Prevalence of Anxiety and Depression Among Cardiac Diseases Patients in Saudi Arabia: A Cross-Sectional Study

Khalid A. Alnemer, MD* Naif Ahmed Alghassab, MD** Abdulaziz Mohammed Aleidan, MD**

ABSTRACT

Epidemiological studies have confirmed the relationship between CVD and several psychological conditions. Patients who suffer from CVD and psychological conditions such as depressive symptoms are also at increased risk for repeated cardiovascular events. The aim of this research was to assess the prevalence of anxiety and depression among CVD patients in Saudi Arabia. A cross-sectional online survey study was conducted in Saudi Arabia in November 2024 on patients who are diagnosed with cardiac diseases. The Arabic version of patient health questionnaire–9 (PHQ-9) scale and the Generalized Anxiety Disorder - 7 (GAD-7) scale was used to assess depression and anxiety level across the study sample. Multiple logistic regression was performed to assess the factors associated with severe to moderate depression and severe anxiety levels. A total of 260 participants included in the study. Females had significantly higher odds of depression compared to males (OR=1.84,95% CI=0.99−3.43, p=0.05). Patients with a diagnosis duration of 1–3 years had significantly lower odds of experiencing depression compared to those diagnosed less than six months ago (OR=0.29,95% CI=0.11−0.78, p=0.014). Patients aged over 60 years old had a significant lower odd of anxiety (OR =0.18, 95%CI= 0.05 - 0.72, p =0.01). Anxiety and depression are common across patients with CVDs. Females showed higher likelihood of developing severe depression. The psychological evaluation and management of CVDs patients should be given priority in current practices. High risk population should be educated and directed on self-care practices in order to minimize the risk of mental issues.

Keywords: Anxiety; Cardiovascular Diseases; Depression; Mental; Saudi Arabia

INTRODUCTION

Cardiovascular diseases (CVDs) affect many parts of the body, including endocarditis, abnormalities in the conduction system, and rheumatic heart disease [1]. Cardiovascular disease needs assessment in various aspects to prevent patient complications including the use of traditional 10-year risk calculator [2]. Emotional disorders have a common point in pathology and epidemiology in CVD. Health behaviors, personality features, and patient emotions may cause and contribute to cardiovascular events [3]. Examining the relationship between heart disease and its complications with psychological conditions such as anxiety and depression has become common. Psychological effects such as anxiety and depression can lead to serious cardiac events and thus unwanted complications [4].

Large prospective epidemiological studies have confirmed the relationship between CVD and several psychological conditions, including posttraumatic stress disorder, depression, anxiety, and chronic psychological stress [5]. Therefore, there is a correlation between cardiovascular problems and anxiety or depression [4]. Anxiety and depression can be frequent among patients who have CVD in which the heart is incapable of pumping blood efficiently [6]. The deterioration or progress of anxiety and depression symptoms are associated with physical limits, and lifestyle fluctuations that are related to heart problems [7].

Patients who suffer from CVD and psychological conditions such as depressive symptoms are also at increased risk for repeated cardiovascular events and high mortality rate [8-10]. For instance, depressed patients with acute coronary syndrome have a dual risk of future major harmful cardiovascular episodes [10]. Previous studies also indicate a dose-response correlation between depressive indications and cardiac consequences in patients with coronary heart disease, with even slightly elevated depressive symptoms combined with a weak prognosis [11]. Anxiety is described by temporary panic, hesitation, and worry about the future, but individuals vary in the rate and intensity with which they experience anxiety [12].

Previous studies examined the prevalence and predictors of different types of psychological illnesses among different population in the Middle east region [13-17]. Recently, there has been limited knowledge of the best treatment to reduce the risk of CVD, and the mortality rate associated with depression, despite the availability of many antidepressant medications [18]. It has been indicated that anti-inflammatory drugs have a role in reducing the symptoms of depression in patients with CVD who suffer from depression. Therefore, many studies are trying to find new methods to treat depression associated with CVD [19]. Some studies have found that demographic factors, such as age, gender, and socioeconomic status, play a role in influencing the incidence of psychiatric diseases in heart failure patients [20]. Increasing the sympathetic activity phase, sensitivity of emotions, and weakened adaptive responses to stressors will decrease heart rate variability. It serves as a physiological indicator linking autonomic dysfunction and mood conditions in heart failure [21]. The aim of this research was to assess the prevalence of anxiety and depression among CVD patients in Saudi Arabia.

* Department of Internal Medicine
College of Medicine
Imam Mohammad Ibn Saud Islamic University (IMSIU), Saudia Arabia.
E-mail: alnemerk@hotmail.com
** College of Medicine, Imam Mohammad Ibn Saud Islamic University (IMSIU)
Riyadh 13317, Saudi Arabia.

METHODS

Study design: A cross-sectional online survey study was conducted in Saudi Arabia in November 2024 on patients who are diagnosed with cardiac diseases.

Sampling strategy and study population: Convenience sampling technique was employed to identify eligible participants, who were subsequently invited to participate in this study. Through the utilization of social media platforms including WhatsApp, X, and Facebook, invitations for participation in this study were extended to the maximum number of patients. The subjects were provided with a comprehensive explanation of the study's objectives and goals at the outset of the survey. Participants who were at least 18 years of age and presently resided in Saudi Arabia and had a diagnosed cardiac condition were included in the study. Participants who were diagnosed with psychiatric disorders prior to their cardiac diagnosis, were under the age of 18, or were unable to read or comprehend Arabic were excluded.

Study tool: The Arabic version of patient health questionnaire–9 (PHQ-9) scale was used to assess the severity of depression in the past two weeks [22]. The scale encompasses the nine diagnostic criteria of the clinical diagnosis of depressive disorder, as outlined in the Diagnostic and Statistical Manual of Mental Disorders [22]. A Likert scale is used to rate each item, with a range of 0 (no symptom) to 3 (symptom present on virtually every day). Depression of a more severe nature is indicated by higher scores. Furthermore, the Generalized Anxiety Disorder - 7 (GAD-7) scale was used to assess the severity of the anxiety [23]. A Likert scale is used to rate each item, with a range of 0 (no symptom) to 3 (symptom present on virtually every day). Anxiety of a more severe nature is indicated by higher scores. The cut-off points used to identify moderately severe to severe depression and severe anxiety were reported previously across multiple studies [24-26]. In addition, the questionnaire tool asked the participants about their demographic characteristics including gender, age, marital status, education level, and duration of disease.

Ethical approval: This research was approved by the Institutional Review Board at Al-Imam Muhammad Ibn Saud Islamic University, Riyadh, Saudi Arabia (Project number: 728/2024).

Statistical analysis: Descriptive statistics such as the frequency and percentage were used to present categorical variables. The mean (standard deviation (SD)) was used to present continuous variables as they were normally distributed. The Chi0squared test was used to examine the difference in proportion across different demographic groups. The Analysis of Variance (ANOVA) test and the independent t-test were performed to examine the difference in the continuous variables across different demographic groups. Multiple logistic regression was performed to assess the factors associated with severe to moderately depression and severe anxiety levels. The findings from the regression analyses are presented as odds ratios (OR) with 95% confidence intervals (CI) and corresponding p-values. The level of significance was defined as $\alpha = 0.05$. All calculations and analyses were carried out with the SPSS (Statistical Package of Social Sciences Software, Version 29.0).

RESULTS

A total of 260 participants included in the study. Out of them, 184 patients 70.8 % were male, and (76,29.2%) were female. The majority of participants (73, 28.1%) were aged between 50-59 years, while (46,17.7%) were aged 60 and above. Most participants (210, 80.8%) were married, with a smaller proportion being single (33,12.7%), divorced (12,4.6%), or widowed (5,1.9%). Regarding education level, approximately half (131, 50.4%) had a university degree, while (82,31.5%) completed high school, and (20,7.7%) held postgraduate qualifications. Additional details about demographic characteristics are provided in Table 1.

Table 1. Demographic characteristics of the participants.

Variable		Frequency	Percentage
Gender	Male	184	70.8%
	Female	76	29.2%
Age	18-29 years	20	7.7%
	30-39 years	50	19.2%
	40-49 years	71	27.3%
	50-59 years	73	28.1%
	60 years and older	46	17.7%
Marital status	Widowed	5	1.9%
	Single	33	12.7%
	Married	210	80.8%
	Divorced	12	4.6%
Education level	Not educated	3	1.2%
	Primary school	6	2.3%
	Middle school	18	6.9%
	High school	82	31.5%
	University	131	50.4%
	Postgraduate	20	7.7%
Duration of disease	Less than 6 months	39	15.0%
	6-12 months	37	14.2%
	1-3 years	55	21.2%
	More than 3 years	129	49.6%

The frequency of depressive symptoms experienced by participants over the past two weeks presents in Table 2. A notable proportion of participants reported "little interest or pleasure in doing things," with 40.8% indicating none, while 33.1% experienced this on several days in the last two weeks, and 13.1% experienced it daily or almost half of the days. Similarly, the majority of the participants (n= 104, 40%) reported feeling sad, down, or hopeless on several days, and 15.4% feeling this daily. Sleep disturbances were common, a total of (n= 99,38.1%) of the enrolled patients reporting difficulty sleeping or oversleeping on several days, and (n= 31,11.9%) experiencing it daily. Additional details about depression symptoms in the last two weeks are provided in Table 2.

The frequency of anxiety symptoms experienced by participants over the past two weeks varied among the patients. Feeling irritable, anxious, or on edge was reported by 121 participants (46.5%) on several days, and 28 participants experienced it daily (10.8%). Similarly, the majority of the participants (n= 104, 40%) on several days were unable to stop or control worrying, and 52 (20.0%) almost half of the days, while 27.7% reported none. Most of participants (n= 91, 35.0%) reported experiencing excessive worry about different things on several days, and 43 participants reported experiencing it almost half of the days (16.5%). Additional details about anxiety symptoms in the last two weeks are provided in Table 3.

As shown in the table below, a total of 26 participants (10.0%) experienced minimal depression, 29 participants (11.2%) reported severe depression. Severe anxiety was observed in 54 participants (20.8%), and 113 participants (43.5%) were identified as having mild anxiety. Additional details about depression and anxiety prevalence are provided in Table 4.

Table 2. The depression symptoms frequency in the last two weeks.

Over the past two weeks, how often have you experienced any of the following problems?	None	Several days	Almost half of the days	Everyday
Little interest or pleasure in doing things	106 (40.8%)	86 (33.1%)	34 (13.1%)	34 (13.1%)
Feeling sad, down, or hopeless	79 (30.4%)	104 (40.0%)	37 (14.2%)	40 (15.4%)
Difficulty sleeping or sleeping more than usual	87 (33.5%)	99 (38.1%)	43 (16.5%)	31 (11.9%)
Feeling tired or having very little energy	53 (20.4%)	106 (40.8%)	57 (21.9%)	44 (16.9%)
Poor appetite or eating less than usual	132 (50.8%)	85 (32.7%)	27 (10.4%)	16 (6.2%)
Feeling bad about yourself or feeling that you have let yourself or your family down	112 (43.1%)	84 (32.3%)	32 (12.3%)	32 (12.3%)
Difficulty concentrating on reading the newspaper or watching television	133 (51.2%)	75 (28.8%)	34 (13.1%)	18 (6.9%)
Slowness in movements or speech noticeable to others, or conversely, becoming more restless and finding it harder to sit still than usual	161 (61.9%)	60 (23.1%)	26 (10.0%)	13 (5.0%)
Recurring thoughts that life is not worth living, wishing you were dead, or thoughts of self-harm	188 (72.3%)	34 (13.1%)	20 (7.7%)	18 (6.9%)

Table 3. The anxiety symptoms frequency in the last two weeks.

Over the past two weeks, how often have you experienced any of the following problems?	None	Several days	Almost half of days	Everyday
Feeling irritable, anxious, or on edge	60 (23.1%)	121 (46.5%)	51 (19.6%)	28 (10.8%)
Inability to stop or control worrying	72 (27.7%)	103 (39.6%)	52 (20.0%)	33 (12.7%)
Excessive worry about different things	94 (36.2%)	91 (35.0%)	43 (16.5%)	32 (12.3%)
Difficulty relaxing	98 (37.7%)	91 (35.0%)	44 (16.9%)	27 (10.4%)
Boredom or restlessness to the point of difficulty staying calm	128 (49.2%)	83 (31.9%)	34 (13.1%)	15 (5.8%)
Getting annoyed or upset easily	71 (27.3%)	106 (40.8%)	52 (20.0%)	31 (11.9%)
Feeling afraid as if something terrible is about to happen	91 (35.0%)	90 (34.6%)	45 (17.3%)	34 (13.1%)

Table 4. Depression and anxiety score categories

Depression and anxiety levels		Frequency	Percentage
Depression	Minimal	26	10.0%
	Mild	98	37.7%
	Moderate	69	26.5%
	Moderately severe	38	14.6%
	Severe	29	11.2%
Anxiety	Mild	113	43.5%
	Moderate	93	35.8%
	Severe	54	20.8%

The total score for depression and anxiety were presented in Table 5. As the table shown, females reported a significant higher depression score mean (18.83 ± 6.27) compared to males (16.30 ± 5.96) (p = 0.002). participants aged between 18 to 29 years reported a significant higher depression score mean (20.35 ± 8.14) compared to participants over 60 years old (14.24 ± 5.06) (p = 0.0001). Furthermore, divorced patients reported a significant higher depression score mean (21.50 ± 5.84) compared to married (16.43 ± 5.88) (p = 0.006). Regarding the anxiety, females reported a significant higher anxiety score mean (15.82 ± 6.00) compared to males (13.83 ± 5.50) (p = 0.01). participants aged between 18 to 29 years reported a significant higher anxiety score mean (17.20 ± 7.96) compared to participants over 60 years old (10.98 ± 4.20) (p = 0.0001). Furthermore, divorced patients reported a significant higher depression score mean (18.08 ± 5.62) compared to married (14.58 ± 5.91) (p = 0.03). Additional details about both depression and anxiety score stratified by the demographics are provided in Table 5.

Females reported a higher proportion of severe depression (35.5%) compared to males (20.0%), with a statistically significant difference ($\chi2$=7.20, p=0.007). Regarding the age, the table below shows a significant difference in depression severity based on age ($\chi2$=19.02, 0.001), a younger age groups (30–39) reporting higher proportions of severe depression (26.5%), compared to patients aged over 60 years (11.6%). The anxiety level was demonstrated in the table below, the data showed a significant difference in anxiety severity based on age ($\chi2$=19.44, 0.001), a younger age groups (30–39) reporting higher proportions of severe depression (29.4%), compared to patients aged over 60 years (7.8%). Married patients with severe anxiety were significantly higher than divorced (16, 15.7%) (0, 0.0%), respectively, indicating a significant difference in anxiety level based on marital status ($\chi2$=9.21, 0.02). Additional details about severity of depression and anxiety are provided in Table 6.

A multiple logistic regression model was obtained to assess the factors associated with moderately severe to severe depression and severe anxiety level. Females had significantly higher odds of depression compared to males (OR=1.84,95% CI=0.99−3.43, p=0.05). Patients with a diagnosis duration of 1–3 years had significantly lower odds of experiencing depression compared to those diagnosed less than six months ago (OR=0.29,95% CI=0.11−0.78, p=0.014). Patients aged over 60 years old had a significant lower odd of anxiety (OR =0.18, 95%CI= 0.05 - 0.72, p =0.01).

Table 5. Depression and anxiety score stratified by the demographics.

Variable		Depression score		Anxiety score	
		Mean ± SD	P value	Mean ± SD	P value
Gender	Male	16.30 ± 5.96	0.002*	13.83 ± 5.50	0.01*
	Female	18.83 ± 6.27		15.82 ± 6.00	
Age	18-29 years	20.35 ± 8.14	0.0001*	17.20 ± 7.96	0.0001*
	30-39 years	19.16 ± 5.69		16.66 ± 5.26	
	40-49 years	16.85 ± 5.61		14.10 ± 4.81	
	50-59 years	16.64 ± 6.20		14.58 ± 5.91	
	60 years and older	14.24 ± 5.06		10.98 ± 4.20	
Marital status	Widowed	18.80 ± 1.64	0.006*	14.00 ± 4.85	0.03*
	Single	19.06 ± 7.29		15.97 ± 6.52	
	Married	16.43 ± 5.88		13.97 ± 5.52	
	Divorced	21.50 ± 5.84		18.08 ± 5.62	
Education level	Not educated	18.67 ± 1.53	0.66	11.00 ± 2.00	0.82
	Primary school	13.67 ± 3.08		12.67 ± 3.08	
	Middle school	15.72 ± 4.87		14.50 ± 6.28	
	High school	17.27 ± 6.20		14.79 ± 6.08	
	University	17.09 ± 6.45		14.25 ± 5.46	
	Postgraduate	17.75 ± 6.06		14.85 ± 6.45	
Diagnosis	Less than 6 months	18.79 ± 5.93	0.06	15.92 ± 6.32	0.26
	6-12 months	17.24 ± 6.30		14.54 ± 5.90	
	1-3 years	15.40 ± 4.80		13.58 ± 4.82	
	3 years and above	17.16 ± 6.56		14.27 ± 5.79	

* $p < 0.05$ is considered statistically significant.

Table 6. The severity of depression and anxiety level stratified by the demographics.

Variable		Depression			Anxiety		
		Moderate	Severe	X^2, P value	Moderate	Severe	X^2, P value
Gender	**Male**	84 (80.0%)	100 (64.5%)	7.2.0.007*	115 (72.8%)	69 (67.6%)	0.79, 0.37
	Female	21 (20.0%)	55 (35.5%)		43 (27.2%)	33 (32.4%)	
Age	**18-29 years**	7 (6.7%)	13 (8.4%)	19.02. 0.001*	10 (6.3%)	10 (9.8%)	19.44, 0.001*
	30-39 years	9 (8.6%)	41 (26.5%)		20 (12.7%)	30 (29.4%)	
	40-49 years	29 (27.6%)	42 (27.1%)		45 (28.5%)	26 (25.5%)	
	50-59 years	32 (30.5%)	41 (26.5%)		45 (28.5%)	28 (27.5%)	
	60 years and older	28 (26.7%)	18 (11.6%)		38 (24.1%)	8 (7.8%)	
Marital status	**Widowed**	0 (0.0%)	5 (3.2%)	11.5, 0.009*	4 (2.5%)	1 (1.0%)	9.21, 0.02*
	Single	10 (9.5%)	23 (14.8%)		17 (10.8%)	16 (15.7%)	
	Married	94 (89.5%)	116 (74.8%)		134 (84.8%)	76 (74.5%)	
	Divorced	1 (1.0%)	11 (7.1%)		3 (1.9%)	9 (8.8%)	
Education level	**Not educated**	0 (0.0%)	3 (1.9%)	4.57,0.47	3 (1.9%)	0 (0.0%)	3.63, 0.60
	Primary school	3 (2.9%)	3 (1.9%)		5 (3.2%)	1 (1.0%)	
	Middle school	8 (7.6%)	10 (6.5%)		11 (7.0%)	7 (6.9%)	
	High school	35 (33.3%)	47 (30.3%)		47 (29.7%)	35 (34.3%)	
	University	54 (51.4%)	77 (49.7%)		80 (50.6%)	51 (50.0%)	
	Postgraduate	5 (4.8%)	15 (9.7%)		12 (7.6%)	8 (7.8%)	
Diagnosis	**Less than 6 months**	9 (8.6%)	30 (19.4%)	7.55, 0.05*	20 (12.7%)	19 (18.6%)	1.84, 0.60
	6-12 months	14 (13.3%)	23 (14.8%)		24 (15.2%)	13 (12.7%)	
	1-3 months	28 (26.7%)	27 (17.4%)		34 (21.5%)	21 (20.6%)	
	3 months and above	54 (51.4%)	75 (48.4%)		80 (50.6%)	49 (48.0%)	

Table 7. Logistic regression analysis of demographic characteristics and depression and anxiety levels

Variable		Depression		Anxiety	
		OR (95% CI)	p value	OR (95% CI)	p value
	Male	Reference		Reference	
Gender	**Female**	1.84 (0.99 - 3.43)	0.05	1.03 (0.56 - 1.90)	0.91
Age	**18-29 years**	Reference		Reference	
	30-39 years	2.80 (0.83 - 9.41)	0.09	1.39 (0.45 - 4.27)	0.56
	40-49 years	1.08 (0.36 - 3.23)	0.88	0.49 (0.15 - 1.63)	0.24
	50-59 years	1.00 (0.33 - 3.03)	0.99	0.55 (0.16 - 1.88)	0.34
	60 years and older	0.45 (0.14 - 1.42)	0.17	0.18 (0.05 - 0.72)	0.01*
Diagnosis	**Less than 6 months**	Reference		Reference	
	6-12 months	0.44 (0.15 - 1.28)	0.13	0.52 (0.19 - 1.42)	0.20
	1-3 months	0.29 (0.11 - 0.78)	0.01*	0.75 (0.30 - 1.86)	0.53
	3 months and above	0.45 (0.18 - 1.11)	0.08	0.76 (0.34 - 1.73)	0.51
Marital status	**Widowed**	Reference		Reference	
	Single	-		1.00 (0.08 - 11.81)	0.99
	Married	-		1.31 (0.13 - 13.11)	0.81
	Divorced	-		6.97 (0.49 - 98.68)	0.15
	Constant	-		1.10 (0.00 - 0.00)	0.94

* $p < 0.05$ is considered statistically significant.

DISCUSSION

The aim of this research was to assess the prevalence of anxiety and depression among CVD patients in Saudi Arabia. In this study, a notable proportion of participants reported "little interest or pleasure in doing things, where 33.1% experienced this on several days in the last two weeks, and 13.1% experienced it daily or almost half of the days. Similarly, the majority of the participants (40%) reported feeling sad, down, or hopeless on several days, and 15.4% feeling this daily. In this study, a total of 10.0% experienced minimal depression and 11.2% reported severe depression. Previous studies reported that mental and psychological diseases have a role in increasing cardiovascular risk factors [4]. Moreover, depression affects negatively on the growth of CVD and CVD consequences [27]. Prior studies highlighted that people with CVD have higher prevalence rate of depression compared to the general population, also, patients with depression are more likely to develop CVD and have a higher mortality rate than the general population [28]. These studies indicated that there is a direct link between heart disease and mental illness, and it is a two-way link, as heart disease has a negative impact on lifestyle and daily performance, which negatively affects the psychological state, which leads to an increased chance of depression and psychological illnesses. On the other hand, mental illness is the cause of heart disease or worsening the condition and may lead to death. Based on these data, paying attention to the psychological state of patients who have CVDs is very important to achieve better outcomes for the health status of patients.

In this research, sleep disturbances were common, and a total of 38.1% of the patients reported difficulty sleeping or oversleeping on several days, and 11.9% experiencing it on daily basis. Previous literature reported that sleep disorders are a common problem and around 10% of the general adult population suffer from insomnia, and 4% have obstructive sleep apnea. In the meantime, several sleep disorders including obstructive sleep apnea and insomnia or oversleeping may be underlying factors in the increasing heart events [28]. A previous study has observed that there is a higher incidence of heart disease in those with sleep disturbances [29]. Moreover, a six-year follow-up of about 13,000 people from the Atherosclerosis Risk in Populations survey noticed a slightly higher risk of CVD in those with constant insomnia or poor personal sleep [30]. Therefore, this indicates a clear link between heart disease and sleep problems such as lack of sleep or excessive sleep. The explanation for these effects related to heart diseases and symptoms of heart diseases, such as difficulty breathing or the inability to perform daily functions as before, and the psychological impact of that may be the cause of insomnia. At the same time, the opposite is true, as lack of sleep and its difficulty can negatively affect a person's health and reduce immunity in general, which leads to CVDs. This indicates that these diseases fall into a cycle, each leading to the other.

In this study, feeling irritable, anxious, or on edge was reported by 46.5% of the patients on several days, and 10.8% experienced it daily. Similarly, the majority of the participants (40%) on several days were unable to stop or control worrying, and 20.0% almost half of the days. Most of participants (35.0%) reported experiencing excessive worry about different things on several days, and 16.5% of the participants reported experiencing it almost half of the days. Severe anxiety was observed in 20.8%, and 43.5% of the patients were identified as having mild anxiety. Anxiety is defined as a feeling of temporary fear, apprehension about the future, and uncertainty. This condition is common in varying proportions among people [12]. Two previous studies have indicated a link between anxiety and CVDs, these studies were conducted on approximately forty-nine thousand men to assess their anxiety status before military service, after monitoring them for 37 years, they noted that the diagnosis of anxiety disorder had a strong relationship with coronary heart disease and acute myocardial infarction [31]. Another study conducted on approximately twenty-six thousand Finnish men and women showed a significant relationship between anxiety and an increased risk of coronary heart disease over a 7-year follow-up period [32]. These studies indicated that anxiety is linked directly to CVDs, which is an indication of the importance of controlling psychological diseases because they play a major role in worsening the condition of patients suffering from CVDs and vice versa. Knowing the exact definition of anxiety and increasing the patient's education about this disease plays a key role in reducing its symptoms and complications, especially in patients with heart disease.

In this study, females had significantly higher odds of depression compared to males (OR=1.84,95% CI=0.99−3.43, p=0.05). A previous study conducted in China indicated that depression was directly and positively associated with the risk of all-cause and cardiovascular mortality in adults, especially men [33]. Other studies and a large literature have found that women have twice the mortality rate from CVDs, as well as angina, stroke, and heart failure, compared to men.

In addition, about 25% of women have experienced depression during their lifetime. Psychological illnesses, including depression, are a high-risk factor for CVD [34]. Females showed an elevated risk of having anxiety and/or depression conditions related to males [35]. Physiological differences between the gender and the clinical symptoms may play a vital part in heart disease incidence as well as depression symptoms and the relationship between them. Therefore, it is preferable to conduct studies to determine the prevalence of these diseases between females and males and how the gender is associated with them.

In this research, participants with a diagnosis duration of 1–3 years had significantly lower odds of experiencing depression compared to those diagnosed less than six months ago (OR=0.29,95% CI=0.11−0.78, p=0.014). In comparison, another study conducted in China where patients who have CVDs with a diagnosis duration of 3-5 years and 5-10 years were at high-risk factors for depressive symptoms, however, being with a spouse was a protecting factor [36]. According to that, we must be more attentive to patients without a spouse, and whose disease duration is between 3 and 10 years. As these factors can increase the incidence of depression, using social media as a tool to ensure the role of having help from psychiatric physicians and specialists is so critical to reducing the incidence of suffering from these diseases and symptoms.

In this research, patients aged over 60 years old had a significant lower odd of anxiety (OR =0.18, 95%CI= 0.05 - 0.72, p =0.01). A previous study found no statistically significant relationship (p-value>0.05) in the role of different demographic factors age, gender, and occupation, on patients with depression and anxiety [37]. On the other hand, another previous study reported depression severity increased with age in men, while anxiety severity decreased. In comparison, depression and anxiety severity were similar for females of all ages after the MI [35]. This confirm that demographic factors such as age play a role in increasing or decreasing the incidence of psychological illnesses such as anxiety and depression, and attention is paid to the role of mental health in alleviating and treating the symptoms of these illnesses which are related directly to heart disease.

The research has limitations as it did not involve mental health assessment by a psychiatric consultant. The cross-sectional study design has limited ability to examine causality across the study variables. Therefore, we encourage the utilization of longitudinal study design in future research. The absence of psychiatric consultant assessments is another valid limitation. Therefore, we suggest the utilization alternative methods (e.g., structured clinical interviews) for future research.

RECOMMENDATIONS

In the future, focusing on creating and assessing targeted interventions precisely designed to address the exceptional requirements of people with heart failure and comorbid anxiety and depression. These interventions include self-care, managing negative feelings and thoughts, and resorting to psychiatrists and specialists in this field to prevent the condition from worsening, as well as carrying out appropriate activities for this group of patients to distract themselves from negative thoughts. Besides, integrated mental health screening for CVD patients is recommended. All this falls on the role of the medical team and increases awareness in society.

CONCLUSION

Anxiety and depression are common across patients with CVDs. Females showed higher likelihood of developing severe depression. The psychological evaluation and management of CVDs patients should be given priority in current practices. High risk population should be educated and directed on self-care practices in order to minimize the risk of mental issues.

Authorship Contribution: All authors share equal effort contribution towards (1) substantial contributions to conception and design, acquisition, analysis and interpretation of data; (2) drafting the article and revising it critically for important intellectual content; and (3) final approval of the manuscript version to be published. Yes.

Potential Conflicts of Interest: None

Competing Interest: None

Acceptance Date: 24 March 2025

REFERENCES

1. Lopez EO, Ballard B D, Jan A. Cardiovascular disease [Internet]. 2023 [accessed March 24, 2025]. Available from: https://www.ncbi.nlm.nih.gov/books/NBK535419/.
2. Goldsborough E, Osuji N, Blaha MJ. Assessment of Cardiovascular Disease Risk: A 2022 Update. Endocrinol Met Cli North Am 2022;51(3):483-509.
3. Chauvet-Gelinier JC, Bonin B. Stress, anxiety and depression in heart disease patients: A major challenge for cardiac rehabilitation. Ann Phys Rehab Med 2017;60(1):6-12.
4. Rashid S, Qureshi AG, Noor TA, et al. Anxiety and Depression in Heart Failure: An Updated Review. Cur Prob Cardiol 2023;48(11): 1-10
5. Cohen BE, Edmondson D, Kronish IM. State of the Art Review: Depression, Stress, Anxiety, and Cardiovascular Disease. Am J Hyper 2015;28(11):1295-302.
6. Konstam V, Moser DK, De Jong MJ. Depression and anxiety in heart failure. J Card Failure 2005;11(6):455-63.
7. Celano CM, Villegas AC, Albanese AM, et al. Depression and Anxiety in Heart Failure: A Review. Har Rev Psych 2018;26(4):175-84.
8. Bartoli F, Lillia N, Lax A, et al. Depression after stroke and risk of mortality: a systematic review and meta-analysis. Stroke Res Trea 2013;13(1): 1-18.
9. Bobo WV, Ryu E, Petterson TM, et al. Bi-directional association between depression and HF: An electronic health records-based cohort study. J Comorbidity 2020;10(1): 1-22
10. Nicholson A, Kuper H, Hemingway H. Depression as an aetiologic and prognostic factor in coronary heart disease: a meta-analysis of 6362 events among 146 538 participants in 54 observational studies. Euro Heart J 2006;27(23):2763-74.
11. Frasure-Smith N, Lespérance F. Reflections on depression as a cardiac risk factor. Psychosomatic Med 2005;67(1):19-25.
12. Barlow DH. Anxiety and its disorders: The nature and treatment of anxiety and panic. Guilford Pr 2002; 1(1): 1-17.
13. Abuhamdah SMA, Naser AY. Smart phone addiction and its mental health risks among university students in Jordan: a cross-sectional study. BMC Psych 2023;23(1):1-18
14. Abuhamdah SMA, Naser AY, Abdelwahab GM, et al. The Prevalence of Mental Distress and Social Support among University Students in Jordan: A Cross-Sectional Study. Inter J Environment Res Public Health 2021;18(21): 1-16.
15. Aldhahir AM, Bintalib HM, Siraj RA, et al. Prevalence of Nomophobia and Its Impact on Academic Performance Among Respiratory Therapy Students in Saudi Arabia. Psycho Res

Behavior Manag 2023;16(1):877-84.
16. Alwafi H, Naser AY, Aldhahir AM, et al. Prevalence and predictors of nomophobia among the general population in two middle eastern countries. BMC Psych 2022;22(1):1-15.
17. Qanash S, Alwafi H, Barasheed S, et al. Impact of night shifts on sleeping patterns, psychosocial and physical well-being among healthcare professionals: a cross-sectional study in a tertiary hospital in Saudi Arabia. BMJ Open 2021;11(9): 1-14.
18. Berkman LF, Blumenthal J, Burg M, et al. Effects of treating depression and low perceived social support on clinical events after myocardial infarction: the Enhancing Recovery in Coronary Heart Disease Patients (ENRICHD) Randomized Trial. JAMA 2003;289(23):3106-16.
19. Raison CL, Rutherford RE, Woolwine BJ, et al. A randomized controlled trial of the tumor necrosis factor antagonist infliximab for treatment-resistant depression: the role of baseline inflammatory biomarkers. JAMA Psych 2013;70(1):31-41.
20. Tsabedze N, Kinsey JH, Mpanya D, et al. The prevalence of depression, stress and anxiety symptoms in patients with chronic heart failure. Inter J Ment Health Sys 2021;15(1):36-44.
21. Hong S, Park DH, Ryu SH, et al. Association between Heart Rate Variability Indices and Depressed Mood in Patients with Panic Disorder. Clin Psychophar Neuro 2022;20(4):737-46.
22. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. J General Inter Med 2001;16(9):606-13.
23. Spitzer RL, Kroenke K, Williams JB, Löwe B. A brief measure for assessing generalized anxiety disorder: the GAD-7. Arch Inter Med 2006;166(10):1092-7.
24. Naser AY, Alwafi H, Amara NA, et al. Epidemiology of depression and anxiety among undergraduate students. Int J Clin Pract 2021;75(9):1-14.
25. Naser AY, Dahmash EZ, Al-Rousan R, et al. Mental health status of the general population, healthcare professionals, and university students during 2019 coronavirus disease outbreak in Jordan: A cross-sectional study. Brain Behav 2020;10(8): 1-17.
26. Naser AY, Hameed AN, Mustafa N, et al. Depression and Anxiety in Patients With Cancer: A Cross-Sectional Study. Front Psychol 2021;12(1): 1-15.
27. Krittanawong C, Maitra NS, Qadeer YK, et al. Association of Depression and Cardiovascular Disease. Am J Med 2023;136(9):881-95.
28. Quan SF. Sleep Disturbances and their Relationship to Cardiovascular Disease. AmJ Lifestyle Med 2009;3(1):55-9.
29. Schwartz S, McDowell Anderson W, Cole SR, et al. Insomnia and heart disease: a review of epidemiologic studies. J Psycho Res 1999;47(4):313-3.
30. Phillips B, Mannino DM. Do insomnia complaints cause hypertension or cardiovascular disease? J Clin Sleep Med 2007;3(5):489-94.
31. Janszky I, Ahnve S, Lundberg I, et al. Early-onset depression, anxiety, and risk of subsequent coronary heart disease: 37-year follow-up of 49,321 young Swedish men. J Am Col Cardiol 2010;56(1):31-7.
32. Nabi H, Hall M, Koskenvuo M, et al. Psychological and somatic symptoms of anxiety and risk of coronary heart disease: the health and social support prospective cohort study. Bio Psych 2010;67(4):378-85.
33. Meng R, Yu C, Liu N, et al. Association of Depression With All-Cause and Cardiovascular Disease Mortality Among Adults in China. JAMA Net Open 2020;3(2): 1-19.
34. Bucciarelli V, Caterino AL, Bianco F, et al. Depression and cardiovascular disease: The deep blue sea of women's heart. Tr Cardio Med 2020;30(3):170-6.
35. Serpytis P, Navickas P, Lukaviciute L, et al. Gender-Based Differences in Anxiety and Depression Following Acute Myocardial Infarction. Arquivos Brasi Cardio 2018;111(5):676-83.
36. Cheng L, Zhong Z, Ding S, et al. Low body mass index and disease duration as factors associated with depressive symptoms of Chinese inpatients with chronic heart failure. J Hea Psycho 2023;28(13):1227-37.
37. Açıkel MET. Evaluation of Depression and Anxiety in Coronary Artery Bypass Surgery Patients: A Prospective Clinical Study. Braz J Cardio Sur 2019;34(4):389-95.