

## ORIGINAL ARTICLE

## FREQUENCY OF DEPRESSION AND ANXIETY IN PATIENTS WITH ACUTE CORONARY SYNDROME

Zeeshan Shaikh<sup>1</sup>, Ali Nawaz Khan<sup>1</sup>, Ghulam Rasool Maken<sup>1</sup>, Safina<sup>1</sup>, Erum Shahzadi Malik<sup>1</sup>, Mahesh Kumar<sup>1</sup>, Yumna Siddiqui<sup>1</sup>

<sup>1</sup>The Pakistan Navy Station Shifa Hospital, Karachi, Pakistan

**Objectives:** The objective of the current study was to determine the frequency of anxiety and depression among patients diagnosed with acute coronary syndrome (ACS) at a tertiary care cardiac center in Pakistan.

**Methodology:** This cross-sectional study was conducted at a tertiary care cardiac center in Pakistan from May to November 2019. We included patients of either gender, between 30 and 70 years of age, diagnosed with ACS, and presented within 72 hours of onset of symptoms. After the standard treatment of the condition, the Beck Depression Inventory Scale (BDI) and Beck Anxiety Inventory (BAI) were used to assess post-AMI depression and anxiety. The BDI  $\geq 17$  was categorized as depression and BAI  $\geq 11$  was taken as anxiety.

**Results:** In the selected sample of 122 patients, the mean age was  $58.7 \pm 10.2$  years and 88 (72.1%) patients were male. Diabetes mellitus was detected in 76 (62.3%) patients and 64 (52.5%) patients were smokers. The mean BDI score was  $28.6 \pm 6.5$  and mean BAI score was  $19.5 \pm 5.1$ . Anxiety and depression were observed in 36 (29.5%) and 51 (41.8%) patients, respectively.

**Conclusion:** Depression and anxiety are a common remnants of ACS, hence, in our day to day clinical practice, appropriate consideration should be given to the psychological wellbeing of patients in addition to the management of ACS.

**Keywords:** myocardial infarction, acute coronary syndrome, anxiety, depression

**Citation:** Shaikh Z, Khan AN, Maken GR, Safina, Malik ES, Kumar M, Siddiqui Y. Frequency of Depression and Anxiety in Patients with Acute Coronary Syndrome. Pak Heart J. 2023;56(01):77-81. DOI: <https://doi.org/10.47144/phj.v56i1.2401>

## INTRODUCTION

Coronary artery disease (CAD) is the leading cause of death worldwide. These conditions caused most of the under-35 deaths in 2017.<sup>1</sup> The death toll due to CAD is 120 to 140 thousand people annually, accounting for a total of 40% of all deaths.<sup>2</sup> The onset of acute cardiac events are generally sudden and traumatic in nature as most of the patients happen to be not aware of their underlying condition and are not ready for any such event. Therefore, all the cardiovascular events including acute coronary syndrome (ACS) often cause anxiety and depression. These psychiatric disorders are common, but often misdiagnosed. They can last months or years after the acute event and can have adverse effects on quality of life of the patients.<sup>3</sup> Almost 1 in 5 of patients with CAD are also reported to have major depression.<sup>4</sup> Several cardiovascular disease risk factors are also linked to depression,<sup>5</sup> which included smoking, diabetes, hypertension, and inactivity.<sup>6</sup>

Depression and anxiety are independently linked to poor cardiac outcomes in patients suffering from acute cardiac events and a variety of cardiac diseases.<sup>7,8</sup> Hence, in these patients, identification and treatments for anxiety and depression as well as systematically checking for psychiatric symptoms can improve outcomes.<sup>9</sup> Depression, anxiety, and stress are the among the major challenges for cardiac rehabilitation and the psychological determinants are considered to be some of the key factors that affect the cardio-metabolic pathways.<sup>10</sup> Although many studies have been conducted around the world,<sup>11</sup> the published findings vary, and the data currently available in Pakistan is out-of-date or insufficient. It is crucial to determine the current and local prevalence of depression in these patients because it is associated with a poor prognosis and can harm the health of the community.

Hence, the objective of the current study was to determine the frequency of anxiety and depression among patients diagnosed with acute coronary

syndrome (ACS) at a tertiary care cardiac center in Pakistan.

**METHODOLOGY**

This cross-sectional study was conducted at the National Institute of Cardiovascular Diseases (NICVD), Karachi, Pakistan from May to November 2019 as part of the fellowship program in cardiology from the College of Physicians and Surgeons Pakistan (CPSP). Study proposal was approved the CPSP research and evaluation unit. After verbal consent, consecutive patients who met the inclusion criteria were enrolled in the study. Inclusion criteria were patients of either gender, between 30 to 70 years of age, diagnosed with ACS (presence of typical chest pain for more than 30 minutes with ST elevation of > 2mm in precordial leads or > 1mm in limb leads and presence of increased cardiac enzyme Troponin I of >0.5mg/ml) and presented within 72 hours of onset of symptoms. Patients who refused to participate in the study, with cognitive impairment, diagnosed renal or hepatic impairment, chronic kidney disease (creatinine > 2 mg/dl), congenital heart diseases, valvular heart diseases, alcoholic liver disease, liver cirrhosis, pregnancy/lactation, and/or previous history of psychiatric disorder or mental retardation (clinically assess) were excluded from the study.

All the patients were managed as per the clinical practice guidelines and institutional protocol. Patients' responses on the Beck Depression Inventory Scale (BDI) and Beck Anxiety Inventory (BAI) were obtained during the post-intervention observational period in the ward. In order to minimize biasness, all patients were interviewed by the single (principal investigator) investigator. Patients with a BDI score of 17 or above were categorized for depression and patients with BAI score of 11 or higher were categorized for anxiety.

Addition to demographic data of the patients, data regarding duration of symptoms, diabetes status, and smoking status were also obtained. A patient was diagnosed with diabetes if their fasting plasma glucose was greater than 6.5 mmol/l (126 mg/dl), or if their 2-hour postprandial plasma glucose was greater than 10 mmol/l (180 mg/dl), or if they had been using antidiabetic medications for more than 6 months. A patient was deemed a smoker if they had smoked at least 5 cigarettes per day for over a year or had quit smoking within the past six months.

The sample size of 122 was calculated using a confidence level of 95%, an error margin of 7%, and an expected percentage of anxiety in patients with ACS as 19.18%. For analysis and interpretation of

data, mean ± stand deviation (SD) was computed for age, chest pain duration, BDI, and BAI scores. The frequency and percentages for gender, diabetes, smoking status, anxiety and depression were determined. Confounding factors such as age, gender, duration of chest pain, diabetes mellitus, and smoking status were controlled by stratification and Chi-square/Fisher's Exact test at 5% level of significance.

**RESULTS**

In the selected sample of 122 patients, the mean age was 58.7 ± 10.2 years and 88 (72.1%) patients were male. Diabetes mellitus was detected in 76 (62.3%) patients and 64 (52.5%) patients were smokers. The mean BDI score was 28.6 ± 6.5 and mean BAI score was 19.5 ± 5.1. The duration of chest pain 21.4 ± 4.7 hours. Anxiety and depression were observed in 36 (29.5%) and 51 (41.8%) patients, respectively. Stratification of age group, gender, smoking status, duration of chest pain and diabetes mellitus had been done with respect to depression. Results were significant for gender, diabetes mellitus and smoking (Table 1).

**Table 1: Stratification of clinical characteristics for depression in acute coronary syndrome**

	Total (N)	Depression [row %]		P-value
		Yes	No	
<b>Age groups</b>				
30 to 50 years	77	48.1% (37)	51.9% (40)	0.067
>50 years	45	31.1% (14)	68.9% (31)	
<b>Gender</b>				
Male	88	51.1% (45)	48.9% (43)	0.001
Female	34	17.6% (6)	82.4% (28)	
<b>Diabetes mellitus</b>				
Diabetic	76	52.6% (40)	47.4% (36)	0.002
Non diabetic	46	23.9% (11)	76.1% (35)	
<b>Smoking status</b>				
Smoker	64	56.3% (36)	43.8% (28)	0.001
Non smoker	58	25.9% (15)	74.1% (43)	
<b>Duration of chest pain</b>				
≤ 24 hours	73	42.5% (31)	57.5% (42)	0.856
>24 hours	49	40.8% (20)	59.2% (29)	

Stratification of age group, gender, smoking status, duration of chest pain and diabetes mellitus had been done with respect to anxiety. Results were significant for smoking and duration of chest pain (Table 2).

**Table 2: Stratification of clinical characteristics for anxiety in acute coronary syndrome**

	Total (N)	Anxiety [row %]		P-value
		Yes	No	
<b>Age groups</b>				
30 to 50 years	77	28.6% (22)	71.4% (55)	0.067
>50 years	45	31.1% (14)	68.9% (31)	
<b>Gender</b>				

Male	88	28.4% (25)	71.6% (63)	0.001
Female	34	32.4% (11)	67.6% (23)	
<b>Diabetes mellitus</b>				
Diabetic	76	27.6% (21)	72.4% (55)	0.002
Non diabetic	46	32.6% (15)	67.4% (31)	
<b>Smoking status</b>				
Smoker	64	37.5% (24)	62.5% (40)	0.001
Non smoker	58	20.7% (12)	79.3% (46)	
<b>Duration of chest pain</b>				
≤ 24 hours	73	38.4% (28)	61.6% (45)	0.856
>24 hours	49	16.3% (8)	83.7% (41)	

## DISCUSSION

Studies have shown that there is a high risk of developing either depression or anxiety in the months following an ACS event. In this particular study we aimed at determining the frequency of depression and anxiety among patients diagnosed with ACS. We observed a mean BDI score of  $28.6 \pm 6.5$  with 51 (41.8%) patients fall in the category of depression. The mean BAI score was  $19.5 \pm 5.1$  with 36 (29.5%) patients categorized for anxiety. Studies have reported some varying results regarding the point prevalence of depression and anxiety among patients with a wide spectrum of CAD from various regions across Pakistan. A study conducted by Mujtaba SF et al.<sup>12</sup> reported depression and anxiety in 10.5% and 7.5%, respectively, of the ACS patients at a tertiary care cardiac center in Larkana, Sindh, Pakistan. A study conducted by Hadi N et al.<sup>13</sup> at the Mardan Medical Complex had reported very severe and severe depression in 35.5% and 15.5%, respectively, of the patients with ACS and 14.5% were reported to meet the criteria of very severe anxiety. According to the findings of a study that was conducted by Oh H and colleagues,<sup>14</sup> the mean BDI score was  $13.65 \pm 11.534$ , and the mean BAI score was  $8.34 \pm 10.511$ . In a study by Allabadi H et al.<sup>15</sup>, the prevalence of anxiety patients was 53.1%. In a study, Muntingh AD, et al.<sup>16</sup> found that 30.8% of patients had anxiety problems. In this study, depressive symptoms were reported by 51 individuals (41.8%). The study conducted by Allabadi H et al.<sup>15</sup> also revealed that 52.9% of the patients were depressed. The varying results in various studies can be attributed to the difference in demographic composition of the study sample coupled with use of different modalities and criteria for the assessment of depression and anxiety by various researchers.

It is uncertain if post-ACS anxiety has the same effect on the risk of subsequent cardiovascular events and death as post-ACS depression, however post-ACS depression may raise the risk. There is presently inadequate evidence to evaluate if post-ACS depression or anxiety therapy could enhance the cardiac prognosis of these individuals.<sup>16</sup> Anxiety and

depression have comparable risk factors and pathogenetic linkages with ACS, and both enhance the cardiovascular risk of ACS patients by altering their physiology and behavior.<sup>17-19</sup>

Depression and anxiety are associated with increased platelet activity, endothelial dysfunction, inflammation, decreased heart rate variability, and neuroendocrine abnormalities, all of which can increase the risk of cardiovascular events.<sup>17-19</sup> Patients with ACS may be less likely to comply with secondary prevention measures such as quitting smoking, adopting a healthy diet, engaging in physical activity, seeking medical assistance, and participating in cardiac rehabilitation if they are depressed or anxious.<sup>17,19</sup> It is possible for individuals who have ACS to experience unfavorable cardiovascular events as a result of the onset of depressive or anxious states while under the influence of these conditions.

Therefore, treatment with antidepressants or anxiety medications might improve these patients' overall prognosis. It is impossible to overstate the significance of psychotherapy in the treatment of mental health conditions like anxiety and depression. On the other hand, it has a very modest impact on the risk of development of cardiac issues in patients who have depression or anxiety after ACS.<sup>20</sup> Sertraline and citalopram are examples of selective serotonin reuptake inhibitors (SSRIs), which have the potential to treat symptoms of depression as well as anxiety. When it comes to treating depression in CHD patients, the American Heart Association (AHA) endorsed citalopram and sertraline as first-line antidepressants in 2008.<sup>21</sup> Positive pleiotropic effects of SSRIs may include the recovery of heart rate variability, the reduction of inflammatory indicators, the enhancement of endothelial function, and the decrease in platelet aggregation. These effects may give patients with PCI following ACS cardiovascular protection.<sup>22</sup> On the other hand, it is not yet known whether or not treatment with SSRIs can improve the cardiovascular prognosis of individuals who have experienced post-ACS depression.<sup>23,24</sup> Utilization of citalopram has been shown in a number of studies to carry with it the possibility of QT interval prolongation.<sup>25</sup> Additionally, numerous adverse reactions to other types of antidepressants or antianxiety medications may have negative effects, reducing or even prohibiting the dosage prescribed to post-ACS patients.<sup>17,22</sup> This can have a negative impact on the patient's quality of life. As a direct result of this, exercising caution when administering antidepressants is essential.

Despite the fact that the sample size and single-center are the two major limitations for the external validation of our study's findings, it is important to note that the organization where the current study was conducted attracts patients from all over the country with various demographic and socioeconomic backgrounds. The present study proposes performing subgroup analysis on the data of patients getting antidepressant or anti-anxiety therapy based on their varied treatments and responses in order to give additional evidence for the treatment of these individuals with ACS.

## CONCLUSION

Depression and anxiety are a common remnants of ACS, hence, in our day to day clinical practice, appropriate consideration should be given to the psychological wellbeing of patients in addition to the management of ACS. In addition, it is crucial to identify subgroups of cardiac patients for whom early and aggressive treatment of depression and anxiety is vital.

## AUTHORS' CONTRIBUTION

ZS and ANK: Concept and design, data acquisition, interpretation, drafting, final approval, and agree to be accountable for all aspects of the work. GRM, S, ESM, MK, and YS: Data acquisition, interpretation, drafting, final approval and agree to be accountable for all aspects of the work.

**Conflict of interest:** Authors declared no conflict of interest.

## REFERENCES

- Hajar R. Risk factors for coronary artery disease: historical perspectives. *Heart Views*. 2017;18(3):109.
- Sabatine MS, Giugliano RP, Keech AC, Honarpour N, Wiviott SD, Murphy SA, et al. Evolocumab and clinical outcomes in patients with cardiovascular disease. *N Engl J Med*. 2017;376(18):1713-22.
- Celano CM, Healy B, Suarez L, Levy DE, Mastromauro C, Januzzi JL, et al. Depression and anxiety treatment program in patients with acute cardiac illness. *Value Health*. 2016;19(2):185-91.
- Jha MK, Qamar A, Vaduganathan M, Charney DS, Murrough JW. Screening and management of depression in patients with cardiovascular disease: JACC state-of-the-art review. *J Am Coll Cardiol*. 2019;73(14):1827-45.
- Khandaker GM, Zuber V, Rees J, Carvalho L, Mason AM, Foley CN, et al. Shared mechanisms between coronary heart disease and depression: findings from a large UK general population-based cohort. *Mol Psychiatry*. 2020;25(7):1477-86.
- Penninx BW. Depression and cardiovascular disease: epidemiological evidence on their linking mechanisms. *Neurosci Biobehav Rev*. 2017;74:277-86.
- Pedersen SS, Von Känel R, Tully PJ, Denollet J. Psychosocial perspectives in cardiovascular disease. *Eur J Prev Cardiol*. 2017;24(3\_suppl):108-15.
- Gathright EC, Goldstein CM, Josephson RA, Hughes JW. Depression increases the risk of mortality in patients with heart failure: a meta-analysis. *J Psychosom Res*. 2017;94:82-9.
- Reavell J, Hopkinson M, Clarkesmith D, Lane DA. Effectiveness of cognitive behavioral therapy for depression and anxiety in patients with cardiovascular disease: a systematic review and meta-analysis. *Psychosom Med*. 2018;80(8):742-53.
- Chauvet-Gelinier JC, Bonin B. Stress, anxiety and depression in heart disease patients: A major challenge for cardiac rehabilitation. *Ann Phys Rehabil Med*. 2017;60(1):6-12.
- Meneghetti CC, Guidolin BL, Zimmermann PR, Sfoglia A. Screening for symptoms of anxiety and depression in patients admitted to a university hospital with acute coronary syndrome. *Trends Psychiatry Psychother*. 2017;39(1):12-8.
- Mujtaba SF, Sial JA, Karim M. Depression and anxiety in patients undergoing percutaneous coronary intervention for acute coronary syndrome. *Pak J Med Sci*. 2020;36(5):1100.
- Hadi N, Gul E, Kamal A, Muneeb PM, Khan A, Alam S. Prevalence of depression and anxiety in patients presenting with acute coronary syndrome to Mardan Medical Complex. *Pak Heart J*. 2020;53(4):359-364.
- Oh H, Park K, Yoon S, Kim Y, Lee SH, Choi YY, et al. Clinical Utility of Beck Anxiety Inventory in Clinical and Nonclinical Korean Samples. *Front Psychiatry*. 2018;9:666.
- Alabadi H, Alkaiyat A, Alkhayyat A, Hammoudi A, Odeh H, Shtayeh J, et al. Depression and anxiety symptoms in cardiac patients: a cross-sectional hospital-based study in a Palestinian population. *BMC Public Health*. 2019;19(1):232.
- Muntingh AD, van der Feltz-Cornelis CM, van Marwijk HW, Spinhoven P, Penninx BW, van Balkom AJ. Is the Beck Anxiety Inventory a good tool to assess the severity of anxiety? A primary care study in the Netherlands Study of Depression and Anxiety (NESDA). *BMC Fam Pract*. 2011;12(1):1-6.
- Huffman JC, Celano CM, Januzzi JL. The relationship between depression, anxiety, and cardiovascular outcomes in patients with acute coronary syndromes. *Neuropsychiatr Dis Treat*. 2010;6:123-36.
- Joynt KE, Whellan DJ, O'Connor CM. Depression and cardiovascular disease: mechanisms of interaction. *Biol Psychiatry*. 2003;54:248-61.
- Carney RM, Freedland KE. Depression and coronary heart disease. *Nat Rev Cardiol*. 2017;14(3):145-55.
- Lespérance F, Frasure-Smith N, Koszycki D, Laliberté MA, van Zyl LT, Baker B, et al. Effects of citalopram and interpersonal psychotherapy on depression in patients with coronary artery disease: the Canadian Cardiac Randomized Evaluation of Antidepressant and Psychotherapy Efficacy (CREATE) trial. *JAMA*. 2007;297(4):367-79.
- Lichtman JH, Bigger JT Jr, Blumenthal JA, Frasure-Smith N, Kaufmann PG, Lespérance F, et al. Depression and coronary heart disease: recommendations for screening, referral, and treatment: a science advisory from the American Heart Association Prevention Committee of the Council on Cardiovascular Nursing, Council on Clinical Cardiology, Council on Epidemiology and Prevention, and Interdisciplinary Council on Quality of Care and Outcomes Research: endorsed by the American Psychiatric Association. *Circulation*. 2008;118(17):1768-75.
- Tepley RM, Packard KA, White ND, Hilleman DE, DiNicolantonio JJ. Treatment of Depression in Patients with Concomitant Cardiac Disease. *Prog Cardiovasc Dis*. 2016;58(5):514-28.
- Taylor CB, Youngblood ME, Catellier D, Veith RC, Carney RM, Burg MM, et al. Effects of antidepressant medication on morbidity and mortality in depressed patients after myocardial infarction. *Arch Gen Psychiatry*. 2005;62(7):792-8.
- Glassman AH, O'Connor CM, Califf RM, Swedberg K, Schwartz P, Bigger Jr, et al. Sertraline treatment of major depression in patients with acute MI or unstable angina. *JAMA*. 2002;288(6):701-9.

25. Cooke MJ, Waring WS. Citalopram and cardiac toxicity. Eur J Clin Pharmacol. 2013;69(4):755-60.

**Address for Correspondence:**

**Dr. Zeeshan Shaikh**, Senior Registrar at Pakistan Navy Station Shifa Hospital (PNS Shifa), Karachi Pakistan.

**Email:** [zeeshanshaikh3093@gmail.com](mailto:zeeshanshaikh3093@gmail.com)