

# Frequency of Depression in Patients Undergoing Coronary Artery Bypass Grafting Surgery (CABGS), Before the Surgery, at Discharge and at Six Months Follow up

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## ABSTRACT

**INTRODUCTION:** Depression is much frequent in patients undergoing CABGS. However, severity was reduced post operatively. Counseling and psychosocial interventions can play an important role in recovery and functionality of patients.

**OBJECTIVE:** To compare the frequency of depression in patients undergoing coronary artery bypass grafting surgery (CABGS) before the surgery, at discharge and at six months follow up.

**DESIGN:** Prospective, observational study conducted from Dec 2008 to Dec 2009.

**SETTING:** National Institute of Cardiovascular Diseases (NICVD) Karachi.

**METHODS:** One hundred and thirty four (134) patients of 18+ years old who were consecutively listed for first time CABGS were included in the study after fulfilling the inclusion and exclusion criteria and addressing the ethical issues. ICD-10 criteria to diagnose and Hamilton Rating Scale for Depression (HAM-D) were applied to assess the frequency and severity of depressive disorder respectively. Results were analyzed using SPSS version 17.0.

**RESULTS:** One hundred and thirty four (134) patients undergoing CABGS fulfilled the criteria for Depressive disorder. One hundred and thirteen (84.3%) were male and 21 (15.7%) were female with age range 33 to 75 years (mean 53.7  $\pm$ SD 8.57). Preoperatively 132 (98.5%) patients and postoperatively 108 (80.6%) patients were depressed. At 6 months follow up which was available in 73 patients, only 12 (16.4%) were found depressed. Both genders were almost equally affected. Surprisingly age, ethnicity, education and co-morbidities did not show a significant role.

**CONCLUSION:** Depression is commonly reported before and after cardiac surgery procedures and it significantly influences the quality of life of the patients undergoing CABGS. The consequences can increase morbidity and mortality.

**KEYWORDS:** Depression, Coronary Artery Bypass Graft Surgery, at discharge, Follow up.

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## INTRODUCTION

Depressive Disorder is a serious health problem and according to WHO (World Health Organization) it will be the second leading cause of burden of disease worldwide by 2030<sup>1</sup>.

Depressive disorder is a mood disorder characterized by episodes of low mood, decreased interest and energy for two weeks or more according to the International Classification of Diseases (ICD-10)<sup>2</sup>. Depressive disorder significantly affects quality of life of the individual undergoing Coronary Artery Bypass Grafting Surgery (CABGS)<sup>3</sup>. Depression has been associated with increased morbidity and mortality in general medical population including patients with Coronary Artery Diseases (CAD). Depressive mood has high risk of withdrawal from therapy (poor compliance) worse prognosis, prolonged hospitalization and ele-

vated treatment cost. It has been emphasized that CAD is psychologically and behaviorally demanding disease, as patient's whole life style is changed after diagnosis of it. Psychosocial factors are relevant to nearly all aspects of its management. Thus the whole of promoting the patient's well-being requires a holistic treatment approach that incorporates an understanding of not only physical symptom but addressing the psychosocial issues such as fear of death, incapacitation and feeling of being non functional<sup>4</sup>.

The diagnosis of major depressive disorder is based on the patient's history findings, mental state examination and psychometric testing. There is no laboratory test for major depression, although physicians generally request tests for physical conditions that may cause similar symptoms. The most common time of onset is between the ages of 20 and 30 years, with a later peak between 30 and 40 years<sup>5</sup>. Patients are

treated with anti depressant medications as well as psychotherapy depending upon the severity of symptoms and the depressive episode according to the ICD-10.

There have been many studies internationally addressing this problem as it has a lot of prognostic importance in future positive outcome in post CABGS patients. Two of them most closely related to Pakistan have been done in China which suggest that the rate of depression in post CABGS patients increases significantly (42.7%) and also on 6 months follow up (23.1%)<sup>6</sup>. In view of the increasing number of patients undergoing CABGS as an elective as well as emergency procedure following cardiovascular events, it was deemed necessary to undergo such a study. In a tertiary care facility like NICVD where hundreds of patients undergo CABGS yearly, it was a matter of concern to see the psychological implications of such a major procedure before, and at time of discharge because fears and concerns about operative outcome are mostly resolved after successful procedure and evaluation at six months to analyze good recovery and effective functioning.

**METHODS**

This was a prospective, observational study conducted over one-year with non-probability convenience method of sampling. Patients over the 18 years who were consecutively listed for first time CABG at NICVD, Karachi were included. The emergency related CABG cases and with additional cardiac procedures, myocardial infarction (MI) within one month, known psychiatric illness, renal disease (indicated by a serum creatinine greater than 2.0 mg/dl) and liver disease, history of alcohol/drug abuse, and lack of understanding of local national language were excluded from the study.

An informed consent was taken from eligible patients after assuring them of confidentiality. Ethical issues were addressed accordingly. A semi-structured Performa was used to collect the data. Cardiac surgery was performed by expert cardiac surgeons. All anesthetic and surgical techniques plus the complications of treatment were standardized for all patients. Socio-demographic, medical characteristics, anesthetic and surgical data were recorded. Special care was taken to ensure that patients were free from narcotics and sedatives for at least 2 days before testing was carried out. Each patient was assessed before the surgery, at discharge and at six months of follow up for the frequency and severity of depressive disorder. Diagnosis of depressive disorder was made according to ICD-10<sup>3</sup> criteria and Hamilton Rating Scale for Depression (HAM-D)<sup>7</sup> was applied to assess the severity of depressive disorder. HAM-D Score, 8-13 labeled as

mild, 14-18, moderate, 19-22 severe and score of 23 and above was considered as very severe Depression. Data entered in SPSS version-17 for analysis. Different variables were stratified into categories. It was followed by application of Chi-square with p value <0.05 taken as significant.

**RESULTS**

One hundred and thirty four (134) patients undergoing CABGS fulfilled the criteria for Depressive disorder. One hundred and thirteen 113(84.3%) were male and 21(15.7%) were female with age range from 33 to 75 years, mean ±SD was 53.7±8.57. Preoperatively 132 (98.5%) patients and postoperatively 108 (80.6%) patients were depressed. At 6 months follow up which was available in 73 patients, only 12 (16.4%) were depressed. Both genders were almost equally affected. Surprisingly age, ethnicity, education and co-morbid did not show a significant role.

One hundred and thirty two patients (98.5%) were depressed preoperatively. Postoperatively 108(80.6%) were depressed. After surgery depression was reduced significantly and only 3 (2.23%) out of 32 (23.9%) patients were having Depression of moderate severity. At 6 months follow up which was available in 73 patients only 12 (16.4%) were having depression of mild severity.

**TABLE Ia: CHARACTERISTICS OF CABGS PATIENTS (n=134)**

Characteristic		Baseline	
		No.	%
Age in years (Mean ± S.D)		53.7 ± 8.56	
Gender	Male	113	84.3
	Female	21	15.7
Mother tongue	Urdu	46	34.3
	Sindhi	30	22.4
	Punjabi	25	18.7
	Pashto	16	11.9
	Balochi	11	8.2
	Others	6	4.5
Education	Illiterate	46	34.3
	Primary to Matriculation	57	42.5
	Intermediate & above	31	23.1
Obesity on the basis of	Body Mass Index	19	14.2
	Waist circumference	71	53.0
	Waist hip ratio	106	79.1
Previous H/O MI		72	53.7
Hypertension		55	41.0
Diabetes Mellitus		43	32.1

**TABLE Ib:**  
**ASSOCIATION OF DEMOGRAPHIC CHARACTERISTICS WITH DEPRESSION IN CABGS PATIENTS**

	Pre CABGS (n=134)		Post CABGS (n=134)		6 months Follow-up (n=73)	
	No.	Depression	No.	Depression	No.	Depression
<b>Gender</b>						
Male	113	111 (98%)	113	91 (81%)	60	9 (15 %)
Female	21	21 (100%)	21	17 (81%)	13	3 (23 %)
<b>Age in years</b>						
Under 50	47	46 (98%)	47	35 (74%)	23	3 (13%)
50 & above	87	86 (99%)	87	73 (84%)	50	9 (18%)
<b>Education</b>						
Illiterate	46	46 (100%)	46	40 (87%)	23	5 (22%)
Primary to Matriculation	57	56 (92%)	57	46 (81%)	32	6 (19%)
Intermediate & above	31	30 (97%)	31	22 (71%)	18	1 (6%)
<b>Mother tongue</b>						
Urdu	46	44 (96%)	46	34 (74%)	28	7 (25%)
Sindhi	30	30 (100%)	30	26 (87%)	11	1 (9%)
Punjabi	25	25 (100%)	25	21 (84%)	12	2 (17%)
Pashto	16	16 (100%)	16	13 (100%)	11	1 (9%)
Balochi	11	11 (100%)	11	8 (72.7%)	8	1 (12%)
Others	6	6 (100%)	6	6 (100%)	3	0 (0%)
No significant association p>0.05						

**TABLE II: CHARACTERISTICS OF CABGS PATIENTS (n=134)**

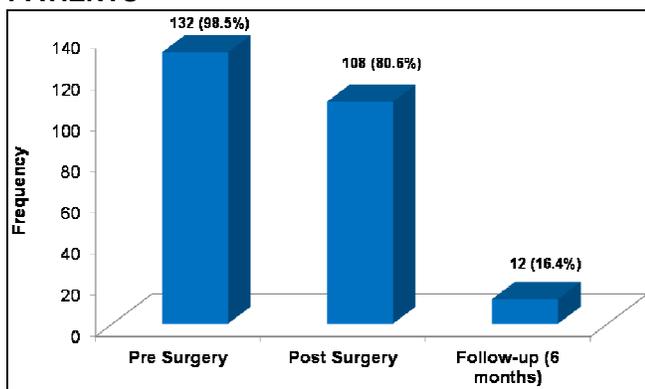
Characteristics		Baseline	
		No.	%
Pre surgery serum creatinine	≤ 1.4	131	97.8
	> 1.4	3	2.2
Post-surgery serum creatinine	≤ 1.4	104	77.6
	> 1.4	30	22.4
Bleeding episodes	≤ 1000 ml	119	88.8
	> 1000 ml	15	11.2
ICU stay	≤ 3 nights	104	77.6
	> 3 nights	30	22.4
Ventilator support	≤ 12 hours	120	89.6
	> 12 hours	14	10.4
Hospital stay	≤ 7 days	16	11.9
	> 7 days	108	80.6

**TABLE III: DEPRESSION IN PRE, POST AND AT 6 MONTHS FOLLOW-UP OF CABGS PATIENTS**

	Patients undergoing CABGS		
	Before Surgery (n=134)	At Discharge (n=134)	At 6 months Follow-up (n=73)
Depression	132 (98.5%)	108 (80.6%)*	12 (16.4%)* ▲
<b>Depression severity</b>			
Mild (8-13)	96 (71.6%)	99 (73.9%)	12 (16.4%)
Moderate (14-18)	32 (23.9%)	3 (2.23%)	-
Severe (19-22)	2 (1.5%)	3 (2.23%)	-
Very Severe (>=23)	2 (1.5%)	3 (2.23%)	-

Significant \* p<0.01 from Pre-op, ▲ p<0.01 from post-op

**FIGURE 1: DEPRESSION IN PRE, POST SURGERY AND AT 6 MONTHS FOLLOW-UP OF CABGS PATIENTS**



## DISCUSSION

Coronary artery disease (CAD) is one of the leading causes of morbidity and mortality worldwide. CABGS as a palliative treatment of CAD especially triple artery disease significantly reduces this number<sup>8</sup>. It is considered as one of the major surgeries throughout the world. Neurobehavioral outcomes in the form of stroke, post-operative delirium, cognitive impairment and Depression are common after CABGS<sup>9</sup>. Major Depressive disorder appears to be one such factor which significantly influences the quality of life post CABGS. For most of the patients gaining emotional strength after CABGS is more difficult than physical rehabilitation. Prevalence of depression is high in patients treated with revascularization procedures and is related with poor post-procedure prognosis<sup>10</sup>. Most of the reports however do not take into account the pre-operative mood of the patient. Research studies have shown that depression predicts chest pain up to 6 months post CABG surgery which necessitates re hospitalization in some cases<sup>11-13</sup>.

The study included assessment of Depression before the surgery, at discharge and at 6 months posts CABGS. It could have been Major Depressive Disorder prior to surgery exacerbated by the psychological effect of anticipating the surgery, the prolonged time under anesthesia which is about 4 to 5 hours, or the results of heart – lung machine. The patients were followed up to see the mental status at that time as well as the long term psychological recovery. Important aspect of the study is the assessment of mood state prior to the surgery which wasn't there in prior studies. This is important because identifying depression before surgery and early intervention is important to reduce the frequency of Depressive disorder and is a positive prognostic factor for better results of CABGS.

In this study it was revealed that 134 patients

undergoing CABGS were fulfilling the criteria of Depressive Disorder. This huge figure is probably related to fear of outcome of this major surgery, difficulties of returning to work, high economic cost and substantially elevated mortality risk. Possible factors contributing to the high frequency of Depressive Disorder in this study include that it was conducted in a tertiary care centre which mostly caters to people with prolonged illness and clientele come from poor middle economic status which is also associated with Depressive disorder. However, on 6 month follow up available in 73 patients only 16.4% were depressed (Table III), which suggests that time and adjustments to the life stressors are important factors in the resolution of depressive symptoms. Other possibility may be related to regeneration and vascular betterment after the revascularization surgery. This change in biochemical/neurotransmitter aspect needs further research.

It has been seen that depression is more prevalent in certain cultures and severity is also related to the educational level of person as well<sup>14</sup> but surprisingly in our study ethnicity, education or any secondary co-morbid did not seem to play a significant role in severity of depressive disorder (Table - Ib).

The various determinants and factors influencing depression were also studied upon. The age limit kept was from 33-75. This is important because cardiovascular disease poses a greater risk for middle and geriatric depression. Ali and Amanullah pointed out that Depression and Anxiety were much prevalent in the ages between 45-54 years<sup>15</sup> and it ruins the productive years of life of a person if not managed. Depression has generally been found to be high in women as compared to men<sup>1</sup> but our study showed that Depression was almost equally common in males and it was slightly high in patients of ages 50 and above (Table Ib). It may be due to the fact that males tend to internalize stress and do not ventilate their feelings and emotions which can aggravate anxiety and depression. Also the responsibilities outside the home, effects on employment status and managing finances can be an additive stress factors for males in our society. Its worth noting that 72 patients (53.7%) were having previous history of myocardial infarction (MI) as compared to a systemic review which showed that about 19.8% patients of MI were having depressive disorder<sup>16</sup>. In our study 55(41%) patients were having hypertension as compared to the results of a Meta analysis which showed 29.8% prevalence of depression in hypertensive patients<sup>17</sup>. The prevalence of co morbid depression was significantly higher in diabetic patients (32.1%) which are comparable with a study conducted by Ryan J. et al<sup>18</sup>. No other causative factor seemed to contribute significantly to

the depression taking all risk factors, operative variables and demographics into account. Similar findings were also found in previous studies contemplating the fact that lack of patient information about their open chest surgery, myths related to outcome and future prospective contribute to the over whelming Depression<sup>19</sup>. In trying to overcome this problem, the role of psychological intervention cannot be overlooked. Several studies have proven significant improvement in physical and mental status and quality of life after psychosocial intervention of depressed post-operative CABGS patients. Therefore, follow-up should also be done by Mental Health professional to assess and manage depression for better outcome<sup>2,4,10</sup>.

### LIMITATIONS

We were successfully capable of gathering significant number of patients that met our requirements. Pre-operative and post-operative assessment was easily conducted and patients were cooperative. However, our data collection was limited to 6 months follow-up. Due to a high rate of lack of patient compliance to come for follow up, we were unable to render the same population that the study was conducted on initially. Since a high number of under privileged patients come from across the country to have surgery, traveling may be too costly. The same number of patients would have allowed us to satisfactorily understand the role of Depression in CABGS patients.

Our study is limited by the lack of assessment of pain post CABGS and its relation to depression as well. Also the number of follow ups and re-hospitalizations should be checked.

### CONCLUSION

Our results indicate that there is very high prevalence of depression during perioperative period in CABGS patients. However, post-operatively severity of depression reduced. However psychological health should also be given a key importance in patients undergoing revascularization procedure.

### RECOMMENDATION

Further research is required to clarify the predictive values of age, gender and other factors, including pre-morbid ill health and socio-economic status. Various other parameters including social functioning, mental health, and bodily pain subscale scores, 6 months after operation can be analyzed and compared with non-depressed group.

**CONFLICT OF INTEREST:** None

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