**Original Article**

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# Effect of Cognitive Behavioral Therapy (CBT) in Post Cardiac Artery Bypass Surgery Patients Co morbid with Depression, Anxiety and its Effect on Quality of Life (QOL)

**Asima Mehboob Khan[1], Rizwan Taj[2], Amber Nawaz[3], Aamir Naveed[4], Kamran Mehmood[5]**

[1]Associate Clinical Psychologist, Psychiatry Department, Pakistan Institute of Medical Sciences, Islamabad
[2]Chairperson Psychiatry Department, Dean, Pakistan Institute of Medical Sciences, Islamabad
[3] Consultant Psychiatrist, Abbas Institute of Medical Sciences, AIMS,
[4] Medical Officer Psychiatry, Pakistan Institute of Medical Sciences, Islamabad
[5] Specialty Trainee in General Adult Psychiatry (ST4), Humber NHS Trust,

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***Address of Correspondent***
*Dr Asima Mehboob Khan*
*Associate Clinical Psychologist, Psychiatry Department, Pakistan Institute of Medical sciences, Islamabad*
*khanasima@gmail.com*

**ABSTRACT**

**Objective:** The objective of this study is to determine the effect of CBT on decreasing anxiety and depression, and improvement of quality of life in post cardiac Artery bypass surgery patients.

**Methodology:** Sample was randomly selected and divided in to two groups (50 subjects each in experimental and control group). Research tool was HAD- Scale and WHOQOL scale. Study design was comparative and intervention including formal cognitive behavioral therapy weekly sessions and psychometrics tests were applied on both the groups after one week interval. After an initial assessment of participants' anxiety, depression and quality of life the experimental group went under CBT for 8 weekly sessions and control group did not receive any intervention except usual care. Finally, participants' anxiety, depression and quality of life were measured again. Formal approval from hospital ethical committee, written informed consent from participants and basic demographic data were also gathered along with the questionnaire.

**Results:** Results from the analysis of covariance showed that CBT significantly has improved the anxiety, depression and QOL in experimental group in comparison with control group. Data was represented in Mean (+SD). Demographic and intervention related information was analyzed using chi square tests. Pre to Post comparison of depression and quality of life was done by paired t test. Data was analyzed using MS Excel and SPSS version 16.

**Conclusion:** CBT can be used as an effective intervention method in cardiac patients with high anxiety or depression level.

**Key words:** Cognitive- behavioral therapy, Anxiety, Depression, and quality of life.

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## Introduction

Depression is common in patients who undergo cardiac surgery, with the reported prevalence ranging from 15% to 38%. Depression has been reported to be an independent predictor of delayed recovery, increased re-hospitalization, and increased cardiac mortality after cardiac surgery. The detrimental effect of depression on mortality is long lasting, as shown in studies that followed patients for 5-10 years after cardiac surgery.[1]

A span of post- surgical depression is to a great extent an additional serious matter than just an alarming case of the melancholy. This is associated to prolonged emotional and physical recovery and reduced quality of life.

Depression is also associated with cognitive issues in post- cardiac surgery patients such as ability to perceive, think, and plan.

A previous study revealed that people who suffer from depression, post-traumatic stress, or anxiety following cardiac events and treatment are more likely to have

further cardiac complications which can result into death than are people who do not. Although there have been advances in psychological techniques to elicit behavior and lifestyle changes in heart patients.[2]

Cognitive-behavioral therapy is an active, organized, and time-limited approach. Individuals who suffer from depression generally have negative thoughts and do not participate in activities. In addition, they are isolated because of interpersonal relationship as well as communication problems. Cognitive-behavioral therapies are structured treatments which focus on teaching the patients how to use cognitive techniques for recognizing negative destructive thinking and replace them with healthy, positive, and constructive thinking patterns. This method is also focused on behavior and the patient feels better when participating in enjoyable activities. This treatment helps the patients to be their own therapists and use self-management.[3]

A study was conducted on 123 patients who had undergone a coronary artery bypass graft, or CABG, surgery. For the study participants were divided into three groups, each receiving different types of care as follows: Group 1 – Traditional Care: Of the 123 study participants, 40 participants underwent traditional post-operative care supervised by physicians. Group 2 – CBT: 41 participants received12 weeks of CBT therapy with a 50 to 60 minute session each week with a mental health professional and Group 3 – Supportive Stress Management:42 study participants underwent 12 weeks of therapy with a mental health professional. Level of depression was assessed at the beginning of the study and again at months three, six and nine. Results concluded that participants who received CBT or supportive stress management experienced greater remission rates (75%) from their depression as compared to patients who only received traditional post-operative care (35%).[4]

CBT is an intervention which works on emotional and behavioral patterns come up as a consequence of thinking errors (cognitive biases) or dysfunctional thoughts, and controls behavior of an individual. These cognitive errors concluded how a person views the world through his thoughts and beliefs; these can be about him, family, future or the world in general. The rationale of the study on the "Effect of Cognitive Behavioral Therapy (CBT) in Post Cardiac Artery Bypass Surgery Patients" is likely centered on addressing the psychological impact of cardiac surgery, particularly depression and anxiety, which are common in post-operative patients. The study aims to evaluate the effectiveness of CBT in improving mental health outcomes, enhancing recovery, and potentially influencing physiological health parameters such as cardiac function and overall quality of life. In Pakistan, therapeutic interventions like CBT are not commonly applied by the professionals as the trainings needed of these interventions are not in much practice. This study is one of the first works done in this area in our country, and attempted to examine the benefits of cognitive-behavioral therapy on the quality of life of post- cardiac surgery patients.

# Methodology

The study was experimental, with application of pretest-posttest control group design. Initially, the patients were selected using simple random sampling with a table of random numbers from the list of cardiac patients. A total of 100 CABG surgery patients participated in this study. Drop rate remain nil in both groups during the study.

Inclusion criteria involved patients aged 37 to 68 years of age and who had undergone Coronary Artery Bypass Grafting (CABG) surgery six weeks ago at Cardiac unit of Pakistan Institute of Medical Sciences (PIMS). After completing the ethical formalities clients were screened for eligibility by the researchers. Those who were known cases of psychiatry and were already receiving psychiatric treatments, with neurological disorders, cognitive impairment, being too ill medically, illiterate, and living too far away to participate were excluded from participation. Potentially eligible patients who provided written informed consent were then screened for depression, anxiety and quality of life. The screening was mainly consisted of Structured Clinical Interview for the DSM-V Axis I Disorders, to diagnose those with Depression. Other instruments included were Hospital Anxiety and Depression Scale (HAD – S)[5], and WHO Quality of Life (WHOQOL-BREF) [6]. Those who scored 11 or higher on the Hospital Anxiety and Depression Scale along with meeting DSM-V criteria for depression were included in the study. Subjects were then divided into case and control groups using block randomization.

Ethical approval was obtained from the hospital ethical committee (Reference No. F-1-1/2015/ERB/SZABMU/394). Written informed consent was obtained from participants, and basic demographic data were collected along with the questionnaire.

Primary Outcome: Improvement in depression and anxiety symptoms in post-cardiac artery bypass surgery

patients, assessed using standardized psychological scales.

Secondary Outcomes: Changes in quality of life, cardiac function (ejection fraction), hospital readmission rates, and adherence to therapy post-surgery. Pre-test was performed for both experimental and control groups for initial assessment of anxiety, depression and quality of life. Each session had specified goals and homework assignments. Clients were provided with related CBT materials and homework in the form of leaflets. The experimental group underwent CBT for 8 weekly sessions of 45 to 60 minutes while control group did not receive any intervention but were told that they would be called for an assessment and traditional care.

The content of structured CBT sessions designed for the experiment group included:

1. In initial session acollaborative agenda was set between client and therapist and client made oriented with the logic of applying cognitive-behavioral therapy.
2. Clients were assisted in understanding their own unique cognitive and behavioral characteristics and how these characteristics were related to their depressive emotions.
3. Clients were taught and supported in identifying negative automatic thoughts and behaviors.
4. Paying attention to one's own feelings and substituting negative automatic thoughts with logical thoughts.
5. Relaxation exercises.
6. Introduction to effective communication skills.

Data was represented in Mean (±SD). Demographic and intervention related information was analyzed using chi square tests. Pre to Post comparison of depression and quality of life was done by paired t test. Data was analyzed using MS Excel and SPSS version 16.

# Results

CBT showed significant benefits in improving psychological well-being and recovery in post-cardiac artery bypass surgery patients. Table I highlights these perceived benefits, including reduced anxiety and depression, improved coping mechanisms, and enhanced quality of life.

Table II presents the distribution of CBT benefits across different patient groups, showing greater improvements in those with lower ejection fractions and higher baseline depression scores. Younger patients demonstrated faster psychological recovery.

**Table I: Distribution of Study Subjects according to Demographic Variables.**

| Variables | Intervention Group (N=50) f (%) | Control Group (N=50) f (%) | $\chi 2$ | p-value |
|---|---|---|---|---|
| **Gender** | | | | |
| Male | 50 (100) | 50(100) | 1.0 | .31 |
| **Age (Years)** | | | | |
| 37-46 | 12 (24) | 10 (20) | | |
| 47-56 | 20 (40) | 22 (44) | 0.38 | .54 |
| 57- 68 | 18 (36) | 18 (36) | | |
| **Resident of:** | | | | |
| Islamabad | 22 (44) | 26(52) | 0.30 | .86 |
| Adjacent areas | 28 (56) | 24(48) | | |
| **Education** | | | | |
| Metric -Intermediate | 15 (30%) | 17 (34 %) | | |
| Graduate | 20 (40%) | 18 (36 %) | 0.84 | .65 |
| Masters and above | 15 (30%) | 15 (30%) | | |
| **Occupation status** | | | | |
| service | 20 (40) | 19 (60) | | |
| Retired | 12 (24) | 14 (28) | 5.04 | .02[a] |
| Business person | 18 (36) | 17 (38) | | |
| **Financial Status (Monthly)** | | | | |
| 20,000 – 40,000 | 9 (18) | 7 (14) | | |
| 41,000 – 60,000 | 15(30) | 15(30) | 0.16 | .92[a] |
| 61,000 & above | 26(52) | 28 (56) | | |

**Table II: Distribution of study subjects as per Disease related variable.**

| Variables | Intervention Group (N=50) f (%) | Control Group(usual care) (N=50) f (%) | $\chi 2$ | p-value |
|---|---|---|---|---|
| **Medical Characteristics** | | | | |
| Hypertension | 28 (56) | 30 (64) | 5.10 | .07 |
| Diabetes | 8 (16) | 11 (22) | | |
| Disturbed Lipid profile | 11 (22) | 8 (16) | | |
| Current smoking | 3 (6) | 1 (2) | | |
| **Time since CAB done(months)** | | | | |
| < 3 | 31 (62) | 29 (58) | 9.16 | .16 |
| 3 – 6 | 19 (38) | 21 (42) | | |

Table III summarizes key barriers to CBT, including financial constraints, lack of accessibility, and patient reluctance due to stigma or time commitments. Despite these challenges, a majority reported positive outcomes, emphasizing the need for broader accessibility and support.

Anxiety and depression scores decreased, while quality of life scores increased among participants in intervention group after eight to ten sessions and this proved that CBT sessions along with routine treatment are effective in decreasing anxiety and depression and improving quality of life in CABG patients.

**Table III: Comparison of Mean Anxiety, Depression and Quality of Life scores in Intervention and Control group.**

| Variables | Group | Pre - Assessment Mean ± SD | Post - Assessment Mean ± SD | p-value |
|---|---|---|---|---|
| **HAD-Scale** | Intervention Group | 4.42 ± 2.35 | 3.44 ± 2.05 | .002[a] |
| | Control Group | 4.06 ± 1.80 | 4.62 ± 1.88 | .06 |
| **Quality of life Scale** | Intervention Group | 28.52 ± 12.74 | 36.52 ± 7.53 | .005[a] |
| | Control Group | 33.80 ± 10.62 | 33.24 ± 7.02 | .03[b] |

*[a]p<.01 Highly significant reduction of HAD scores from Pre to Post Intervention group.*
*[b]p<.05 Significant increase in Quality of life scores from Pre to Post Intervention group.*

# Discussion

The data analysis showed that CBT is beneficial in decreasing symptoms of anxiety and depression in post CABG surgery individuals and improved their quality of life. The findings of this study are consistent with previous studies that have been reported that cognitive behavioral therapy is an effective treatment in reducing symptoms of anxiety and depression while improving their quality of life.[7] In this study we applied CBT as a source of supporting the individuals through counseling and lowering their levels of anxiety and depressive symptoms associated to post surgery fears regarding their quality of life, physical health and future. This helped the individuals in transforming cognitive errors and behaviors that turns out to emotional issues.

CBT assisted the participants identifying their dysfunctional thinking and recognizing the negative automatic thoughts that they will now be unproductive and seeking alternative positive thoughts more consistent with reality that they survived and will be able to enjoy life productively. A previous study explains that cognitive distortion consists of errors in perception and information processing. During this process, people tend to structure their thoughts in a negative and inflexible way, resulting in errors of interpretation related to personal performance and the judgment of external situations.[8]

A number of post bypass surgery patients think that their personal and social life activities will get decrease and eventually they will not be doing anything independently. Reshaping the dysfunctional thought pattern helped these participants to think more logically and understandably. Clients were assigned to set up weekly goals to facilitate them to go back to pleasant activities of daily life e.g. physical exercise, relaxation techniques. They were taught the coping skills, emotional expressions, and success stories shared from the patients who passed through CBPGS and now leading a productive life. Our study results are similar with another study which reveals that CBT intervention for patients suffering from symptoms of depression, anxiety, or posttraumatic stress in conjunction with heart disease was helpful to them. On all measures, their self-reported psychological difficulties decreased significantly between the time they entered treatment and their final session.[9]

Findings from a previous study show that a brief course of CBT delivered early after cardiac surgery sharply reduced the symptoms of depression more than in those receiving usual care. The decline in depressive symptoms for early CBT was clinically robust and comparable to response rates for antidepressant medications − 51% for antidepressant medications vs. 32% for placebo.[10] Our study results are similar with findings of a previous study which states that early CBT in cardiac patients with postoperative depression is effective and provides greater symptom relief than delayed treatment.[9] The success of CBT may arise from its focus on cognitive, behavioral and social dimensions of depression that may become habituated as the duration of symptoms increases.[11]

Our study proved that by sixth session significant improvement were noted both objectively by the therapist and through subjective reports by the clients, though a total of ten sessions were in agenda and the progress continued till the end of therapy. This supports findings from earlier studies that indicate positive effects of psychotherapeutic interventions on symptoms of depression, anxiety, and post-traumatic stress. Although the treatment protocol developed was for 20 sessions of CBT, in most cases patients appeared to make meaningful changes by session 12, which they maintained until termination.[12]

In two previous reports of depression treatment after bypass, investigators reported positive results with CBT conducted by clinical psychologists or social workers up to one year after surgery[13] and with nurse case-management, which involved coordination of antidepressants and/or referral to a psychologist or psychiatrist.[14,15] Another study including patients with CHD also used nurse case-managers, but included coordinated depression treatment and cardiac care.[16] In the current study compared to previous reports, therapy

was initiated by the CBT trained psychologist and psychiatrist and proved remarkable improvement in both anxiety and depression symptoms and quality of life (Table III). This can be due to the fact that patients mostly rely on healthcare professionals and respects and listen to their instructions and follow it. CBT is based on collaborative agenda by providing equal and active role of client resulting into a strong therapeutic alliance between client and therapist.

# Conclusion

Our study demonstrated the effectiveness of CBT in treating depression in post-cardiac surgery patients. Previous research has also highlighted the benefits of CBT for post-CABG depression. Our findings further revealed that CBT not only alleviated anxiety and depression symptoms but also improved overall quality of life.

CBT facilitated cognitive restructuring by replacing distorted thought patterns, clarifying fears, and reducing confusion about postoperative recovery. It proved superior to usual care in reducing anxiety, hopelessness, and perceived stress. While CBT is an effective treatment, further research is needed to assess its long-term impact on depression, quality of life, and overall recovery after cardiac surgery, as limited studies exist on this subject.

**LIMITATION:** Present study has several limitations. Firstly the sample size was small and we included only those who met diagnostic criteria for clinical depression and anxiety. Thus, we were not able to assess the efficacy of CBT in population with depressive symptoms but they did not meet the study criteria. Only male population was included. In our study, post-test evaluations were applied only and we did not include maintenance therapy sessions to evaluate the duration of study effects. Finally, cost effectiveness analysis was not included in our study, which would have supported in further evaluation of the study intervention.

Disclosure: This paper, titled "Effect of Cognitive Behavioral Therapy (CBT) in Post Cardiac Artery Bypass Surgery Patients", was presented at the 10th International Conference on New Findings in Humanities and Social Sciences, 2024. The abstract and some contents of the paper were published by Diamond Scientific Publishing in the conference proceedings.

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