The Effect of Cognitive Behavioral Therapy on Depression and Anxiety in Heart Attack Patients

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Quantitative Study

Abstract

Background: Depression and anxiety are among the underlying factors and effects of heart attack. Reducing these patients' levels of depression and anxiety is crucial for reducing recurrent strokes and enhancing their quality of life (QOL). The current study was conducted to examine the effect of cognitive behavioral therapy (CBT) on depression and anxiety in heart attack patients.

Methods: The current experimental study was conducted on a community of heart attack patients in 2021. The statistical population consisted of 197 patients admitted to the CCU of Yarmouk Teaching Hospital and Baghdad Teaching Hospital, Iraq. Using a simple random sampling method, 84 patients were chosen and divided into experimental and control groups (42 patients in each group). For data collection, the Symptom Checklist-90-Revised (SCL-90-R) was utilized. The data were analyzed using the analysis of covariance (ANCOVA) in SPSS software. The significance level was considered to be equal to 0.05.

Results: The mean depression score in the control group (1.27 ± 0.52) was significantly higher after the intervention compared to the experimental group (0.68 ± 0.29) (P < 0.001). In addition, the experimental group's depression score in the posttest stage was significantly lower than in the pretest stage (P < 0.001). ANCOVA showed a statistically significant difference in the mean posttest score of the dependent variables of depression (F = 129.48; P < 0.001) and anxiety (F = 123.99; P < 0.001) in heart attack patients who received the intervention.

Conclusion: CBT intervention was impressive in the treatment of anxiety and depression in heart attack patients, resulting in a significant decrease in anxiety and depression and a reduction in the likelihood of future heart attacks.

Keywords: Cognitive behavioral therapy; Depression; Anxiety; Heart attack

Introduction

Heart attack is presently one of the most common diseases in societies. When blood flow to a portion of the heart is interrupted or reduced, the heart muscle is damaged, and a heart attack occurs. Over time, the frequency of heart attacks has significantly increased (Waloszek et al., 2015). Common crippling conditions like depression and anxiety frequently appear after a heart attack. The harmful impacts of depression and anxiety on heart attack patients have been discussed in many studies, and their role in cardiovascular diseases (CVD) has received more and more attention (Mohtar, Hamzah, Budiyarti, & Solikin, 2021; Xinias, Mavroudi, Theodorou, & Roilidis, 2022).

Moreover, by causing physical symptoms and impairments, damage to the heart hurts a person's mental state, and diseases such as heart attacks are not excluded from this phenomenon (McPhillips, Salmon, Wells, & Fisher, 2018). Numerous studies have shown that depression and anxiety are two prevalent complications in heart attack patients. Depression decreases the patient's motivation to continue therapy; it has also been discovered that depression increases the risk of death for up to 18 months after a heart attack. Depression following a heart attack is considered a normal response by most researchers (Zeighami, Behnammoghadam, Moradi, & Bashti, 2018).

Numerous studies have demonstrated that patients' most significant source of anxiety is fear of death and another stroke. High anxiety levels increase the risk of death by up to threefold. Various treatment approaches have been proposed based on the etiology of mental disorders. Cognitive behavioral therapy (CBT) is one of these methods, and its efficacy has been demonstrated in many researches (Huaroto, Wong, & Alvarado, 2022; Vaca, Tremmel, & Edwards, 2021). In this approach, the patient is cheered to consider the relationship between his minus thoughts and depressive feelings as testable supposition (Dargahi-Kafshgari, Yaghoubi-Hasankola, & Habibzadeh-Ahangarkolaei, 2022). Moreover, the behaviors that result from negative thoughts are used as a yardstick for determining the validity or accuracy of those thoughts. The application of CBT in the treatment of anxiety includes different methods of muscle relaxation and breathing, cognitive reconstruction, regular desensitization, behavioral training, cessation of thoughts, and daring, which is one of the most effective ways to manage psychological issues during medical treatment (Jahangirrad, Kraskian-Mujmenari, & Nasseri-Moghaddam, 2022). The CBT approach to treating depression and anxiety requires between 6 and 20 psychotherapy sessions for recovery (Abubakar et al., 2021).

Depression and anxiety are particularly dangerous for heart attack patients because they necessitate submission to the disease. People who are depressed or anxious stop trying to survive and miss out on better opportunities for the rest of their lives. Various treatment approaches have been proposed based on the etiology of this disorder, one of which is CBT, which is a valuable method for depression and anxiety disorders therapy in heart attack patients (Faryabi, Rafieipour, Haji-Alizadeh, & Khodavardian, 2022). Following a heart attack, many patients experience depressed and anxious thoughts, as well as a decrease in their level of concentration and attention, resulting in a decrease in their quality of life (QOL). According to researchers, depression and anxiety are more common among heart attack patients than other psychiatric disorders (Draheim & Anderson, 2021).

Given that CBT improves pain control and using positive coping strategies reduces depression, anxiety, and negative emotional states in chronic pain patients,

CBT will effectively improve and reduce depression and anxiety in heart attack patients (Levy, H. Stevens, & Tolin, 2022). As a result, knowing the effects of this treatment method can be beneficial in performing mental nursing processes for patients who need them, planning appropriate nursing measures, promoting mental health services, and creating policies related to it in society. As a result, implementing these measures can reduce psychological disorders in patients while also improving their QOL (Li, Laplante, Paquin, Lafortune, Elgbeili, & King, 2022).

Depression and anxiety are the causes and effects of a heart attack, so it is essential to find an effective way to alleviate these conditions. Considering that some patients do not wish to take anti-depressant and anti-anxiety medications and that the use of medication has side effects that can be dangerous for heart patients, the use of psychological treatment methods such as CBT is crucial. Few studies have employed CBT to treat anxiety and depression simultaneously and separately. In most studies, cognitive therapy, relaxation, or both have been used to treat one of these two disorders, anxiety and depression; therefore, the novelty of the present research is the CBT-based simultaneous examination of anxiety and depression levels. The current study was conducted with the aim to examine the effect of CBT on depression and anxiety in heart attack patients.

Methods

In 2021, the current experimental study was conducted on a community of heart attack patients hospitalized in the cardiac care unit (CCU). The patients volunteered to take part in the study and provided informed consent for participation. The statistical population included 197 patients admitted to the CCU of Yarmouk Teaching Hospital and Baghdad Teaching Hospital, Iraq, with a diagnosis of a heart attack. Using a simple random sampling method, 84 patients were selected and randomly divided into experimental and control groups (42 people in each group). The random assignment of codes was used to divide individuals into experimental and control groups; thus, odd codes were assigned to the experimental group, and even codes were assigned to the control group.

The study inclusion criteria included being married, being diagnosed with a heart attack, being between 40 and 70 years of age, not having a history of mental illness, not taking psychiatric drugs, and providing informed consent. The exclusion criteria included unwillingness to participate in the study, failure to complete the questionnaires, and absence from more than 2 sessions of the educational intervention. In order to comply with ethical considerations, the participants were assured that their identities would remain confidential and that they could withdraw from the study at any time. The present study was approved by the ethics committee of the College of Medicine at the University of Baghdad. In addition, the participants were informed of the research's objectives, implementation method, benefits, and drawbacks before its commencement. After completing the research, the CBT educational intervention was also provided to the patients in the control group.

At the beginning of the study, the participants in both groups were asked to complete a demographic questionnaire and a questionnaire on psychological disorder symptoms. A colleague familiar with CBT performed the 10 sessions (each lasting 30 minutes) of CBT intervention in the experimental group after random assignment. Table 1 contains a description of the planned educational intervention sessions. The experimental group's sessions were scheduled individually (1 day a week for 10 weeks). This procedure took place in a room adjacent to the CCU.

Table 1. Description of cognitive behavioral therapy educational intervention sessions in the experimental group

Session	Description of sessions
1	Introductions and establishing initial communication, problem reconceptualization, and initial psychological status evaluation
2	Informing patients about the effectiveness of CBT, explaining anxiety and depression, teaching abdominal breathing, slow breathing, and deep breathing, as well as practicing progressive relaxation, and assigning tasks to patients: abdominal breathing, and progressive relaxation for 20 minutes per day until the next meeting
3	Providing information about the psychological effects of the disease, the role of psychological factors on emotions and sensory experiences, and training to identify negative thoughts
4	A brief review of the previous session, followed by 15 minutes of muscle relaxation and deep breathing, reading the negative thoughts noted by the patients and replacing irrational thoughts with rational thoughts, and asking the patient's opinion and discussing them
5	A brief review of the previous session and review of assignments with the patient's assistance, training to recognize unpleasant emotions, the situation in which these emotions occur, and pleasant thoughts associated with those emotions, making a table of pleasant thoughts and logical responses to them, and assigning homework to the patient
6	Recalling and reviewing the previous session, performing relaxation and deep breathing exercises, checking the patient's assignments, relating the experiences and emotions of other patients to the patient, assessing the patient's mastery of the previously mentioned techniques, and conveying the experiences and emotions of other patients to the patient
7	Reviewing and recalling the previous session, performing muscle relaxation and abdominal breathing, reviewing the patient's assignments, teaching the patient problem-solving skills, expressing and discussing feelings expressed by the patient, and changes in the patient's condition during the educational intervention sessions
8	Continuing the teaching of problem-solving skills using examples from other patients, explaining how to identify negative thoughts and overcome them, mentioning the factors that aggravate and maintain psychological symptoms and how to control them, and assigning homework
9	Continuing the training of identifying and controlling negative spontaneous thoughts, examining how the patient uses problem-solving techniques, and assigning homework for the next session
10	A brief review of the previous session, assuring the patient that these skills help deal with illness and other problems, and re-examining the patient regarding psychological status

In the control group, there was no CBT intervention; however, standard treatment and care were administered. Finally, the psychological disorder symptoms questionnaire was completed again by both groups.

The Symptom Checklist-90-Revised (SCL-90-R) was utilized for data collection. This checklist is designed to evaluate psychological symptoms, consists of 90 questions and takes approximately 12 to 15 minutes to complete. It has been utilized for the first time to demonstrate the psychological aspects of physical illness. The questions are scored on a 5-point Likert scale that assesses the level of discomfort and ranges from 0 (none) to 4 (severe). The obtained scores reflect 9 dimensions of disease symptoms, 2 of which are associated with depression and anxiety (including 22 questions). Following the instrument's instructions, the total scores were divided by the number of questions in each dimension, with a minimum score of 0 and a maximum score of 4. The SCL-90-R assesses an individual's mood from 1 week ago to the present.

As a diagnostic instrument, the SCL-90-R has been utilized in various populations, including cancer patients, those with sexual impotency, and those with heart diseases and severe physical ailments. This instrument has been validated in the Iraqi society with a Cronbach's alpha coefficients of 0.81 for anxiety and 0.87 for depression (Seidi, Jaff, Connolly, & Hoffart, 2021). Additionally, the results of a research conducted by Cucchi, Liuzza, Saleem, and Al Hemiary (2020) indicate the

validity of this instrument in the Iraqi society. Moreover, the reported sensitivity of this instrument is 0.90 (Capone, Presseau, Saunders, Eaton, Hamblen, & McGovern, 2018).

In the current study, descriptive statistics are presented as mean (SD). The Shapiro-Wilk test was used to examine the normality of the distribution of the variables, Levene's test was used to examine the coequality of variances, and analysis of covariance (ANCOVA) was used to test the study hypothesis. Using SPSS software (version 23; IBM Corp., Armonk, NY, USA), the significance level of the results was determined to be equal to 0.05.

Results

Table 2 presents both groups' frequency distribution and percentage of demographic variables. The age range of the participants in the current study was 40 to 70 years, with a mean age of 58.29 ± 6.42 years. Moreover, 52 (61.9%) of the study participants were men, and 47 (56%) had secondary education. Regarding occupation, 32 individuals (38.1%) were employees. All study participants were married, and 62 people (73.8%) resided in urban areas. Furthermore, 54 people (64.3%) had hypertension, 51 (60.7%) had hyperlipidemia, and 43 (51.2%) had diabetes. Additionally, 35 participants (41.7%) were smokers. In the demographic variables, there was no statistically significant difference between the experimental and control groups ($P > 0.05$).

Table 3 shows the results of the independent t-test regarding the significance level of the difference between the study groups at the pretest and posttest stages. There was no significant difference in the mean score of depression symptoms between the study groups before the intervention, ($P > 0.05$); however, the mean depression score in the control group (1.27 ± 0.52) was significantly higher than the experimental group (0.68 ± 0.29) after the intervention ($P < 0.001$). We examined the effect of CBT on patients' anxiety.

Table 2. Frequency distribution of demographic variables in the experimental and control groups

Variable		Experimental group [n (%)]	Control group [n (%)]	P-value
Gender	Female	15 (35.7)	17 (40.5)	0.37
	Male	27 (64.3)	25 (59.5)	
Age (year)	< 50	9 (21.4)	8 (19.0)	0.16
	50-60	15 (35.7)	13 (31.0)	
	> 60	18 (42.9)	21 (50.0)	
Education	Illiterate	4 (9.5)	7 (16.7)	0.68
	Secondary	24 (57.1)	23 (54.8)	
	College	14 (33.3)	12 (28.6)	
Job	Employer	12 (28.6)	11 (26.2)	0.13
	Employee	17 (40.4)	15 (35.7)	
	Unemployed	13 (31.0)	16 (38.1)	
Place of residence	Rural	9 (21.4)	13 (31.0)	0.24
	Urban	33 (78.6)	29 (69.0)	
Smoking	Yes	19 (45.2)	16 (38.1)	0.08
	No	23 (54.8)	26 (61.9)	
Hypertension	Yes	29 (69.0)	25 (59.5)	0.21
	No	13 (31.0)	17 (40.5)	
Hyperlipidemia	Yes	28 (66.7)	23 (54.8)	0.46
	No	14 (33.3)	19 (45.2)	
Diabetes	Yes	19 (45.2)	24 (57.1)	0.53
	No	23 (54.8)	18 (42.9)	

Table 3. Comparison of mean depression and anxiety scores between the two groups

Parameter	Stage	Experimental group (mean ± SD)	Control group (mean ± SD)	P-value
Depression	Pretest	1.24 ± 0.53	1.06 ± 0.47	0.260
	Posttest	0.68 ± 0.29	1.27 ± 0.52	< 0.001
Anxiety	Pretest	1.08 ± 0.45	0.92 ± 0.39	0.480
	Posttest	0.57 ± 0.23	1.05 ± 0.48	< 0.001

SD: Standard deviation

The results of the independent t-test revealed no significant difference between the experimental and control groups in terms of the mean score of anxiety symptoms before the intervention. However, the experimental group had a lower mean anxiety score (0.57 ± 0.23) than the control group (1.05 ± 0.48) after the intervention, and the independent t-test showed this difference to be significant ($P < 0.001$).

The results of ANCOVA in determining the effect of CBT-based intervention on depression and anxiety in heart attack patients are shown in tables 4 and 5. According to table 4, implementing the intervention (independent variable) can result in a statistically significant difference in the mean posttest value of the dependent variables of depression and anxiety in heart attack patients ($P < 0.001$).

Levene's test was used to assess variance homogeneity, and the posttest results for the variables mentioned showed that variance homogeneity was maintained ($P > 0.05$). The Box's M test, which was used to check the homogeneity of the matrices, revealed that the matrices' default was also correct in the posttest stage ($P > 0.05$). Furthermore, the Shapiro-Wilk test results show that the normality of the data sample distribution is supported for the variables in the pretest and posttest stages in both groups ($P > 0.05$).

Discussion

This research was conducted to assess the effect of CBT on depression and anxiety in heart attack patients. CBT intervention has decreased depression and anxiety in heart attack patients, which is consistent with the results of some previous researches (Reavell, Hopkinson, Clarkesmith, & Lane, 2018; Redeker, Jeon, Andrews, Cline, Mohsenin, & Jacoby, 2019; Tully, Selkow, Bengel, & Rafanelli, 2015). Depression and anxiety are influenced by various mediating factors, including gender, age, job, and level of education, among others. Therefore, the study groups were compared in terms of these factors. However, no significant differences were observed, and the groups were homogeneous. Thus, the findings of this study can be attributed to the intervention's effect. The primary objective of experimental research is to control all variables associated with the experimental conditions. Several researchers have examined the impact of LDL and HDL triglyceride cholesterol on depression and anxiety disorders (Li, Buys, Li, Li, Song, & Sun, 2021).

Table 4. Analysis of covariance results regarding the effect of cognitive behavioral therapy-based intervention on patients' depression

Source of variation	SS	df	MS	F	P-value
Pretest	243.72	1	243.72	11.96	< 0.001
Dependent variable	2637.51	1	2637.51	129.48	< 0.001
Error	1589.16	78	20.37		
Total	2307.48	81			

SS: Sum of squares; df: Degree of freedom; MS: Mean square

Table 5. ANCOVA results investigating the effect of cognitive behavioral therapy-based intervention on patients' anxiety

Source of variation	SS	df	MS	F	P-value
Pretest	281.62	1	281.62	12.62	< 0.001
Dependent variable	2766.14	1	2766.14	123.99	< 0.001
Error	1739.87	78	22.31		
Total	2604.16	81			

SS: Sum of squares; df: Degree of freedom; MS: Mean square

The findings of this research indicate that CBT is effective on depression in heart attack patients. Prior research has examined the effectiveness of concurrent psychiatric counseling and interdisciplinary care in reducing depression after a heart attack (Jeyanantham, Kotecha, Thanki, Dekker, & Lane, 2017; Lundgren, Dahlstrom, Andersson, Jaarsma, Karner, & Johansson, 2016). Researchers have demonstrated that psychological interventions can reduce depressive symptoms and alter the lifestyle of heart patients (Gulliksson, Burell, Vessby, Lundin, Toss, & Svardsudd, 2011). In addition, by examining the impact of CBT on the level of depression among patients referred to counseling clinics, they discovered that it is effective (Cajanding, 2016). By altering people's thought patterns, CBT has improved their behavior and alleviated their depression.

In addition, the current study's results demonstrated that CBT effectively reduces anxiety among heart attack patients. Researchers have found in numerous studies that group therapy reduces anxiety in heart attack patients (Cully, Paukert, Falco, & Stanley, 2009; Norlund et al., 2018). In addition, by analyzing the impact of muscle relaxation on anxiety in heart attack patients, researchers found that the anxiety score reduced significantly after the progressive relaxation technique was applied compared to the day before the technique in the experimental group, and to the day before the technique was applied in the control group. Since progressive muscle relaxation is also a component of CBT, these results were consistent with those of the current investigation (Glozier et al., 2013; Jonsbu, Dammen, Morken, Moum, & Martinsen, 2011).

Multiple researches have investigated the impact of muscle relaxation and cognitive therapy on depression and anxiety in two groups of heart attack patients; they have concluded that the impact of relaxation and cognitive therapy on reducing anxiety and depression in heart attack patients is substantial. Furthermore, in this regard, some researchers have stated that it is possible to reduce the need for medication in heart attack patients and instead use non-pharmacological methods by employing these techniques. Since cognitive therapy and muscle relaxation are components of CBT, it can be argued that the results of these studies were consistent with that of the current research (Dao, Youssef, Armsworth, Wear, Papathopoulos, & Gopaldas, 2011; Malm, Fridlund, Ekblad, Karlstrom, Hag, & Pakpour, 2018).

Various researches have indicated that the presence of an essential component of behavioral activation alongside cognitive treatments is the factor that reduces depression and anxiety at the start of treatment. It is also the factor that sustains the effects of these treatments in reducing depression and anxiety after treatment. As a result, it can be argued that paying attention to negative emotions and attitudes that trigger depression and anxiety, and strengthening the patient's active and efficient behaviors lead to an increase in self-efficacy and changing dysfunctional cognitions, which eventually leads to the alteration of depression and anxiety into a balanced mood. The findings of some studies are inconsistent with that of the current study,

suggesting that a lack of treatment sessions may impede the success of the treatment aims (Kunik et al., 2008; Lazaridou et al., 2017).

According to the current study findings, a relatively CBT can reduce psychological disorders in heart attack patients. The reduction of the prevalence of those agents may have beneficial effects. Considering that a person's thoughts are the source of his anxiety and depression, the researcher guided each individual to recognize their thoughts as an independent example and encouraged them to distinguish emotional symptoms and characteristics from the effect of group factors. Therefore, they should attempt to alter their thoughts, and ultimately, their emotions. After the educational intervention, the patients were able to gain insight and alter their perspectives regarding their thoughts, emotions, and feelings.

The limited sample size and small community of heart attack patients in Baghdad from which the sample was drawn limits the generalizability of the findings of this study. Therefore, care should be taken when generalizing the findings. Psychotherapy on the symptoms of heart disease and other physical diseases, and the use of other psychological programs to modify and correct the behavioral system of patients are proposed for future studies with a larger sample size.

Conclusion

Individual CBT interventions were impressive in the treatment of anxiety and depression in heart attack patients, according to the results of the present research. It led to a considerable decrease in anxiety and depression in these patients and had a positive effect on reducing the likelihood of future heart attacks. Therefore, therapists, social workers, psychiatric nurses, and nurses can use it as a guide for new and effective methods in this field.

Conflict of Interests

Authors have no conflict of interests.

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