Prevalence of Depression, Anxiety and Stress and Their Associated Factors among Cardiac Patients in Jazan, Saudi Arabia

Mohammed Ali Madkhali[1], Atheer Y. Hakami[2], Mohammad A. Jareebi[3*], Alhassan H. Hobani[4], Halimah A. Sumayli[5], Khawlah A. Abbas[6], Hanadi F. Abueishah[7], Ghalia H. Hakami[8], Amal J. Alfaifi[9], Khalid Y. Haroobi[10], Bayan H. Hakami[11], Weaam A. Najmi[12], Yasser A. Sultan[13] and Luai Alhazmi[14]

[1]Department of Internal Medicine, Division of Hematology and Oncology, Faculty of Medicine, Jazan University, Jazan, Saudi Arabia
[2]Department of Medical Rehabilitation, Jazan Health Cluster, Ministry of Health, Jazan, Saudi Arabia
[3-7,10-14]Faculty of Medicine, Jazan University, Jazan, Saudi Arabia
[8]Department of Intensive Care Unit, Jazan General Hospital, Ministry of Health, Jazan, Saudi Arabia
[9]Department of Family Medicine, Jazan Health Cluster, Ministry of Health, Jazan, Saudi Arabia

Author Designation: [1,3,14]Assistant Professors, [2,4-13]Medical Officers

Corresponding author: Mohammad A. Jareebi (e-mail: mjareebi@jazanu.edu.sa).

Abstract **Objectives:** Cardiovascular diseases pose life-threatening health conditions. The presence of depression and anxiety has been associated with increased rates of hospitalization and elevated mortality risks. This study aims to assess the prevalence of depression, anxiety and stress, along with their determinants, among cardiac patients in the Jazan region, Saudi Arabia. **Methods:** A cross-sectional study was conducted among all individuals seeking care at Prince Mohammed Bin Nasir Hospital, Jazan, from July 2023 to June 2024. The questionnaire, adapted from the literature, comprised sections addressing sociodemographic particulars, health-related information and the standardized Depression, Anxiety and Stress Scale-21 (DASS-21). SPSS v 26 was used for data analysis. **Results:** A total of 327 patients participated in our study, revealing a prevalence of 47%, 73% and 50% for depression, anxiety and stress, respectively. Stressful life events (95% CI for depression: 1.0 to 6.7; 95% CI for anxiety: 0.68 to 6.6; 95% CI for stress: 4.3 to 11) and the presence of chronic diseases were significantly associated with higher risks of depression, anxiety and stress. Female gender (95% CI: -8.2 to -0.20, p value: 0.04) and smoking (95% CI: 0.91 to 7.1, p value: 0.011) were predictors of higher anxiety, while a sedentary lifestyle (95% CI: 0.09 to 5.5, P value: 0.043) was associated with an increased risk of depression. Social support was linked to a greater risk of stress (95% CI: 2.8 to 11, P value: 0.001). Effective control over heart diseases was associated with lower risks of depression, anxiety and stress. **Conclusion:** Our findings underscore an alarming prevalence of depression, anxiety and stress among cardiovascular disease patients, with key predictors identified as stress, lifestyle, the presence of chronic diseases and social support. Thus, attention should be directed towards interventions that may enhance mental health in cardiac patients, ultimately improving their quality of life.

Key Words Cardiovascular diseases, depression, anxiety, stress, prevalence, jazan region, saudi arabia, mental health

INTRODUCTION

Cardiovascular diseases stand as a prevalent and life-threatening chronic ailment, consistently maintaining their position as the leading global cause of mortality [1]. Notably, ischemic heart disease accounts for 15.9% of total global deaths [2], with recent WHO data reporting a staggering 17.7 million deaths attributed to cardiovascular diseases [3]. This category encompasses a broad spectrum of vascular, structural and valvular cardiac anomalies, spanning from acute coronary syndrome to chronic hypertension, chronic and valvular insufficiency and congenital disorders [4,5].

The realm of mental health within cardiac patients reveals noteworthy figures, with global prevalence rates of 31.3% for depression, 32.9% for anxiety and 57.7% for stress [6]. An Iranian study disclosed proportions of 38.6% for anxiety, 41% for stress and 38.6% for depression symptoms [7], while Jordanian research indicated a depression prevalence of 45.1% [8]. Depression, a prominent psychiatric disorder among heart patients, is characterized by feelings of sadness, loss of interest in pleasurable activities, social withdrawal, questioning the meaning of life, reduced interest in intimacy, lowered tolerance threshold and suicidal ideation [9].

Madkhali *et al.* : Prevalence of Depression, Anxiety and Stress and Their Associated Factors among Cardiac Patients in Jazan, Saudi Arabia

jpms

Significantly, depression substantially affects cardiovascular patients' behavioral and psychological capacities to engage in health-enhancing behaviors mitigating cardiac risks, including exercise, adherence to a diet and medication compliance [10,11]. Moreover, these patients tend to partake in activities exacerbating their cardiac condition, such as smoking, alcohol misuse, social isolation and suboptimal response to cardiac rehabilitation [12].

Simultaneously, anxiety can manifest as a response to cardiac discomfort, resulting in symptoms like heart palpitations, high blood pressure, muscle tension, sweating, a flushed face, a sense of impending danger, difficulty focusing and disruptions in sleep [13,14]. Repeated hospitalizations amplify patient stress, collectively impacting their quality of life [15]. Both depression and, to a lesser extent, anxiety correlate with adverse clinical outcomes in heart disease patients, leading to increased hospitalization rates and heightened mortality [16-18]. affecting cardiac rehabilitation crucial to improving patient outcomes [19]. Therefore, the objective of our study was to assess the prevalence of depression, anxiety and stress, alongside their associated determinants, among cardiac patients within the Jazan region of Saudi Arabia.

METHODS

Study Design and Settings

A cross-sectional study was conducted in the cardiac outpatient department (OPD) of Prince Mohammed bin Nasir Hospital (PMBN) in the Jazan region of Saudi Arabia. In the first half of 2022, the Heart Center at PMBN performed over 1,400 catheterization and cardiac procedures, including diagnostic catheterizations, electrical cardiac interventions and open-heart surgeries. The centre also provided training to senior cardiology fellows. Furthermore, 6,819 patients were admitted to the emergency department and 1,241 patients were admitted to the adult cardiac department to treat various heart conditions [20]. For our study, we enrolled patients aged 18 and above who visited the cardiac outpatient department at PMBN on specific outpatient days from September 2022 to April 2023. Exclusions were made for patients with cognitive impairment, those on medications that could affect results and those unable to participate in surveys.

Sample Size and Data Collection Tools

The sample size was calculated using the statistical equation: initial sample size = $[(z^2 \times p \times q)]/d^2$. To align with the study's objectives and scientific literature, an interview-based structured questionnaire with closed-ended items was developed. Consultant cardiologists, an internist and a family medicine specialist conducted a comprehensive review of the questionnaire's face and content validity. Following necessary revisions, expert approval and translation into Arabic, the mentioned specialists further reviewed the questionnaire. A total of 327 participants were included.

A pilot study was conducted with 20 randomly selected patients and feedback from this pilot study was carefully analyzed, leading to iterative modifications to enhance the questionnaire's clarity, pertinence and efficacy.

The questionnaire comprised three sections. The first part contained socio-demographic attributes, including variables such as age, gender, marital status, educational attainment, nationality, employment status and monthly income level. The second section covered health-related particulars, encompassing aspects such as sedentary lifestyle, parenthood, living alone, familial support, stressful life events, heart disease management, duration of heart disease, familiarity with health applications and their accessibility, tobacco and alcohol consumption habits, presence of chronic diseases and their numbers.

The final section introduced the Depression, Anxiety and Stress Scale-21 (DASS-21), originally developed by Lovibond and Lovibond [21]. The DASS-21 is a self-administered evaluative tool featuring three distinct subscales, each assessed on a four-point Likert scale (ranging from 0, "Strongly Disagree," to 3, "Totally Agree"). Each of the three subscales within the DASS-21 comprises seven items, collectively assessing emotional states related to depression, anxiety and stress.

The Arabic version of the DASS-21 [22] was employed, demonstrating commendable reliability coefficients of 0.76 for depression, 0.75 for anxiety and 0.77 for stress. In the context of this study, the internal consistency reliability of the depression subscale was 0.85, 0.81 for anxiety and 0.87 for stress.

Ethical Approval

Approval was secured from the ethical committee of Jazan University (Reference No. 2288), following the principles outlined in the 1964 Helsinki Declaration and its subsequent amendments. Informed consent was obtained from all participants, ensuring the confidentiality of their information, which is strictly maintained for scientific purposes.

Statistical Analysis

Data were extracted into an Excel sheet, thoroughly cleaned and subsequently imported into R software version 4.2.2. Descriptive statistics, including medians and interquartile ranges for continuous variables, along with frequencies and percentages for categorical variables, were employed. The chi-square test and Fisher's exact test were utilized to identify variables associated with depression, anxiety and stress. Patients without heart conditions were excluded from the analysis. Furthermore, a multiple linear regression analysis was conducted to assess predictors of depression, anxiety and stress. Variables that exhibited a statistically significant relationship at the bivariate analysis level were included in the multiple analysis. A p-value less than 0.05 was deemed significant in all analyses.

Madkhali *et al.* : Prevalence of Depression, Anxiety and Stress and Their Associated Factors among Cardiac Patients in Jazan, Saudi Arabia

jpms

RESULTS

Participant Information

A total of 327 individuals participated in the study. Among them, the majority 147(45%) were aged 60 years and above. Most participants were male 223(68.2%), married 255(78%) and of Saudi nationality 298(91.1%). Approximately 124(37.9%) of the participants were both illiterate and unemployed. Moreover, 181(55.4%) reported an income level of less than 5000 SAR. The study revealed significant associations; specifically, depression was associated with nationality (p-value: 0.011), while anxiety showed associations with gender (p-value: 0.027), level of education (p-value: 0.010), employment (p-value: 0.020) and heart disease (p-value: 0.020). Stress did not exhibit associations with any sociodemographic predictors (Table 1).

Health-Rrelated Information

The majority of participants reported having children (87%), leading stressful lives (70%), maintaining sedentary lifestyles (59%), receiving family support (86%) and having heart disease (91%). The majority also indicated not living alone (82%). Most participants stated having cardiovascular disease for less than 3 years (45%), with a significant portion

maintaining good control (81%). A substantial 75% of patients claimed awareness of health applications, with only 15% having never heard of them. Approximately 42% were aware but had never used them; however, 61% had access. Seventy-six percent of patients reported having a chronic disease, with the majority (37%) having only two diseases. Hypertension (57%), diabetes mellitus (48%) and arthritis (45%) were the most prevalent chronic conditions. Notably, only 31% of participants reported smoking, while 99% did not consume alcohol. Table 2

Prevalence of Depression, Anxiety and Stress

Depression was categorized as "moderate," "severe," or "extremely severe" among heart disease patients for 47% of participants, while anxiety and stress were reported in 73% and 50% of cases, respectively. The mean depression score among heart disease patients was 6.8±5.5, with the anxiety and stress mean scores being 8.6±5.5 and 9.5±6.1, respectively. The total DASS score was 24.4±15.5 (Table 3).

Predictors of Depression, Anxiety and Stress

Concerning depression, individuals experiencing a stressful life had a significantly higher risk, with a 3.9-fold increase

Table 1: Sociodemographic characteristics of the study participants (n = 327)

Characteristic	Overall n = 327	Depression n = 186	p-value	Anxiety n = 252[1]	p-value	Stress n = 87	p-value
Age							
18-29 years	16(4.9%)	9(4.8%)	0.32	11(4.4%)	0.11	7(3.7%)	0.44
30-45 years	53(16%)	27(15%)		35(14%)		27(14%)	
46-59 years	111(34%)	58(31%)		86(34%)		64(34%)	
>60 years	147 (45%)	92(49%)		120(48%)		89(48%)	
Gender							
Female	104(32%)	54(29%)	0.23	88(35%)	0.02	60(32%)	0.95
Male	223(68%)	132(71%)		164(65%)		127(68%)	
Marital status							
Single	31(9.5%)	20(11%)	0.74	25(9.9%)	0.57	17(9.1%)	0.86
Married	255(78%)	144 (77%)		192(76%)		145(78%)	
Divorce	11(3.4%)	5(2.7%)		9(3.6%)		8(4.3%)	
Widow	30(9.2%)	17(9.1%)		26(10%)		17(9.1%)	
Nationality							
Non-Saudi	29(8.9%)	23(12%)	0.011	21(8.3%)	0.54	20(11%)	0.24
Saudi	298(91%)	163(88%)		231(92%)		167(89%)	
Level of education							
Illiterate	124(37.9%)	75(40%)	0.41	107(42%)	0.010	77(41%)	0.52
Primary school	60(18%)	37(20%)		47(19%)		35(19%)	
Secondary school	57(17%)	28(15%)		37(15%)		28(15%)	
Intermediate school	29(8.9%)	18(9.7%)		22(8.7%)		15(8.0%)	
University	57(17%)	28(15%)		39(15%)		32(17%)	
Employment							
Governmental employee	55(17%)	29(16%)	0.62	37(15%)	0.020	34(18%)	0.98
Private sector employee	14(4.3%)	10(5.4%)		12(4.8%)		9(4.8%)	
Self employed	17(5.2%)	11(5.9%)		9(3.6%)		9(4.8%)	
Unemployed	124(37.9%)	71(38%)		105(42%)		71(38%)	
Retired	108(33%)	62(33%)		82(33%)		60(32%)	
Student	9(2.8%)	3(1.6%)		7(2.8%)		4(2.1%)	
Income level							
0-5000	181(55%)	108(58%)	0.57	146(58%)	0.10	97(52%)	0.057
5001-10000	73(22%)	39 (21%)		58 (23%)		47(25%)	
10001-15000	47(14%)	28(15%)		32(13%)		32(17%)	
15001-20000	20(6.1%)	8(4.3%)		12(4.8%)		10(5.3%)	
more than 20000	6(1.8%)	3(1.6%)		4(1.6%)		1(0.5%)	
Do you have a heart condition	297(91%)	173(93%)	0.12	234(93%)	0.020	173(93%)	0.21

Madkhali *et al.* : Prevalence of Depression, Anxiety and Stress and Their Associated Factors among Cardiac Patients in Jazan, Saudi Arabia

jpms

Table 2: Health-related data of the study participants (n = 327)

Characteristic	N(%)
Having children	285(87%)
Family support	281(86%)
A stressful life	230(70%)
Living alone	58(18%)
A sedentary lifestyle	193(59%)
Extension of the disease	
less than 3 years	146(45%)
3-5 years	70(21%)
5-10 years	59(18%)
More than 10 years	52(16%)
Disease control	
Poorly	62(19%)
Good	265(81%)
Access to health applications	201(61%)
Knowledge about health applications	239(73%)
Knowing about health applications but not using it	138(42%)
Never hear about health applications	49(15%)
Presence of chronic disease	247(76%)
How many chronic disease you have.	
One	93(35%)
Two	100(37%)
Three	56(21%)
More than 3	20(7.4%)
Missing	58
Do you have diabetes	158(48%)
Do you have hypertension	188(57%)
Do you have angina pectoris	130(40%)
Do you have stroke	21(6.4%)
Do you have arthritis	147(45%)
Do you have heart failure	28(8.6%)
Do you smoke?	101(31%)
Do you drink alcohol	2(0.6%)

Table 3: DASS level among the heart disease patients

Level	Depression	Anxiety	Stress
Normal	124(42%)	63(21%)	124(42%)
Mild	35(12%)	16(5.4%)	24(8.1%)
Moderate	67(23%)	60(20%)	46(15%)
Sever	33(11%)	40(13%)	56(19%)
Extremely sever	38 (13%)	118(40%)	47 (16%)

(95% CI: 1.0 to 6.7, p-value: 0.008). Moreover, those leading a sedentary lifestyle showed a 2.8 times higher risk (95% CI: 0.09 to 5.5, p-value: 0.043) of developing depression. Additionally, patients with chronic diseases had a 4.9 times higher risk (95% CI: 0.70 to 9.0, p-value: 0.022) of experiencing depression.

Regarding anxiety, males exhibited a 4.2-fold lower risk than females (95% CI: -8.2 to -0.20, p-value: 0.04). Conversely, being a smoker was linked to a 4-fold higher risk (95% CI: 0.91 to 7.1, p-value: 0.011) of anxiety compared to nonsmokers. Furthermore, individuals facing stressful life situations were 3.6 times more likely (95% CI: 0.68 to 6.6, p-value: 0.016) to suffer from anxiety, while those with chronic diseases had a 4.5 times higher risk (95% CI: 0.11 to 8.9, p-value: 0.045) of developing anxiety.

Concerning stress, individuals facing stressful life situations exhibited a 7.6-fold higher risk (95% CI: 4.3 to 11, p-value: <0.001). Interestingly, having family support was associated with a 7.2 times higher risk (95% CI: 2.8 to 11, p-value: 0.001) compared to patients without support.

Additionally, individuals with chronic diseases showed a 5.2 times higher risk (95% CI: 0.47 to 10, p-value: 0.032) of experiencing stress.

Among patients with heart disease, those who effectively controlled their condition had significantly lower risks of depression, anxiety and stress. Specifically, they had a 6.7 times lower risk for stress, a 5.9 times lower risk for depression and a 3.8 times lower risk for anxiety than those with poorly controlled heart disease (Table 4).

DISCUSSION

Heart disease patients are susceptible to psychological distress. Therefore, we aimed to estimate the prevalence of anxiety, depression and stress among cardiovascular disease patients attending the Heart Center at Prince Mohammed bin Nasser Hospital and identify potential predictors.

Our findings revealed associations between gender, educational level, employment and heart disease with anxiety, consistent with well-established predictors proven by prior research [22,23]. Intriguingly, depression was associated with nationality, with Saudi patients exhibiting a higher association than non-Saudi patients, potentially attributed to cultural influences impacting mental health discussions and help-seeking behavior. Further investigation is needed to unravel the underlying factors, including awareness of depressive symptoms and treatment-seeking behavior.

The prevalence of anxiety (73%), depression (47%) and stress (50%) among cardiovascular Saudi patients in this study appears notably higher than the global prevalence among cardiac patients [6], where anxiety was 32.9%, depression was 31.3% and stress was 57.7%. It surpasses rates in other Middle Eastern countries, as demonstrated by an Iranian study reporting 38.6% for anxiety, 41% for stress and 38.6% for depression symptoms [7] and a Jordanian study indicating a depression prevalence of 45.1% [8]. This higher prevalence may be linked to social stigma, interpersonal dilemmas and limited accessibility to mental health services and information, as reported in a qualitative study [24].

Depression's association with a sedentary lifestyle aligns with prior research [25,26]. Numerous studies emphasize the positive impact of regular exercise in reducing depression risk and enhancing overall well-being [27]. Implementing educational programs and promoting physical activity may enhance outcomes and reduce depression risk among heart disease patients.

Our study identified an increased risk of depression, anxiety and stress among individuals with chronic diseases, consistent with the literature [28]. Chronic diseases impact mental health through physiological mechanisms, lifestyle limitations and psychological distress related to managing the condition [29,30]. Holistic chronic disease management should integrate mental health assessments and interventions. The study reaffirms the established link between stress and mental health conditions [31,32].

Madkhali *et al*. : Prevalence of Depression, Anxiety and Stress and Their Associated Factors among Cardiac Patients in Jazan, Saudi Arabia

jpms

Table 4: Risk factors for depression, anxiety and stress among cardiac patients in Jazan (N = 297)

Characteristic	Depression		Anxiety		Stress	
	OR(95% CI)	p-value	OR(95% CI)	p-value	OR(95% CI)	p-value
Age	0.06 (-0.04 , 0.16)	0.22	-		0.09 (-0.04, 0.21)	0.17
Gender						
Female	-		-		-	
Male	-		-4.2(-8.2, -0.20)	0.040	-	
Marital status						
Divorce	-		-		-	
Married	-		1.1 (-6.1, 8.3)	0.76	-	
Single	-		8.6 (-0.69, 18)	0.070	-	
Widow	-		-0.30 (-8.4, 7.8)	0.94	-	
Level of education						
Illiterate	-		-		-	
Intermediate school	-		-2.0 (-6.9, 3.0)	0.43	-1.8 (-7.5, 4.0)	0.55
Primary school	-		-0.77(-4.5, 3.0)	0.68	-1.6 (-5.8, 2.6)	0.46
Secondary school	-		-0.67(-5.6, 4.3)	0.79	3.3 (-2.3, 8.9)	0.25
University	-		-0.88 (-6.5, 4.7)	0.76	3.2 (-2.6, 9.1)	0.28
Employment						
Government	-		-		-	
Private sector	-		2.4 (-8.7, 14)	0.67	7.5 (-5.3, 20)	0.25
Retired	-		0.20 (-4.3, 4.7)	0.93	-1.8 (-6.8, 3.2)	0.47
Self employed	-		1.7 (-6.1, 9.4)	0.67	3.1 (-5.1, 11)	0.46
Student	-		-9.2 (-31, 13)	0.41	1.8 (-21, 24)	0.87
Unemployed	-		3.1 (-2.8, 9.0)	0.30	2.9 (-2.9, 8.7)	0.32
Nationality						
Non-Saudi	-		-		-	
Saudi	-3.0 (-8.1, 2.1)	0.24	-		-	
Income level						
0-5000 SR	-		-		-	
5001-10000 SR	-0.13 (-3.5, 3.3)	0.94	3.1 (-0.58, 6.7)	0.10	-	
10001-15000 SR	2.9 (-1.1, 6.8)	0.15	3.5 (-0.92, 8.0)	0.12	-	
15001-20000 SR	-2.4 (-7.8, 3.0)	0.39	-1.0 (-7.6, 5.6)	0.76	-	
>20000 SR	-0.41 (-10, 9.5)	0.94	2.0 (-8.2, 12)	0.70	-	
Knowing about health applications but not using it	-		-0.40(-3.1, 2.3)	0.77	2.0 (-0.86,4.9)	0.17
Family support	-		-		7.2 (2.8, 11)	0.001
A stressful life	3.9 (1.0, 6.7)	0.008	3.6 (0.68,6.6)	0.016	7.6 (4.3, 11)	<0.001
Living alone	-0.47(-3.8, 2.9)	0.78	0.99 (-2.6, 4.6)	0.59	-	-
A sedentary lifestyle	2.8(0.09, 5.5)	0.043	2.1(-0.66, 4.9)	0.13	2.7(-0.29, 5.7)	0.076
Disease control (good)	-5.9 (-8.9, -2.8)	<0.001	-3.8 (-7.0, -0.47)	0.025	-6.7(-10, -3.2)	<0.001
Knowledge about health applications	-2.2(-5.3, 0.87)	0.16	-		-	
Presence of chronic disease (yes)	4.9(0.70, 9.0)	0.022	4.5(0.11, 8.9)	0.045	5.2(0.47 to 10)	0.032
How many chronic disease you have						
More than 3	-		-		-	
One	-2.0(-7.3, 3.3)	0.47	-3.7 (-9.0, 1.7)	0.18	-4.1 (-10, 1.8)	0.17
Three	-4.5(-9.8, 0.79)	0.10	-3.0 (-8.3, 2.3)	0.26	-2.8 (-8.6, 3.1)	0.35
Two	-3.0(-8.0, 2.0)	0.24	-2.5 (-7.6, 2.6)	0.33	-1.4 (-7.0, 4.2)	0.62
Do you smoke (Yes)	1.9 (-0.87, 4.7)	0.18	4.0(0.91, 7.1)	0.011	3.0(-0.27, 6.2)	0.072

Psycho-social vulnerabilities were identified as better predictors of depression in cardiac patients than demographic and disease-related variables [33]. Considering the personal life experiences of cardiac patients when treating depression and incorporating stress management techniques, such as mindfulness and relaxation, is crucial [34].

The finding that males exhibited a lower risk of anxiety compared to females aligns with literature suggesting gender differences in anxiety disorder prevalence [22,23]. While the reasons for this discrepancy are complex, hormonal and genetic factors may contribute to varying vulnerability between genders [35].

Our findings also established a connection between smoking and anxiety, consistent with previous research [36]. Nicotine and other components of tobacco smoke are implicated in influencing brain neurotransmitter systems, contributing to anxiety and related mood disorders [37]. Consequently, smoking cessation programs are imperative to mitigate heightened anxiety risk [38].

Effective cardiovascular disease management can positively influence mental health outcomes, recognizing the bidirectional relationship between cardiovascular health and mental well-being [39]. The biological linkage of depression to cardiovascular disease through inflammation underscores the potential for treating cardiovascular diseases to alleviate the severity of depression symptoms [40], though further investigations are needed for confirmation.

Interestingly, our study indicated a counterintuitive association between family support and heightened stress risk, contrasting some literature that underscores the

Madkhali *et al.* : Prevalence of Depression, Anxiety and Stress and Their Associated Factors among Cardiac Patients in Jazan, Saudi Arabia

jpms

protective role of social support against stress [41]. The social support-stress relationship is influenced by individual factors, relationship quality and cultural context, warranting careful consideration. Notably, a study suggests that culturally inappropriate forms of social support might inadvertently exacerbate stress [42].

One of the key limitations of our study is the cross-sectional design, which inherently restricts the ability to establish causal relationships between variables. While our study provides valuable associations, we cannot infer causality and this limits the conclusions we can draw about the temporal sequence of events or effects.

CONCLUSIONS

The study revealed an alarming prevalence of depression, anxiety and stress among cardiovascular disease patients in the Jazan region of Saudi Arabia. It emphasizes the crucial need to consider multiple factors, including stress, lifestyle, chronic diseases and social support, to comprehend and enhance these individuals' mental health and well-being. Given the complex interplay between mental and physical health, clinicians should adopt a multifactorial approach, taking into account factors such as stress, lifestyle, chronic diseases and social support when evaluating mental well-being

REFERENCES

[1]   Murray, Christopher JL, and Alan D Lopez. "Alternative projections of mortality and disability by cause 1990-2020: Global burden of disease study." *The Lancet*, vol. 349, no. 9064, May 1997, pp. 1498-1504. http://dx.doi.org/10.1016/s0140-6736(96)07492-2.

[2]   Wang, Haidong, *et al.* "Global, regional, and national life expectancy, all-cause mortality, and cause-specific mortality for 249 causes of death, 1980-2015: A systematic analysis for the global burden of disease study 2015." *The Lancet*, vol. 388, no. 10053, October 2016, pp. 1459-1544. http://dx.doi.org/10.1016/s0140-6736(16)31012-1.

[3]   Allabadi, H., *et al.* "Depression and anxiety symptoms in cardiac patients: A cross-sectional hospital-based study in a Palestinian population." *BMC Public Health*, vol. 19, no. 1, February 2019. http://dx.doi.org/10.1186/s12889-019-6561-3.

[4]   Iung, Bernard, *et al.* "Valvular heart disease in the community: A European experience." *Current Problems in Cardiology*, vol. 32, no. 11, November 2007, pp. 609-661. http://dx.doi.org/10.1016/j.cpcardiol.2007.07.002.

[5]   Rehan, Rajan, *et al.* "Adult congenital heart disease survivors at age 50 years: Medical and psychosocial status." *Heart, Lung and Circulation*, vol. 30, no. 2, February 2021, pp. 261-266. http://dx.doi.org/10.1016/j.hlc.2020.05.114.

[6]   Karami, Nastaran, *et al.* "Global prevalence of depression, anxiety, and stress in cardiac patients: A systematic review and meta-analysis." *Journal of Affective Disorders*, vol. 324, 2023, pp. 175-189. http://dx.doi.org/10.1016/j.jad.2022.12.055.

[7]   Goli, Behrooz. "Prevalence of Anxiety, Depression and Stress in CABG Candidate Patients and Factors affecting it at Farshchian Cardiovascular Hospital in Hamadan." *Iranian Journal of Health Education and Health Promotion*, vol. 9, no. 2, 2021, pp. 212-225. https://journal.ihepsa.ir/article-1-1608-en.html.

[8]   Rawashdeh, Sukaina I., *et al.* "Prevalence estimates, severity, and risk factors of depressive symptoms among coronary artery disease patients after ten days of percutaneous coronary intervention." *Clinical Practice and Epidemiology in Mental Health*, vol. 17, no. 1, September 2021, pp. 103-113. http://dx.doi.org/10.2174/1745017902117010103.

[9]   Chen, Mei Ling, *et al.* "Anxiety and depression in Taiwanese cancer patients with and without pain." *Journal of Advanced Nursing*, vol. 32, no. 4, October 2000, pp. 944-951. http://dx.doi.org/10.1046/j.1365-2648.2000.t01-1-01560.x.

[10] Holvast, Floor, *et al.* "Non-adherence to cardiovascular drugs in older patients with depression: A population-based cohort study." *International Journal of Cardiology*, vol. 274, 2019, pp. 366-371. http://dx.doi.org/10.1016/j.ijcard.2018.08.100.

[11] Luyster, Faith S., *et al.* "Depression and anxiety symptoms are associated with reduced dietary adherence in heart failure patients treated with an implantable cardioverter defibrillator." *Journal of Cardiovascular Nursing*, vol. 24, no. 1, January 2009, pp. 10-17. http://dx.doi.org/10.1097/01.jcn.0000317469.63886.24.

[12] Correa-Rodríguez, María, *et al.* "Prevalence of depression in coronary artery bypass surgery: A systematic review and meta-analysis." *Journal of Clinical Medicine*, vol. 9, no. 4, March 2020. http://dx.doi.org/10.3390/jcm9040909.

[13] Mostafayi, Mehrnush, *et al.* "The effect of familiarization with preoperative care on anxiety and vital signs in the patient's cesarean section: A randomized controlled trial." *European Journal of Midwifery*, vol. 5, no. 21, June 2021, pp. 1-7. http://dx.doi.org/10.18332/ejm/137366.

[14] Ghods, Ali Asghar. "Anxiety and Associated Factors in Patients Undergoing Coronary Artery Bypass Surgery." *Journal of Mazandaran University of Medical Sciences*, vol. 28, no. 170, 2019, pp. 127-137. https://jmums.mazums.ac.ir/article-1-12278-en.html.

[15] Feng, Limin, *et al.* "Prevalence of depression in myocardial infarction." *Medicine*, vol. 98, no. 8, February 2019. http://dx.doi.org/10.1097/md.0000000000014596.

[16] Roest, Annelieke M., *et al.* "Prognostic association of anxiety post myocardial infarction with mortality and new cardiac events: A meta-analysis." *Psychosomatic Medicine*, vol. 72, no. 6, July 2010, pp. 563-569. http://dx.doi.org/10.1097/psy.0b013e3181dbff97.

[17] Melle, Joost P. van, *et al.* "Prognostic association of depression following myocardial infarction with mortality and cardiovascular events: A meta-analysis." *Psychosomatic Medicine*, vol. 66, no. 6, November 2004, pp. 814-822. http://dx.doi.org/10.1097/01.psy.0000146294.82810.9c.

[18] Moraska, Amanda R., *et al.* "Depression, healthcare utilization, and death in heart failure." *Circulation: Heart Failure*, vol. 6, no. 3, May 2013, pp. 387-394. http://dx.doi.org/10.1161/circheartfailure.112.000118.

[19] Chauvet-Gelinier, Jean Christophe, and Bernard Bonin. "Stress, anxiety and depression in heart disease patients: A major challenge for cardiac rehabilitation." *Annals of Physical and Rehabilitation Medicine*, vol. 60, no. 1, January 2017, pp. 6-12. http://dx.doi.org/10.1016/j.rehab.2016.09.002.

[20] Arab News. "Thousands treated for heart ailments in Saudi Arabia's Jazan." *Arab News*, 2022. https://www.arabnews.com/node/2147331/saudi-arabia

[21] Lovibond, P.F., and S.H. Lovibond. "The structure of negative emotional states: Comparison of the depression anxiety stress scales (DASS) with the beck depression and anxiety inventories." *Behaviour Research and Therapy*, vol. 33, no. 3, March 1995, pp. 335-343. http://dx.doi.org/10.1016/0005-7967(94)00075-u.

[22] Serpytis, Pranas, *et al.* "Gender-based differences in anxiety and depression following acute myocardial infarction." *Arquivos Brasileiros de Cardiologia*, vol. 111, no. 5, December 2017, pp. 676-683. http://dx.doi.org/10.5935/abc.20180161.

[23] Greenman, Paul S., *et al.* "Of Sound Heart and Mind: A Scoping Review of Risk and Protective Factors for Symptoms of Depression, Anxiety, and Posttraumatic Stress in People With Heart Disease." *Journal of Cardiovascular Nursing*, vol. 33, no. 5, September 2018, pp. E16-E28. http://dx.doi.org/10.1097/jcn.0000000000000508.

[24] Noorwali, Robena, *et al.* "Barriers and facilitators to mental health help-seeking among young adults in Saudi Arabia: A qualitative study." *International Journal of Environmental Research and Public Health*, vol. 19, no. 5, March 2022. http://dx.doi.org/10.3390/ijerph19052848.

Madkhali *et al.* : Prevalence of Depression, Anxiety and Stress and Their Associated Factors among Cardiac Patients in Jazan, Saudi Arabia

jpms

[25] Zhu, Yidan, *et al.* "Sedentary behavior and the risk of depression in patients with acute coronary syndromes." *The American Journal of Cardiology*, vol. 121, no. 12, June 2018, pp. 1456-1460. http://dx.doi.org/10.1016/j.amjcard.2018.02.031.

[26] Huang, Yuchai, *et al.* "Sedentary behaviors and risk of depression: A meta-analysis of prospective studies." *Translational Psychiatry*, vol. 10, no. 1, January 2020. http://dx.doi.org/10.1038/s41398-020-0715-z.

[27] Verschueren, Suzanne, *et al.* "The effect of exercise therapy on depressive and anxious symptoms in patients with ischemic heart disease: A systematic review." *Journal of Psychosomatic Research*, vol. 105, no. 2018, February 2018, pp. 80-91. http://dx.doi.org/10.1016/j.jpsychores.2017.11.018.

[28] Wang, Zhenjie, *et al.* "Socio-demographic characteristics and co-occurrence of depressive symptoms with chronic diseases among older adults in China: The China longitudinal ageing social survey." *BMC Psychiatry*, vol. 19, no. 1, October 2019. http://dx.doi.org/10.1186/s12888-019-2305-2.

[29] Xiao, Shujuan, *et al.* "The impact of chronic diseases on psychological distress among the older adults: The mediating and moderating role of activities of daily living and perceived social support." *Aging and Mental Health*, vol. 26, no. 9, July 2021, pp. 1798-1804. http://dx.doi.org/10.1080/13607863.2021.1947965.

[30] Cheng, Cheng, *et al.* "The relationship between coping strategies and psychological distress in Chinese older adults with multiple chronic conditions." *Australasian Journal on Ageing*, vol. 40, no. 4, March 2021, pp. 397-405. http://dx.doi.org/10.1111/ajag.12946.

[31] Westfall, Susan, *et al.* "Chronic stress-induced depression and anxiety priming modulated by gut-brain-axis immunity." *Frontiers in Immunology*, vol. 12, no. 2021, June 2021. http://dx.doi.org/10.3389/fimmu.2021.670500.

[32] Liu, Mei Yan, *et al.* "Association between psychosocial stress and hypertension: A systematic review and meta-analysis." *Neurological Research*, vol. 39, no. 6, April 2017, pp. 573-580. http://dx.doi.org/10.1080/01616412.2017.1317904.

[33] Doyle, F., *et al.* "What predicts depression in cardiac patients: Sociodemographic factors, disease severity or theoretical vulnerabilities?." *Psychology and Health*, vol. 26, no. 5, October 2010, pp. 619-634. http://dx.doi.org/10.1080/08870441003624398.

[34] Zou, Huijing, *et al.* "A systematic review and meta analysis of mindfulness based interventions for patients with coronary heart disease." *Journal of Advanced Nursing*, vol. 77, no. 5, January 2021, pp. 2197-2213. http://dx.doi.org/10.1111/jan.14738.

[35] Farhane-Medina, Naima Z., *et al.* "Factors associated with gender and sex differences in anxiety prevalence and comorbidity: A systematic review." *Science Progress*, vol. 105, no. 4, October 2022. http://dx.doi.org/10.1177/00368504221135469.

[36] Zimmermann, Martha, *et al.* "Modifiable risk and protective factors for anxiety disorders among adults: A systematic review." *Psychiatry Research*, vol. 285, no. 2020, March 2020. http://dx.doi.org/10.1016/j.psychres.2019.112705.

[37] Hahad, Omar, *et al.* "Smoking and neuropsychiatric disease—associations and underlying mechanisms." *International Journal of Molecular Sciences*, vol. 22, no. 14, July 2021. http://dx.doi.org/10.3390/ijms22147272.

[38] Taylor, Gemma MJ, *et al.* "Smoking cessation for improving mental health." *Cochrane Database of Systematic Reviews*, vol. 2021, no. 3, March 2021. http://dx.doi.org/10.1002/14651858.cd013522.pub2.

[39] Ogunmoroti, Oluseye, *et al.* "A systematic review of the bidirectional relationship between depressive symptoms and cardiovascular health." *Preventive Medicine*, vol. 154, no. 2022, January 2022. http://dx.doi.org/10.1016/j.ypmed.2021.106891.

[40] Zuzarte, Pedro, *et al.* "Current therapeutic approaches for targeting inflammation in depression and cardiovascular disease." *Current Drug Metabolism*, vol. 19, no. 8, July 2018, pp. 674-687. http://dx.doi.org/10.2174/1389200219666180305143501.

[41] Wiesmaierova, Simona, *et al.* "Social support buffers the negative effects of stress in cardiac patients: A cross-sectional study with acute coronary syndrome patients." *Journal of Behavioral Medicine*, vol. 42, no. 3, December 2018, pp. 469-479. http://dx.doi.org/10.1007/s10865-018-9998-4.

[42] Taylor, Shelley E. "Cultural differences in the impact of social support on psychological and biological stress responses." *Psychological Science*, vol. 18, no. 9, 2007, pp. 831-837. https://pubmed.ncbi.nlm.nih.gov/17760781.