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INTERVENTION OF GROUP-BASED COGNITIVE BEHAVIORAL THERAPY (CBT) TO REDUCE ANXIETY AMONG CARDIAC PATIENTS: A RANDOMIZED CONTROLLED STUDY

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Abstract
The current research aims to investigate the effectiveness of group-based CBT in reducing anxiety among cardiac patients in Karachi. Research design of Randomized controlled trial (RCT) to compare outcomes between an intervention group receiving group-based CBT and a control group research design was used. A non-probability purposive sampling technique was used to approach diagnosed cardiac patients (N=40) with an age range of 20-70 years with mean age group of 3.52 (± SD=0.93). The data was collected through the Generalized Anxiety Scale (Robert L. Spitzer et al., 2006). The intervention included a 12-session plan following the theoretical framework of Dan DeSena for anxiety reduction through CBT. Findings of paired sample t-test highlighted a statistically significant decrease in the level of anxiety at post-intervention as compared to pre-

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intervention (M = 15.9, SD = 2.46 at pre-test; M = 9.9, SD = 2.57 at post-test; t(19) = 10.1, p < .001), is evident in individuals who have taken 12 sessions of group-based cognitive behavioral therapy interventions, indicating that group CBT is effective in alleviating symptoms of anxiety in cardiac patients (Aghaei, et al., 2015). These findings have significant clinical and research implications.

Keywords: *Cardiac patients, Anxiety, CBT*

INTRODUCTION

Anxiety is a pervasive and debilitating condition that affects millions of people worldwide, manifesting as an excessive and persistent fear or worry that interferes with daily life. It is characterized by feelings of apprehension, nervousness, and tension, often accompanied by physical symptoms such as rapid heartbeat, sweating, and trembling. Anxiety can have severe consequences, including social skills deficits, stress management difficulties, and decreased productivity. In adolescents and adults, anxiety disorders are the most common form of psychopathology, with a lifetime prevalence of approximately 15-20%. Anxiety can arise from various sources, including genetic predisposition, environmental factors, and life experiences. In the context of coronary heart disease (CHD), anxiety is a common comorbidity that can exacerbate symptoms, delay recovery, and increase mortality risk.

CHD is a leading cause of mortality worldwide, accounting for millions of deaths annually. The prevalence of CHD is rising in developing countries, including Pakistan, where it has become a major public health concern. Anxiety is a significant predictor of poor outcomes in CHD patients, including increased risk of myocardial infarction, stroke, and sudden death. Cognitive Behavioral Therapy (CBT) has emerged as a highly effective treatment for anxiety, with a strong evidence base supporting its use in individual and group formats. CBT is a problem-focused approach that aims to identify and modify maladaptive thought patterns, emotions, and behaviors. By teaching individuals skills for emotional regulation, problem-solving, and stress management, CBT can help reduce anxiety symptoms and improve overall mental health. Group-based CBT is a particularly effective format for delivering anxiety treatment, offering additional benefits such as peer support, shared experiences, and collaborative learning. This approach can foster a sense of community and reduce feelings of isolation, leading to improved therapeutic outcomes.
(Holdgaard et al. 2021) assessed the effectiveness of brief group-based cognitive therapy integrated into cardiac rehabilitation for patients with coronary artery disease (CAD) and valvular heart disease (VHD). The results indicated a significant reduction in anxiety and depression, as well as improved adherence to rehabilitation programs. Another study by (Holdgaard et al. 2023) found that patients who received CBT showed greater reductions in psychological distress compared to the control group, suggesting its effectiveness as an adjunct to standard cardiac care.

(Norlund et al. 2018) Investigated an internet-based CBT program designed for post-myocardial infarction (MI) patients to reduce symptoms of anxiety and depression. Although the intervention was promising, low adherence to the online program limited its overall effectiveness, highlighting challenges in digital mental health interventions for cardiac patients.

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(Holdgaard *et al.* 2022) Examined the integration of brief, intensive group-based cognitive therapy in cardiac rehabilitation. Patients undergoing this intervention reported significant reductions in anxiety and depression, demonstrating that group CBT can enhance psychological well-being in individuals recovering from cardiac events.

A meta-analysis conducted by (Linden *et al.* 2007) of psychosocial interventions, including CBT, for patients with coronary artery disease. The findings confirmed that psychological interventions significantly reduce anxiety and depression while also improving long-term cardiac outcomes, reinforcing the need for psychological support in cardiac care. A systematic review and meta-analysis evaluating the impact of psychosocial interventions, particularly CBT, on depression among patients with coronary heart disease. The study concluded that CBT was an effective tool for improving mental health and enhancing overall recovery in cardiac rehabilitation programs (Ski et al. 2015).

In the light of the above literature review, the following hypotheses were formulated:

1. CBT in Group Therapy will lead to a significant reduction in anxiety levels among cardiac patients.
2. There would be a statistically significant mean difference between the intervention and the control group in terms of anxiety symptoms after 12 weekly intervention sessions.

METHOD

The study employed a randomized controlled trial (RCT) design to compare outcomes between an intervention group receiving group-based cognitive behavioral therapy (CBT) and a control group. A total of 40 male cardiac patients, diagnosed and referred by cardiologists in Karachi, were included in the sample. Purposive sampling was used to select participants based on specific criteria. The inclusion criteria required participants to be male cardiac patients aged between 20 and 70 years, with a score of ≥5 on the Generalized Anxiety Disorder-7 (GAD-7) scale, voluntary consent, and a stable medical condition. Patients in critical or alarming medical conditions were excluded, as were those with severe comorbid illnesses such as hepatitis, kidney transplantation, or other major health complications. This approach ensured that the sample consisted of participants who could safely and effectively engage in the intervention while minimizing confounding variables.

Measures

Demographic sheet

A self-constructed questionnaire was used in the study to seek the demographic data. Demographic sheet was constructed which provided necessary information about participants including Age, Gender, Family System, Education Level, Socio-economic

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Status, Onset Age of anxiety issue, illness duration, previously seek any group therapy, other medical and anxiety related history.

GAD-7 Scale

Generalized Anxiety Disorder 7-item (GAD-7) Questionnaire is a self-report questionnaire used to screen for generalized anxiety disorder (GAD). It assesses anxiety symptoms experienced over the past two weeks. The questionnaire asks about seven different symptoms, such as feeling nervous, worrying too much, and having trouble relaxing. Respondents rate how often they've experienced each symptom, from "not at all" to "nearly every day". Scores range from 0 to 21, with higher scores indicating greater anxiety severity. Scores of 5, 10, and 15 represent mild, moderate, and severe anxiety, respectively.

Procedure

The initial stage of the research included getting permission to use the scale from the authors through email. The next step was to employ participants who were diagnosed cardiac patients using purposive sampling. The participants were briefed regarding the details of the research after which their informed consent was taken, followed by the administration of the selected scale in the pre-intervention stage. The participants were then randomly divided into the intervention and control group.

The intervention group received the designed CBT intervention for twelve weeks which aimed to bring about a reduction in their anxiety symptoms. The participants who were part of the control group were not a part of any intervention. After the ten weeks of intervention, the generalized anxiety scale 7 was administered again to the participants of both the groups to measure their anxiety level. Lastly, the participants in the control group were given the option to undergo the same therapeutic plan employed on the intervention group.

Theoretical framework

Cognitive Behavioral Therapy (CBT) Basic Group for Anxiety, adult patients manual by Dan DeSena, LMSW, DMA (University of Michigan) was followed for twelve-week group therapy sessions, each lasting 60 minutes.

Intervention Session Plan

Session No	Session Plan
Session 1	**Aims & Objectives:** Recognize the anxiety which in this case is the anxiety related to heart problems.
	Intervention: GAD-7 (Urdu version) was administered to establish a baseline as a pre-intervention test.

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	Outcome: The first session was spent in taking history of the cardiac patients and building rapport. They were also informed about confidentiality and right to withdraw from the research. Along with this, the GAD-7 scale was administered which the patients filled without difficulty.

Session No.	Session Plan
Session 2	**Aims & Objectives:** To educate participants about anxiety, its physiological and psychological effects, and how it impacts their daily lives, particularly in the context of cardiac health.
	Intervention: Anxiety was defined as a natural response to stress or perceived threats, characterized by feelings of worry, fear, or unease. It was emphasized that while anxiety is a normal emotion, excessive or chronic anxiety can be detrimental to both mental and physical health. Participants were informed about common physical symptoms of anxiety, such as increased heart rate, sweating, shortness of breath, and chest tightness. These symptoms were linked to the body's "fight or flight" response. The session highlighted psychological symptoms, including excessive worry, difficulty concentrating, irritability, and sleep disturbances. They were explained how chronic anxiety can exacerbate cardiac conditions by increasing blood pressure, heart rate, and stress hormone levels, potentially leading to complications such as arrhythmias or heart attacks. Participants shared personal experiences of how anxiety affects their daily routines, relationships, and ability to manage their cardiac health. Common themes included avoidance of physical activity, social withdrawal, and difficulty adhering to medical advice.
	Outcome: Participants gained a clearer understanding of anxiety as a multifaceted condition with both physical and emotional components. They recognized the importance of addressing anxiety to improve their overall well-being and cardiac health.

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Session 3	**Aims & Objectives:** To help participants identify their unique anxiety triggers and recognize patterns in their anxious thoughts and behaviors.
	Intervention: Triggers were defined as specific situations, thoughts, or events that provoke anxiety. Examples included medical appointments, physical exertion, or stressful family interactions. Participants were guided through a self-reflection exercise to identify their personal triggers. They were asked to recall recent episodes of anxiety and note the circumstances surrounding them. The facilitator highlighted triggers commonly reported by cardiac patients, such as fear of another cardiac event, uncertainty about the future, and concerns about physical limitations. Participants were encouraged to look for patterns in their anxiety, such as specific times of day, recurring thoughts, or behaviors that exacerbate their symptoms.
	Outcome: Participants began to identify their personal anxiety triggers and recognize patterns in their responses. This awareness is a critical first step in developing strategies to manage anxiety effectively.

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Session No.	Session Plan
Session 4	**Aims & Objectives:** To introduce participants to the cognitive model and explain how thoughts, feelings, and behaviors are interconnected in the experience of anxiety.
	Intervention: Participants were explained the cognitive model, which posits those thoughts influence emotions and behaviors, and vice versa. A simple diagram was used to illustrate the connections between these components. A hypothetical scenario was presented (e.g., a patient experiencing chest tightness and fearing a heart attack). The group analyzed how thoughts ("I'm having a heart attack"), feelings (fear, panic), and behaviors (rushing to the hospital, avoiding physical activity) interact in this situation. Common cognitive distortions, such as catastrophizing, black-and-white thinking, and overgeneralization, were introduced. Participants were encouraged to reflect on whether they engage in these patterns. The session emphasized how avoidance behaviors (e.g., avoiding exercise due to fear of triggering a cardiac event) can perpetuate anxiety and negatively impact cardiac health.
	Outcome: Participants gained a foundational understanding of the cognitive model and began to see how their thoughts, feelings, and behaviors are interconnected. This knowledge will serve as the basis for future sessions focused on challenging negative thoughts and modifying maladaptive behaviors.
Session 5	**Aims & Objectives:** To foster a sense of community and provide participants with an opportunity to share their thoughts and experiences.

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	Intervention: Open Discussion: Participants were invited to share their thoughts on the session content, ask questions, and discuss their personal experiences with anxiety. Peer Support: Many participants expressed relief at realizing they were not alone in their struggles with anxiety. Peer support was encouraged as a valuable resource for coping. Feedback: Participants provided feedback on the session, which was overwhelmingly positive. Many appreciated the educational components and the opportunity for self-reflection.
	Outcome: The group discussion helped build rapport among participants and reinforced the sense of shared experience. Participants left the session feeling more informed and supported.

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Session No.	Session Plan
Session 6	**Aims & Objectives:** Help participants recognize and label their negative automatic thoughts (NATs) associated with anxiety. **Intervention:** Psychoeducation on the role of NATs in anxiety. Group discussion on common NATs (e.g., catastrophizing, mind reading). Practice identifying NATs through thought monitoring worksheets (e.g., situation–thought–emotion format). Participants were given assignment to Complete a Daily Thought Record. **Outcome:** Participants can identify at least one personal NAT and begin to recognize thought patterns contributing to their anxiety.
Session 7	**Aims & Objectives:** Introduce and practice diaphragmatic breathing to reduce physiological arousal. **Intervention:** Deep breathing exercises were introduced and practiced during each session. Participants were guided through slow, diaphragmatic breathing (e.g., inhale for 4 seconds, hold for 4 seconds, exhale for 6 seconds). They were encouraged to use this technique daily and in moments of acute anxiety. **Outcome:** Participants reported improved awareness of their breathing and an increased ability to use this technique to calm themselves when feeling anxious.

Session No.	Session Plan
Session 8	**Aims & Objectives:** Teach participants how to systematically relax muscle groups to reduce physical tension. **Intervention:** Progressive muscle relaxation was taught through guided exercises in the group. Participants were led through the process of tensing and relaxing specific muscle groups from head to toe. The technique was also assigned as a daily relaxation practice. **Outcome:** Participants experienced reduced physical tension and reported feeling calmer after practicing PMR. They began to recognize where they held tension in their bodies and how to release it.

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Session 9	**Aims & Objectives:** Foster nonjudgmental awareness of thoughts and bodily sensations. **Intervention:** Mindfulness meditation was introduced and practiced in brief guided exercises, such as body scans and breath awareness meditations. Participants were encouraged to observe their thoughts and bodily sensations without judgment, focusing on the present moment. **Outcome:** Participants became more aware of their internal experiences and reported feeling more grounded. Some began incorporating short mindfulness practices into their daily routines.

Session No.	Session Plan
Session 10	**Aims & Objectives:** Creating an anxiety hierarchy (gradually increasing exposure to feared situations). **Intervention:** Participants identified specific anxiety-triggering situations, such as physical activity, follow-up appointments, or being alone. The therapist introduced the concept of exposure therapy and explained how creating an anxiety hierarchy could support gradual desensitization. Each participant ranked their fears using the Subjective Units of Distress Scale (SUDS) and created a list from least to most distressing. They then discussed practical, low-intensity steps they could take to begin gradual exposure, with emphasis on repetition and starting small. **Outcome:** Patients reported that the session helped them recognize and organize their fears more clearly. Many felt reassured that others shared similar concerns and expressed increased confidence in managing their anxiety.
Session 11	**Aims & Objectives:** Testing beliefs and assumptions through real-life situations. **Intervention:** Participants were explained how anxious thoughts and assumptions (e.g., “If I climb stairs, I’ll have another heart attack”) could lead to avoidance and increased fear. Participants were guided to identify their own untested beliefs and explore how these influenced their behavior. The group discussed how to design simple, safe real-life experiments to test these assumptions—such as slowly increasing physical activity or attending social events. Emphasis was placed on predicting outcomes, carrying out the activity, and reflecting on the actual result compared to the feared outcome.

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	Outcome: Participants found the approach practical and empowering. Many realized that their fears were often based on assumptions rather than facts. Several shared that testing even small situations gave them a sense of control and confidence.
Session 12	**Aims & Objectives:** Practicing new coping skills in daily life.
	Intervention: The therapist reviewed key coping strategies introduced in previous sessions, such as paced breathing, positive self-talk, and activity planning. Participants discussed how these could be integrated into daily situations like dealing with health-related stress, fatigue, or social withdrawal.
	Outcome: Participants reported feeling more equipped to handle stress and noted that using the coping skills helped them feel calmer and more in control. Some faced challenges with consistency but expressed a willingness to keep practicing. Overall, the session was seen as useful and encouraging.

Ethical Considerations

Participants were provided with clear and comprehensive information about the study's purpose, procedures, potential risks, and benefits. Participation was entirely voluntary, and participants were required to sign an informed consent form that outlines their right to withdraw at any time.

Scoring & Statistical Analysis

The scoring of measures was done following standard scoring procedures. Paired Sample and Independent Sample t-tests were used to analyze the hypotheses through the Statistical Package for Social Sciences, Version 22 (SPSSV. 22).

RESULTS

Table 1

Frequencies and Percentages of Demographic Variables (N=40)

Variables	*f*	%
Age		
30-40 years	5	12.5
40-50 years	16	40.0
50-60 years	12	30.0
60-70 years	7	17.5
Education		
Uneducated	5	12.5
Under matric	8	20.0
Matric	9	22.5
Intermediate	7	17.5
Graduation	11	27.5
Marital Status		
Married	40	100.0
Mother tongue		

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Urdu	17	42.5
Sindhi	12	30.0
Pashto	6	15.0
Siraiki	3	7.5
Punjabi	2	5.0

Table 2

Paired Samples t-test for Effectiveness of Group-based CBT on Anxiety on Intervention Group Members (N=20)

Variables	*Pre-Test*		*Post-Test*		*t(19)*	*P*
	M	SD	M	SD		
Anxiety	15.9	2.46	9.9	2.57	10.1	.00*

*p <.05

Table 3

Independent Samples t-test for the Variable of Anxiety at Pre-Intervention (N=40)

Variables	*Intervention Group*		*Control Group*		*t (38)*	*P*
	M	SD	M	SD		
Anxiety	15.9	2.46	14.5	1.76	2.06	.04*

*p <.05

Table 4

Independent Samples t-test for the Variable of Anxiety at Post-Intervention (N=40)

Variables	*Intervention Group*		*Control Group*		*t (38)*	*P*
	M	SD	M	SD		
Anxiety	9.9	2.57	13.9	1.88	5.60	.00*

*p <.05

DISCUSSION

The purpose of the current study was to address the gaps in research literature by assessing the efficacy of group based cognitive behavioral therapy on anxiety in individuals experiencing cardiac issues in Karachi, using a pretest-posttest randomized controlled trial (RCT). Group based cognitive behavioral therapy was used to reduce anxiety symptoms in patients with cardiac issues as psychotherapies, especially are proved to have better results in case of anxiety, depression, stress reduction and improving quality of life as compared to other treatment methods (Erkkilä et al., 2015; Yousefy, Khayyam-Nekouei et al., 2010). Findings of this study provided supporting evidence for using group-based CBT for anxiety reduction among cardiac patients as group therapy is shown to produce equally beneficial results as individual psychotherapy does (McRoberts, Burlingame, & Hoag,1998).

For the purpose of reducing tension among intervention group participants during history taking and while talking about triggers of CHD, relaxation techniques were used in the intervention plan. As relaxation techniques are found to reduce anxiety among cardiac patients and patients of hypertension (Calderone et al., 2025; Hashemzadeh, Mirtaghi, & Chalabianloo, 2011). For that purpose, various relaxation techniques were used such as deep breathing exercises, meditation and progressive muscle relaxation (PMR) technique.

The participants in the intervention group went through the intervention plan consisting of group-based cognitive behavioral therapy techniques, as various researches have shown that such techniques are helpful in reducing stress and stress-related issues in people (Carmody & Baer, 2008; Rausch et al., 2006). Findings of paired sample t-test highlighted a statistically significant decrease in the level of anxiety at post-intervention as compared to pre-intervention (M = 15.9, SD = 2.46 at pre-test; M = 9.9, SD = 2.57 at post-test; $t(19) = 10.1$, $p < .001$), is evident in individuals who have taken 12 sessions of group-based cognitive behavioral therapy

interventions, indicating that group CBT is effective in alleviating symptoms of anxiety in cardiac patients (Aghaei, et al., 2015).

It was also hypothesized that there would be a statistically significant mean difference between the experimental and the control group in terms of anxiety symptoms after 12 weekly intervention sessions. This hypothesis was supported as significant mean difference was found between means of control and experimental group members (M = 9.9 vs. M = 13.9; $t(38) = 5.60$, $p < .001$). moreover, GAD score was higher in intervention group members as compared to control group members at baseline assessment, which further validates that anxiety reduction in patients was due to CBT, not because of spontaneous remission.

There are many strengths of this study. One major and key strength is using CBT as an intervention tool for reducing anxiety symptoms among cardiac patients as CBT is found be the best therapy for producing long term and effective results (DiMauro, Domingues, Fernandez, & Tolin, 2013). Another strength is conducting 12-week sessions by mental health professional who have expertise in using CBT and its therapeutic techniques. Another major strength is that this study is replicable and findings of this study has major implications in daily life. Practitioners can use group-based CBT for reduction of anxiety symptoms among heart patients and increase their psychological resilience and well-being.

Despite being effective research, there are a few potential limitations concerning the results of this study which should be acknowledged. One major concern of this study relates to the purposive sampling strategy for recruiting patients with cardiac issues. Also, sample size taken in this study i.e. 40 was not very large and included male participants only which questions its generalizability. Further studies with larger sample size are needed to investigate the mediating and moderating role of demographic variables such as age, gender, socioeconomic status, education, marital status etc. Moreover, as only 12 sessions were conducted and then sessions were terminated, longitudinal research is suggested to be conducted with more follow-up group-based CBT sessions.

In conclusion, group based cognitive behavioral therapy is an effective intervention technique for reduction of anxiety symptoms among patients of cardiac issues. This study adds to growing body of supporting evidence of CBT as an effective psychotherapy. Hence, such treatment and researches should be conducted more often.

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