n = 126) | 22.6 ± 4.7 | 17.4 ± 3.9 |
| | Divorced (n = 62) | 36.5 ± 2.5 ^{h,1,i,1} | 38.4 ± 2.9 ^{h,1,i,1} |
| Residency | Rural | 23 ± 1.6 ^{d,1} | 18 ± 1.6 ^{d,1} |
| | Urban | 17.1 ± 5.2 | 14.1 ± 4.2 |

Data expressed as mean ± SEM; and analyzed by one way ANOVA followed by Tuckey post hoc test, n = number of respondents.

¹ $p < 0.001$, ² $p < 0.01$, and, ³ $p < 0.05$.

^c Compared to age of 47–60 years.

^a Compared to age of 20–35 years.

^b Compared to age of 36–46 years.

^d Compared to male.

^e Compared to Illiterate.

^f Compared to Primary education.

^g Compared to Secondary education respondents

^h Compared to Single.

ⁱ Compared to Married.

the levels of depression and anxiety among respondents across marital status. Divorced participants have higher mean scores than the respondents who are single and married.

3.3. The prevalence of depression and anxiety and associated factors

For multivariable analysis, depression and anxiety were grouped into two categories: the first group was participants with symptoms of depression/anxiety, and the other group was participants without symptoms of depression/anxiety. Predictors of depression and anxiety were evaluated using the bivariate regression analysis. Sex, marital status, age, and educational status were significantly associated with anxiety and depression symptoms among CVD patients. These variables were also analyzed with a multivariate logistic regression model as presented in Table 3. As a result, female CVD patients had high probability to display depression and anxiety symptoms when compared to male [AOR = 2.9, 95 % CI (1.75–4.39)] and [AOR = 2.7, 95 % CI (1.65–4.17)], respectively.

CVD patients greater than >60 years were more likely depression and anxiety as compared to those aged 20–35 years [AOR = 1.6, 95 % CI (1.17–2.32)] and [AOR = 1.53, 95 % CI (1.12–2.42)] respectively. Similarly, illiterate CVD patients had a greater chance of developing depression and anxiety in comparison to those who have a diploma and above academic level [AOR = 3.35, 95 % CI (2.042–4.25)] and [AOR = 3.7, 95 % CI (2.15–5.16)]. CVD patients with a primary education status were 2.3 times more likely to develop depression than CVD patients with a diploma and above academic status [AOR = 2.3, 95 % CI (1.12–3.35)]. Divorced CVD patients [AOR = 7.945, 95 % CI (1.768–35.702)] had a greater chance of developing depression in comparison to married patients. Besides, Widowed CVD patients were more likely to develop depression as compared to married patients [AOR = 0.054, 95 % CI (0.012–0.243)].

4. Discussions

Anxiety and depression are the major mental health problems in the world, with the mental health system in several countries either under-resourced or disorganized, despite studies indicates that effective prevention and intervention tools available [17]. The mental status of CVD patients has been an important issue to be taken under consideration because CVD patients are affected by several stressors [18,19]. In this study, among 370 CVD patients, 228 (61.6 %) suffer from anxiety, and 53.51 % (198) suffer from depression, which is clearly above the lifetime prevalence of 13 % for major depression in the general population. Our study result showed the need for integration of mental health care service into CVD treatment [20]. Anxiety symptoms among CVD patients were high in this study that may be related to loss of job opportunity after sickness, lack of awareness about CVD prognosis, illiteracy, lack of counseling in a developing country, sample sizes, the tools and cutoffs used for categorizing depression and anxiety symptom among CVD patients.

Regarding depression prevalence, the present study result was similar to studies undertaken in Northwest and Eastern Ethiopia that showed the prevalence of depression were 54.6 % and 57.9 %, respectively [13,21]. But, this study result is less than studies undertaken in India 60.5 % [22], and Iran 58.8 % [23]. The cause of this prevalence difference may be the diagnosis and admission type, the study participant, the study design, the study area, the instrument used, and the socio-cultural difference. But, in this study, the level of depression is greater than the studies undertaken in Ethiopia 38 % [24], Nigeria 45.3 % [25], Iran 42.3 % [26], Italy 21 % [27], and Brazil 28 % [28]. The differences in these studies may be related to the difference in sample sizes, the amount of pocket expenditure, respondents' age, study design, the use of different data collection tool to evaluate the prevalence of depression,

Table 3
Association of depression and anxiety symptoms with socio-demographic characteristics.

| Variables | Depression | | AOR (95 % CI) | anxiety | | AOR (95 % CI) | |
|-------------------------------|-----------------|-----|---------------|-------------------------------|-----|---------------|-------------------------------|
| | Yes | No | | Yes | No | | |
| Age Category | 20-35 (81) | 52 | 29 | 1 | 55 | 26 | 1 |
| | 36-46 (99) | 48 | 51 | .53 (.23–.65) | 58 | 41 | 0.67 (.33–1.75) |
| | 47-60 (97) | 45 | 52 | .48 (.31–.79) | 41 | 56 | 0.35 (.14–1.6) |
| | >60 (93) | 69 | 24 | 1.6 (1.17–2.32) ² | 71 | 22 | 1.53 (1.12–2.42) ² |
| sex | Male (188) | 76 | 112 | 1 | 91 | 97 | 1 |
| | Female (182) | 122 | 60 | 2.9 (1.75–4.39) ² | 109 | 67 | 2.7 (1.65–4.17) ² |
| Residency | Rural | 112 | 94 | 1.9 (1.58–4.54) ² | 119 | 89 | 1.7 (1.12–2.43) ² |
| | Urban | 63 | 101 | 1 | 73 | 91 | 1 |
| Education status | Illiterate (97) | 67 | 30 | 3.35 (2.04–4.25) ¹ | 70 | 27 | 3.7 (2.15–5.16) ¹ |
| | Primary (86) | 52 | 34 | 2.3 (1.12–3.35) ² | 53 | 33 | 2.3 (1.12–3.35) ² |
| | Secondary (92) | 41 | 51 | 1.2 (0.36–2.41) | 44 | 48 | 1.3 (0.36–2.41) |
| | Diploma ≥ (95) | 38 | 57 | 1 | 39 | 56 | 1 |
| Marital Status | Married (128) | 40 | 88 | 1 | 44 | 83 | 1 |
| | Single (126) | 79 | 47 | 3.69 (2.14–5.13) ¹ | 82 | 44 | 3.52 (2.12–4.82) ¹ |
| | Divorced (62) | 44 | 18 | 5.38 (2.93–6.56) ¹ | 45 | 17 | 4.99 (2.76–5.89) ¹ |
| | Widowed (54) | 35 | 19 | 4.04 (2.35–5.37) ¹ | 36 | 19 | 3.57 (2.15–5.14) ¹ |
| Previous history of admission | yes | 112 | 94 | 1.9 (1.58–4.54) ² | 117 | 89 | 1.8 (1.38–4.64) ² |
| | no | 63 | 101 | 1 | 70 | 94 | 1 |

Note: 1 < 0.001; 2 < 0.05.

methodologies, admission site types, a lack of information and lack of quality health care and socio-cultural difference between Ethiopia and other countries.

Several studies showed higher levels of depression and anxiety in the general population and patients in developing countries than in developed countries [29]. The possible reasons may be related to poverty, social insecurity, gender inequities, educational status, financial problems, and other economic difficulties [30].

Studies revealed a significant association between age with depression and anxiety. This study also showed that increased age is a key factor for depression. CVD patients aged greater than 60 years have the most prevalence of depression in all age categories. Being in the age category of greater than 60 years was 1.6 (1.17–2.32) times more likely to have depression than the age category of 18–24 years. The possible reason is that older patients face several challenges such as isolation, being forced to leave their jobs due to retirement, disease burden, and disabilities; hence making them prone to develop depression and anxiety [20].

These things lead to depression among the unemployed there were several factors associated with the development of depression in this study. It is common that being female is significantly associated with depression in general populations. Being female is 2.9 (1.75–4.39) times more likely to develop depression than male among CVD patients. In the present study, 61.5 % of females reported depression which was greater than 45.7 % of males. This study result was similar to studies undertaken in Brazil among patients [31], and in Iran [23]. Females have a chance of 2.7 (1.65–4.17) times than men to show anxiety symptoms. The possible reason is that mood changes due to the normal hormonal fluctuations. Women have several gender-specific activities that expose them to workload and high responsibilities. Besides, the social role of women makes them to be more emotional than men [32]. Generally, biological factors, psychological factors, personal situation, and different socio-cultural factors increase depression in females. For example, in Ethiopia, female face trauma due to discrimination, and gender violence which lead to social withdrawal, stress, low self-esteem and depression. Hence, being female is an important factor for depression. In this study, females have higher levels of anxiety than males. Similar results were reported in America [32]. But a study done in Brazil [33] reported higher status of anxiety males than females. The difference in the results may be related to variation in sample size of the participants.

Being in the age group of greater than 60 years was 1.53 (1.12–2.42) times more likely to have anxiety than the age category of 18–24 years. The result of this study was similar to the study done in the United States [32]. Being single showed 3.69 times the risk of depression symptoms than being married, and being widowed showed was 5.38 times more depression symptom than being married. This study result was similar to other studies undertaken in Uganda [33], and China [34]. Being widowed was associated with depression among CVD patients [33] and being widowed increased depression symptoms among CVD patients [35]. The present study revealed that those unable to read and write are 3.35 times more likely to show depression symptoms as compared to their counterparts, which showed similar results to studies undertaken in Iran; lower educational status significantly associated with depression among surgical patients [23], and in Brazil, a lower education status showed greater than three times likely depression symptom among CVD patients admitted in the hospital [36]. Depression is the most prevalent disorder among CVD patients, which increases medical expenses, and morbidity and mortality rates. The present study revealed that depression was significantly associated with mental disorder history. History of mental disorder has 1.79 times more likely to show depression symptoms than patients with no mental disorder history. This study result was similar to a study undertaken in Iran; history of mental problem increases the chance of depression in surgical patients [23].

5. Limitations of the study

This study design was cross-sectional, so it cannot show a causal relationship between associated factors and anxiety and depression symptoms among CVD patients. The result shows only to hint between anxiety and depression symptoms with these explanatory variables. So, the use of this study design is a limitation. This study was done on a pre-established tool that was designed for a population with different socio-demographic properties. This has a significant effect on respondents during data collection as items could not describe respondents' experiences in terms of the outcome variables. The study did not involve CVD patients less than 18 years old. Hence, the result may not represent the reality of this target population. Besides, the study did not collect data on confounding variables that could influence mental health outcomes.

6. Conclusions

The prevalence of depression and anxiety symptoms among CVD patients was 61.6 % and 53.9 %, respectively. Depression was significantly associated with being sex, being single, widowed, unable to read and write, and possess a history of mental illness. This study showed that healthcare providers should take extra care to diagnose CVD patients for anxiety and depression in a clinical setting. The concerned governmental organization should provide training on how to screen depression among CVD patients, and interventions that would address the awareness of the above factors would benefit the prevention of further complications.

Data sharing statement

All data are provided in the manuscript or found from published papers as cited.

Consent for publication

Not applicable.

Availability of data and materials

The dataset is found at the primary author and anyone can access it by sending email or any other media from the corresponding author upon reasonable application.

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Additional information

No additional information is available for this paper.

CRedit authorship contribution statement

Tihitina Sisay participated in Conceptualization, Data analysis, Investigation, Methodology, Supervision, Validation, Visualization, Writing - original draft. Missaye Mulate and Tewodrose Hailua are advises that Supervise and guide Conceptualization, Data analysis, Investigation, Methodology, Validation, Visualization, Writing - original draft and othe activities. Tafere Mulaw Belete: Writing – review & editing, Writing – original draft, Validation, Supervision, Project administration, Methodology, Conceptualization. Tafere Mulaw Belete: Writing – review & editing, Writing – original draft, Validation, Supervision, Project administration, Methodology, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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