

# Prevalence of Anxiety and Depression in Cardiac Patients Undergoing Coronary Bypass Surgery

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## ABSTRACT

**Objective:** To evaluate the prevalence of psychiatric comorbidity pre and post-surgery in CAD patients undergoing coronary artery bypass grafting.

**Study Design:** A prospective study

**Place and Duration of Study:** This study was conducted at the Department of Cardiology, Ch.Pervaiz Elahi Institute of Cardiology Multan for 1 year from 8<sup>th</sup> April 2019 to 8<sup>th</sup> April 2020.

**Materials and Methods:** A total of 60 patients with coronary artery disease were included in the study that was undergoing coronary artery bypass grafting. All the patients awaiting CABG or undergoing CABG were tested for depression and anxiety by Beck's Depression Inventory and Beck's Anxiety Inventory. The patients were admitted to the hospital two days before the surgery and tests were performed after 1 day before the surgery and 3<sup>rd</sup> day after the surgery with the in-hospital patients. These tests were repeated 1 week and 1 month after the surgery with out-hospital patients.

**Results:** The average depression and anxiety scores before surgery were  $7.21 \pm 4.33$  and  $10.12 \pm 6.53$  respectively. These scores increase on the 3<sup>rd</sup> day after surgery,  $11.24 \pm 5.22$  and  $17.09 \pm 8.92$  respectively. However, the scores after 1 week and 1 month did not differ significantly. Similarly, patients showed more depression and anxiety symptoms post-surgery. No significant difference was found in the relation of depression and anxiety scores with the age and gender of subjects.

**Conclusion:** Depression and anxiety in CAD patients undergoing CABG are not related to heart disease, therefore early management and mental support can improve these conditions and lifestyles after surgery.

**Key Words:** Depression, Anxiety, Coronary artery disease, Coronary artery bypass grafting

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## INTRODUCTION

The morbidity and mortality rate of coronary heart disease (CHD) is increasing every year globally. Disease clustering is also very frequent in patients diagnosed with CAD. These diseases include diabetes, high blood pressure and dyslipidemia etc. In addition to these diseases, mental illness including depression and anxiety are also correlated with coronary heart disease, however, the rate of patients justifying this correlation is insignificant. Literature reports that about 20-40% of CAD patients suffer from depression<sup>(1)</sup>, similarly, 20-30% of CAD patients have been diagnosed with anxiety<sup>(2,3)</sup>. Similar co-morbidity has been seen in other heart diseases excluding coronary artery disease.

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The prevalence of anxiety and depression is increasing in coronary conditions such as chronic heart failure<sup>(4,5)</sup>. The most common treatment prescribed for CAD is coronary artery bypass grafting. Most of these patients suffer from angina and complain of polypharmacy due to consuming antianginal medications such as anti-diabetics, antiplatelets and antihypertensives. Besides these problems, patients also experience fear and stress before the surgery. These factors contribute to psychiatric comorbidity in these CAD patients. Patients who suffer from anxiety and depression before the surgery have also shown worse results after the surgery<sup>(6)</sup>. If these mental illnesses are not treated timely, the patient may not be successful in completing cardiac rehabilitation after the surgery. Therefore, it is important to examine the CAD patients undergoing surgery for psychiatric comorbidities. With the increase in CAD every year, the number of CAB surgeries is also increasing at an accelerated rate. But the data regarding psychiatric comorbidity is still scarce. This study aims to evaluate the prevalence of psychiatric comorbidity pre and post-surgery in CAD patients undergoing coronary artery bypass grafting. We also assess the signs and symptoms of comorbid conditions with respect to age and gender.

## MATERIALS AND METHODS

A prospective study was conducted in the cardiology department of Ch.Pervaiz Elahi Institute of Cardiology Multan from 8<sup>th</sup> April 2019 to 8<sup>th</sup> April 2020. A total of 60 patients with coronary artery disease were included in the study that was undergoing coronary artery bypass grafting. Only those patients were included who had no history of psychiatric medication and chronic psychological conditions. All the additional medical history of the patients was also noted for including them in the study. The patients who had hemodynamic instability were excluded from the study. All patients provided their informed consent to become a part of the study.

All the patients awaiting CABG or undergoing CABG were tested for depression and anxiety by Beck's Depression Inventory and Beck's Anxiety Inventory. The tests were performed in a quiet room where the doctor asked questions to the patient. The data was collected by the answers of the patients.

The patients were admitted to the hospital two days before the surgery and tests were performed after 1 day before the surgery and 3<sup>rd</sup> day after the surgery with the in-hospital patients. These tests were repeated 1 week and 1 month after the surgery with out-hospital patients. The ethical committee approved the study design.

All the data were analyzed by using SPSS version 15. Friedman's test was performed to assess the

quantitative data of dependent variables and independent variables were analyzed by t-test and Wilcoxon Rank Sum test. The association between quantitative quantities was found by Spearman's correlation. A statistical value of less than 0.05 was considered significant.

## RESULTS

The average age of the patients in the study was 60±10.2 years. 50 patients were men and 10 were women. The depression and anxiety scores before surgery and after surgery are shown in Table I. The average depression and anxiety scores before surgery were 7.21±4.33 and 10.12±6.53 respectively. These scores increase on the 3<sup>rd</sup> day after surgery, 11.24±5.22 and 17.09±8.92 respectively. However, the scores after 1 week and 1 month did not differ significantly. The average depression score after 1 week and 1 month was 10.11±5.85 and 11.65±8.01 respectively. The average anxiety score after 1 week and 1 month was 16.16±8.55 and 15.42±10.18 respectively (Table I). Similarly, patients showed more depression and anxiety symptoms post-surgery (Table 2). The correlation between age and gender with BDI and BAI test scores is shown in Table 3 and Table 4 respectively.

**Table No.1: Data collected from Beck's Depression Inventory and Beck's Anxiety Inventory**

		Mean standard deviation	Range	Median
Beck's Depression Inventory	Preoperative period	7.21±4.33	0-20	7
	3 <sup>rd</sup> day after surgery	11.24±5.22	1-32	12
	1 week after surgery	10.11±5.85	1-33	10
	1 month after surgery	11.65±8.01	1-37	9
	P= <0.001			
Beck's Anxiety Inventory	Preoperative period	10.12±6.53	0-32	8
	3 <sup>rd</sup> day after surgery	17.09±8.92	2-52	16
	1 week after surgery	16.16±8.55	2-47	14
	1 month after surgery	15.42±10.18	1-44	13
	P=<0.001			

**Table No.2: Symptoms of psychiatric comorbidity pre and post-surgery**

	Preoperative period		3 <sup>rd</sup> day after the operation		1 week after the operation		1 month after the operation	
	n	%	n	%	n	%	n	%
<b>BDI scores (Depression score)</b>								
Less than 10 symptoms, normal	38	63.3	21	35	24	40	30	50
10-16 symptoms, mild	19	31.7	24	40	18	30	15	25
17-29 symptoms, moderate	3	5	14	23.3	17	28.3	14	23.3
30-60 symptoms, severe	-		1	1.7	1	1.7	1	1.7
<b>BAI scores (Anxiety score)</b>								
<8 symptoms, normal	20	33.3	3	5	8	13.3	11	18.3
8-14 symptoms, mild	27	45	23	38.3	22	36.7	28	46.7
16-25 symptoms, moderate	10	16.7	22	36.7	19	31.7	6	10
26-60 symptoms, severe	3	5	12	20	11	18.3	15	25

**Table No.3: Correlation of age with depression and anxiety scores**

		Age	
		Rho	p
Beck's Depression Inventory	Preoperative period	0.115	0.295
	3 <sup>rd</sup> day after surgery	0.179	0.129
	1 week after surgery	0.145	0.222
	1 month after surgery	0.144	0.205
Beck's Anxiety Inventory	Preoperative period	0.999	0.399
	3 <sup>rd</sup> day after surgery	0.089	0.445
	1 week after surgery	0.098	0.378
	1 month after surgery	0.029	0.549

**Table No.4: Correlation of gender with depression and anxiety scores**

		Male		Female		p
		Mean standard deviation	Median	Mean standard deviation	Median	
Beck's Depression Inventory	Preoperative period	8.43±5.47	7.9	5.50±3.76	4	0.298
	3 <sup>rd</sup> day after surgery	11.55±5.01	12	10.64±6.33	10	0.629
	1 week after surgery	10.21±5.52	10	10.30±7.11	10	0.858
	1 month after surgery	11.92±7.81	9	11.36±8.81	8	0.909
Beck's Anxiety Inventory	Preoperative period	10.44±6.30	8	9.00±4.88	8	0.968
	3 <sup>rd</sup> day after surgery	17.72±7.84	16.5	16.00±10.54	13	0.332
	1 week after surgery	16.88±8.38	16	15.12±9.85	14	0.439
	1 month after surgery	16.77±10.0	14	14.02±10.34	11	0.284

## DISCUSSION

This study aimed to evaluate the prevalence of psychiatric comorbidity pre and post-surgery in CAD patients undergoing coronary artery bypass grafting. We also assess the signs and unipolar symptoms of comorbid conditions with respect to age and gender. A study reported that the prevalence of depression was found in 15-20% of the patients undergoing coronary artery bypass grafting<sup>(7)</sup>. These findings are consistent with the results of our study.

Literature reports that almost 30-40% of the CABG patients suffer from depression<sup>(8)</sup>. This rate increases after the surgery and patients develop new symptoms of depression.

McKhann et al.<sup>(9)</sup> conducted a study on 124 patients undergoing CABG. On follow up after 30 days and 12 months, 13% and 9% of patients were diagnosed with clinical depression, however, symptoms were not so severe pre-surgery. In our study too, the depression score was higher after the surgery and patients showed more depressive symptoms post-surgery. But research shows that the increased depression is not related to CAD<sup>(10)</sup>.

Similar outcomes were observed when anxiety was assessed in these patients. Patients had high anxiety score before surgery, which is explained by the fear and

stress of the operation. Losing a vital organ is a justified reason for the change in behaviour and severe emotional reaction. The uncertainty of outcomes of the surgery is even more strong than the pain from the disease<sup>(10)</sup>.

Research has shown that patients show more depressive and anxious symptoms before surgery as that time on the waiting list is quite distressing<sup>(11)</sup>. A study indicated that supports these findings noted the postoperative results for a period of 7 days<sup>(12)</sup>. In our study, the depression and anxiety scores were high after surgery because the preoperative period I.e 2 days was shorter than the mean postoperative period I.e 5 days. A study showed that more than 19 thousand CABG patients had an average hospital stay of 12 days<sup>(13)</sup>. Whereas in our study, the patient stayed in a hospital for 7-15 days. Researchers recommend depression and anxiety screening after coronary artery bypass grafting to ensure successful rehabilitation post-surgery<sup>(14)</sup>. We examined the patients till 1 month after surgery. Studies show that managing the psychological conditions can decrease hospital stay, drug use and risk of morbidity after surgery and patients can deal in a more healthy way later<sup>(15, 16)</sup>. Kazukauskienė et al.<sup>(17)</sup> reported that depressive symptoms and other mental illnesses are related to exercise in rehabilitation after CABG surgery. We did not manage the depression before the surgery,

however, its early management affect the hospital stay, use of medication and morbidity in a positive way. Literature provides evidence that depressive symptoms in CABG surgery are associated with atherosclerotic progression. Wellenius et al.<sup>(18)</sup> show results that support this finding where patients with a history of CABG patients had high depression scores as atherosclerosis progressed in saphenous vein grafts. Similarly, depression is also related to cardiac mortality according to Frasure-Smith et al<sup>(19)</sup> which decreased with early management.

There is also evidence that other psychological conditions also predict surgical outcomes. Optimism showed decreased readmission rate after coronary artery bypass grafting<sup>(20)</sup>, and pessimism predicted psychological conditions like depression and anxiety and ineffective postoperative coping mechanisms<sup>(21)</sup>. Everson et al<sup>(22)</sup> reported that severe hopelessness predicted incident heart attack and mild hopelessness was related to incident cancer. Our study did not diagnose psychological conditions nor provided psychological therapy. Also, as we included patients who did not have any history of psychological illness or drugs, the increased depression and anxiety were not related to the heart disease.

## CONCLUSION

Depression and anxiety in CAD patients undergoing CABG are not related to heart disease, therefore early management and mental support can improve these conditions and lifestyles after surgery.

### Author's Contribution:

Concept & Design of Study:	Naeem Amjad, Nauman Mazhar
Drafting:	Nauman Mazhar, Muhammad Ikram-ul-Haq
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**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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