Comparing the Effectiveness of Behavioral Therapy and Cognitive Behavioral Therapy on Anxiety Levels of Patients with Heart Attack

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Quantitative Study

Abstract

Background: Anxiety is one of the causes and consequences of a heart attack, and its therapy is critical in lowering the risk of recurrence and improving patients' quality of life. The current study aims to examine the effectiveness of behavioral therapy (BT) and cognitive behavioral therapy (CBT) on the anxiety levels of patients with heart attack.

Methods: In the current experimental study, the statistical population included 387 patients with heart attack who visited Al Budoor Hospital in Baghdad, Iraq, in 2022. A random sample of 150 individuals was selected via simple random sampling. Using a multiple-group pre–test-post-test design, two intervention groups and one control group were examined by the Beck Anxiety Inventory (BAI) (50 people in each group). To analyze the data obtained from the pre-test and post-test for each group, the analysis of covariance (ANCOVA) was used to examine the significance of the results between groups. The SPSS software was used for analyses, and the statistical significance level of the results was deemed to be 0.05.

Results: The one-way analysis of variance (ANOVA) test showed a significant difference between at least two groups (F = 14.90, P < 0.001). Furthermore, Tukey's post hoc test findings revealed that the post-test anxiety scores of both intervention groups were significantly different from the control group (P < 0.001). Moreover, the cognitive behavioral intervention group had lower mean anxiety scores than the behavioral intervention group, but this difference was not significant (P > 0.05).

Conclusion: The findings indicated that BT and CBT methods significantly reduced anxiety in patients with heart attack, with cognitive-behavioral methods being more effective.
Keywords: Heart attack; Anxiety; Behavior therapy; Cognitive behavior therapy

Introduction

Heart attack is the most prevalent cardiovascular disease (CVD), and statistics indicate that its incidence and mortality rate is rising. The mean age at which heart attacks occur has recently declined (Zambrano et al., 2020). Anxiety is a prevalent psychological impact of the majority of heart diseases. The conquest of anxiety in patients with heart attack exceeds 70 to 80 percent, and in 25 percent of these patients, this anxiety may persist for an extended period (Albus et al., 2019). Although anxiety is regarded as a natural response to acute cardiac events and threats, its protracted occurrence will have adverse impacts on patients' health (Alkhafaje, Kshain, Fadhi, Al-Mualm, & Fadhil, 2022). Therefore, it is crucial to reduce anxiety in patients with heart attack. Consequently, these patients should be routinely screened for anxiety, and steps should be taken to alleviate anxiety (Mansouri, Baraz, Elahi, Malehi, & Saberipour, 2019).

There is a solid and age-old bond between the heart and the mind. Anxiety is one of the psychological side impacts of most heart conditions (Hegewald et al., 2019). Reduced heart disease can be achieved by teaching patients how to manage their stress and anxiety (Scott-Sheldon et al., 2020). Methods to improve mental health have gained importance alongside physical therapies as the focus of the new care and therapy system shifts to maintaining and promoting health and preventing diseases (Kitko et al., 2020).

Because of the increasing prevalence of this disease and its impacts on the patient's lifestyle, examining the general health status of patients with heart attack is critical (Jayawardena, Ranasinghe, Ranawaka, Gamage, Dissanayake, & Misra, 2020). A person suffering from this disease may experience significant changes in his family relationships, work, values, physical and social ability, and his ability to care for himself, and his overall health may be affected (Reshetnikov & Tregubov, 2021). Given the changes in people's lives following a heart attack, anxiety symptoms are prevalent among patients after a heart attack (Ilardi et al., 2020). They can hurt the disease prognosis. However, there can be a two-way relationship between a heart attack and general health status, particularly anxiety (Afshar, Roohafza, Hassanzadeh-Keshteli, Sharbafchi, Feizi, & Adibi, 2015). The findings revealed that the patient's general health situation, as well as the first three areas of the general health scale, namely physical complaints, symptoms of anxiety and insomnia, and impairment in social functioning, were significantly different from healthy people at the start of the stroke (Coorey, Peiris, Neubeck, & Redfern, 2020; Dellafiore et al., 2019). Besides, the occurrence and continuation of the disease can cause significant disruption in the public health situation (Jaarsma et al., 2021).

Numerous studies have demonstrated that anxiety, depression, and the ability to cope with heart complications are among the most significant issues that these patients face (Meuret, Tunnell, & Roque, 2020). A heart attack is a threatening event for patients. The concept of anxiety refers to the presence of a threatening event and a person's evaluation of the resources available to face that event (Zargar, Kavoosi, & Molaeinezhad, 2016). In contrast, coping is cognitive and behavioral efforts to overcome threatening situations, such as illness challenges. According to studies, a heart attack multiplies the risk of anxiety and depressive signs among normal individuals (Mohammad et al., 2019). Patients with heart attack may experience post-traumatic disturbances that cause them to think irrationally. Conversely, irrational thoughts may result in psychological disturbances (Kasparian, Kan, Sood, Wray,

Pincus, & Newburger, 2019).

The therapy objectives for patients who have anxiety and depression are to reduce signs, prevent a recurrence, and eradicate the disease (Taha, Kamal, Ali, Saud, & Sabit, 2022). Few public efforts have been made to provide non-pharmacological therapies for this type of anxiety, despite studies indicating a potential need for supportive psychotherapy and behavioral interventions in treating anxiety following a heart attack (Zheng et al., 2019). Various therapy approaches have been proposed based on the etiology of mental disorders. Several researches have showed the influence of cognitive behavioral therapy (CBT), one of these methods (Mehta, Peynenburg, & Hadjistavropoulos, 2019; Silverman, Herzog, & Silverman, 2019). CBT has been evaluated more than other effective therapies for anxiety and has proven to be effective (Thakral, Von, McCurry, Morin, & Vitiello, 2020). The mentioned method is based on the premise that people's interpretations of events and situations significantly contribute to their psychological problems and specific symptoms. This therapy is predicated on the observation that cognitions, emotions, and behaviors have a significant mutual influence and causative relationship (Johansson et al., 2019).

Because patients with heart attack experience varying degrees of anxiety, it is critical to investigate anxiety reduction and management methods. Furthermore, the previous research is critical if there is a cause-and-effect relationship between anxiety and heart attack. The current study aims to compare the effectiveness of behavioral therapy (BT) and CBT on anxiety levels of patients with heart attack. The current study's innovation is the simultaneous examination of BT and CBT methods.

Methods

This was an experimental study, using a multiple-group pre-test and post-test design. The study's statistical population included 387 patients with heart attack who visited Al Budoor Hospital in Baghdad, Iraq, in 2022. A random sample of 150 individuals was selected using a simple random sampling technique. Two intervention groups and one control group were examined (50 people in each group). Each of the intervention groups received one of the interventions of BT and CBT, while the control group did not receive any intervention. In order to compare the effectiveness of each intervention using the Beck Anxiety Inventory (BAI) (Beck & Steer, 1991), each group underwent pre-test and post-test stages. The results were then compared to those of other groups.

The inclusion criteria included age between 30 and 70 years, willingness to take part in the research, the occurrence of heart attack, presence of anxiety (obtaining a minimum score of 15 in the BAI) after the occurrence of heart attack, and absence of other psychiatric disorders, substance abuse, or other organic disorder. Exclusion criteria included unwillingness to participate, incomplete questionnaire completion, and absence from more than two sessions. Following ethical considerations, patients had the option to retract from the research, and the objectives were fully explained before its initiation.

The assessment of anxiety symptoms is critical in diagnosis and therapy. BAI was utilized in the present research. It is designed to assess anxiety and includes 21 statements with four options for each statement; the value for each statement ranges from 0 to 3, and the total value of the inventory ranges from 0 to 63. Each phrase represents one of the symptoms of anxiety that people who are clinically anxious or in an anxiety-provoking situation commonly experience. The reliability and validity of the inventory in the current study were 0.89 and 0.82, respectively.

Participants in the BT intervention group received training outlined in table 1.

Table 1. The topic of sessions based on behavioral therapy (BT)

Session	Session's topic
1	Explaining the importance of creating physical relaxation in controlling disease symptoms
2	Identifying early signs of anxiety
3	Progressive relaxation training
4	Training to tense and relax the rest of the body
5	Teaching relaxation without tension
6	Relaxation training through symptom control
7	Repeating the previous session and assessing the patient's relaxation level
8	Differentiation relaxation pattern training
9	Repetitions of the previous session's exercises in standing and walking behaviors
10	Fast relaxation training
11	Specific practical relaxation training
12	Investigating the impacts of tension in the body and attempting to combine it with relaxation

This training consisted of twelve 45-minute sessions (one session each week). It should be noted that the pre-test and post-test stages were implemented before and after the educational intervention, respectively.

For the cognitive-behavioral intervention group, in addition to the behavioral educational interventions listed in table 1, cognitive educational interventions were also presented according to table 2, which includes twelve 45-minute sessions. The participants of the cognitive behavioral intervention group received the necessary training according to the protocol of Cully and Teten (2008). The participants of this group had two sessions every week: a behavioral session and a cognitive session.

In order to examine the impact of the interventions, the post-test phase was conducted immediately following the final session of each therapy type. The Kolmogorov-Smirnov test was used to determine whether the data were normally distributed, and the independent t-test and chi-square test were used to determine whether the results of demographic variables were statistically significant. SPSS software (version 21, IBM Corporation, Armonk, NY, USA) was utilized to perform the analysis of covariance (ANCOVA) on the data obtained from the pre-test and post-test regarding the state of anxiety of the two test groups and to compare the results to those of the control group. Notably, Tukey's post hoc test was utilized to determine the significance of the results between different groups. It was determined that the statistical significance of the results was equal to 0.05.

Results

In table 3, demographic characteristics are listed.

Table 2. The topic of sessions based on cognitive therapy

Session	Session's topic
1	Introducing the fundamental components of anxiety
2	Introducing anxiety theories and the role of beliefs in its development
3	Identifying the patient's negative central beliefs
4	Challenging the patient's negative cognitions
5	Emphasizing the patient's participation and breaking the mutual influence of attitudes
6	Teaching ways to challenge the opposing styles of the patient's spontaneous thinking
7	Investigating cognitive errors
8	The impact of the cognitive triangle on social interactions
9	Recording the changes made
10	Overall evaluation of the patient's progress
11	Rehearsal and practice sessions
12	Review and practice session evaluation

Table 3. Demographic variables of the participants

Variable	Range	Intervention group [n (%)]	Intervention (cognitive behavioral)	Control group [n (%)]	P-value
Gender	Men	29 (58)	34 (68)	32 (64)	0.53
	Women	21 (42)	16 (32)	18 (36)	
Age (year)	< 50	14 (28)	19 (38)	17 (34)	0.11
	> 50	36 (72)	31 (62)	33 (66)	
Marital status	Single	7 (14)	11 (22)	10 (20)	0.76
	Married	43 (86)	39 (78)	40 (80)	
Education	Illiterate	3 (6)	6 (12)	4 (8)	0.21
	Secondary	30 (60)	30 (60)	31 (62)	
	College	17 (34)	14 (28)	15 (30)	
Job	Employed	29 (58)	36 (72)	31 (62)	0.37
	Unemployed	21 (42)	14 (28)	19 (38)	
Living place	Urban	38 (76)	31 (62)	36 (72)	0.23
	Village	12 (24)	19 (38)	14 (28)	
Smoking	Yes	18 (36)	23 (46)	21 (42)	0.34
	No	32 (64)	27 (54)	29 (58)	

Table 3 revealed that 100 people (66.7%) were over 50 years old. The mean age of people in behavioral intervention, cognitive behavioral intervention, and control groups was 56.49 ± 8.13, 54.67 ± 7.46, and 55.74 ± 7.62 years, respectively. In addition, 95 people (63.3%) were men, 122 people (81.3%) were married, 91 people (60.7%) had secondary education, 96 people (64%) were employed, 105 people (70%) lived in cities, and 88 people (58.7%) were nonsmokers. According to the results of the Kolmogorov-Smirnov test, the data had a normal distribution ($P = 0.67$). Regarding demographic variables, neither the chi-square nor the independent t-test revealed significant differences between the two groups ($P > 0.05$). In this respect, the research subjects were identical. Table 4 compares pre-test and post-test scores in the intervention and control groups.

Table 4 shows a statistically significant difference in mean scores of pre-test and post-test stages in both intervention groups ($P < 0.05$), indicating that the intervention was effective in behavioral and cognitive behavioral intervention groups. This mean difference, however, was not observed in the pre- and post-test scores of the control group persons who did not receive any intervention ($P > 0.05$). In other words, the difference in mean scores between the intervention and control groups was linked to the effectiveness of therapeutic interventions.

Levene's test demonstrated the homogeneity of behavioral and cognitive behavioral variances ($P > 0.05$). The Box's M test results also demonstrated the homogeneity of the variance-covariance matrix ($P > 0.05$). Table 5 displays the results of the ANCOVA to determine the effectiveness of BT and CBT on anxiety levels of patients with heart attack. According to table 5, both methods have decreased anxiety levels.

According to table 5, both methods have decreased anxiety levels. According to the findings, the study's hypotheses regarding the effectiveness of the intervention were confirmed, and the post-test anxiety scores of both intervention groups were significantly different from those of the control group ($P < 0.001$).

Table 4. Pre-test and post-test scores in the intervention and control groups

Group	Pre-test (mean ± SD)	Post-test (mean ± SD)	P-value
Intervention (behavioral)	25.17 ± 5.34	17.33 ± 4.51	< 0.001
Intervention (cognitive behavioral)	24.73 ± 5.19	13.46 ± 4.62	< 0.001
Control	25.08 ± 5.42	24.81 ± 5.28	0.430

SD: Standard deviation

Table 5. The result of the analysis of covariance (ANCOVA) related to the groups studied

Variable	Source of variation	SS	df	MS	F	P-value
Behavioral	Intervention	83.62	1	83.62	5.86	0.007
	Group	438.19	1	438.19	29.71	< 0.001
	Error	371.84	26	14.30		
Cognitive behavioral	Intervention	94.17	1	94.17	6.18	0.005
	Group	486.05	1	486.05	32.26	< 0.001
	Error	406.16	26	15.62		

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

In addition, the cognitive behavioral intervention group's mean anxiety scores were lower than those of the behavioral intervention group and was not significant (P > 0.05). Bonferroni post-hoc test was done for comparing the groups, and the findings are shown in table 6.

The results listed in table 6 showed a statistically significant difference in the post-test stage between the findings of the control group compared to the behavioral and cognitive behavioral intervention groups. Moreover, the comparison of the two groups of behavioral and cognitive behavioral intervention showed no significant difference.

Discussion

The present research aims to compare the effectiveness of BT and CBT on anxiety levels of patients with heart attack. The findings indicated that the implementation of the BT and CBT methods in each of the intervention groups reduced the anxiety levels of the group's persons. The findings of the present study are consistent with numerous other studies in this field (Clarke & Currie, 2009; Riegel et al., 2009). Therefore, psychological interventions can effectively reduce anxiety in this patient population. Moreover, among the interventions mentioned, CBT has more impact in reducing patients' anxiety.

According to studies, psychological interventions for patients with heart attack have been approved for physiological benefits and modifying health behaviors and have significantly reduced anxiety and depression and enhanced patients' life expectancy (Peltzer, Hellstern, Genske, Junger, Woopen, & Albus, 2020). Researchers believe that anxiety after a heart attack is caused primarily by psychological factors and the cardiac consequences of this disease. As a result, patients at risk can be identified and determined, and anxiety in patients following a heart attack can be avoided (Goldston & Baillie, 2008; Havranek et al., 2015). Kubzansky et al. (2006) confirm the role of negative emotional dimensions as one of the components of this relationship by examining the impact of anger, anxiety, and depression in the increase of heart disease; at the same time, they refer to anxiety as an independent factor of increased risk.

To maximize the potential efficacy of interventions, it is necessary to comprehend and alter behavior. In other words, having a theoretical understanding of behavior modification is one of the fundamental requirements for treating psychological disorders (Davis, Campbell, Hildon, Hobbs, & Michie, 2015).

Table 6. Bonferroni post-hoc test for comparing the groups

Paired comparison	Mean difference	Mean deviation	P-value
Behavioral intervention vs. control	-7.48	4.79	< 0.001
Behavioral intervention vs. cognitive behavioral intervention	3.87	2.61	0.517
Cognitive behavioral intervention vs. control	-11.35	4.92	< 0.001

In this context, BT-based intervention reveals action mechanisms (intermediaries) and moderators of change, as well as prior assumptions regarding human behavior and its effects. Behavioral antecedents and determinants of change can be identified and targeted appropriately (Michie, 2008), and component behavior change techniques can be selected (Michie & Prestwich, 2010).

Anxiety can lead to behaviors that increase the risk of heart attack, including increased smoking, alcohol consumption, high-fat foods, unhealthy lifestyles, and emotional behaviors. Implementing BT interventions decreases disease-aggravating behaviors and increases motivation to pursue treatment and cardiac rehabilitation programs. The increase in risky behaviors and the patient's decreased acceptance of treatment complicate the treatment process after a heart attack. Consequently, implementing educational interventions based on BT is crucial and highly effective for patients with heart attack (Beckie, 2006).

Although secondary prevention can be effective in improving psychological factors, regarding this impact, the difference between women and men regarding the incidence of stress and anxiety, social support, social isolation, etc., should also be considered. The researchers demonstrated that anxiety increased risk of disease relapse or death and that psychological interventions had a direct, significant impact on reducing anxiety levels (Hemingway & Marmot, 1999; Yohannes, Willgoss, Baldwin, & Connolly, 2010). Additionally, psychological interventions can indirectly alter patients' lifestyles and mortality rates. Several studies suggest that behavioral and cognitive-behavioral interventions can improve patients with heart attack (Foxwell, Morley, & Frizelle, 2013). Frizelle et al. (2004) found a significant increase in the quality of psychological and functional adaptation of the patients, as well as a decrease in their anxiety and depression, in a research with the implementation of a cardiac rehabilitation plan while performing cognitive-behavioral interventions in patients.

The therapeutic impacts of the patients learning to ignore some negative thoughts can prevent mood deterioration in the interventions carried out, particularly in the cognitive type. In this way, a person can be liberated from the cycles that are the root cause of anxiety recurrence and reduce purposeful behavior, the ability to deal with mental disorders, and interfere with recalling memories and the process of overcoming negative mood. The role of cognitive processes in the formation and maintenance of mental disorders and their therapy is emphasized in cognitive-behavioral methods. In these methods, the therapist pays attention to the client's current time and location and identifies the client's needs, and intervention programs are designed based on the cases mentioned. The focus of therapists' work in this approach is also on teaching self-monitoring methods and explaining the relationship between thinking, creation, and behavior. Physical diseases, particularly heart attacks, are interrelated with anxiety and depression, as well as the lack of support and negative consequences that result from it (Jefferson, 2009), because these factors are considered an impediment to disease recovery and increase the mortality rate in these patients.

Negative and debilitating emotions can be addressed in CBT by reorganizing perception and thinking, so that illogical and unwise thoughts replace rational ones. As a result, the client may realize that irrational thinking is the source and origin of emotional disorder, and he should adopt a way of thinking that makes his inner speech more efficient and unrelated to emotions and debilitating behaviors. The client is assisted in accepting feelings and inappropriate behavior and accepting responsibility for its creation and continuation, as well as accepting himself and the symptoms of the disease.

CBT instills in patients the belief that they can deal with and change negative thoughts. They learn to examine their thoughts logically and determine which are appropriate and which result in undesirable situations. The therapist asks and answers direct questions about the client's opinions, which are about the validity of the client's thoughts and beliefs in dealing with himself, others, and the world. Using the most logical methods available, the therapist insistently and forcibly repeats the processes to teach the clients the proper way to cope. In this intervention, clients confront their problems directly; they are forced to think and reeducate themselves. In this way, they control their cognitive ability and reorient their emotions and feelings.

Cognitive interventions generally highlight the practical and unknown role of shared beliefs that people internalize. They demonstrate that the persistence of emotional disorders is caused by people's perception of external events, which is integrated into mental expressions rather than the external conditions themselves. On the other hand, people can recognize, change, and adopt new ideas they previously accepted without question.

As one of the limitations of the current research, it can only be conducted in the cultural context of one city's patients; however, by conducting similar research in other cities and countries with varying cultural levels, we can observe varying anxiety levels in patients with heart attack. Additionally, the need for follow-up is another limitation of this research. In order to conduct future studies, it is recommended to conduct a follow-up stage employing other psychological interventions. In addition, it is suggested that other variables, such as stress, depression, and life expectancy be investigated.

Conclusion

The findings of the current study demonstrated the importance of timely diagnosis of psychological complications in patients with heart attack to maintain and improve their mental health. Considering the influence of behavioral and cognitive-behavioral interventions in reducing the anxiety level of patients with heart attack, as well as the fact that behavioral and psychological approaches are simple to learn from an educational standpoint, enjoy acceptable social acceptance, and have a short therapy duration, it is preferable for the therapy staff, including physicians and nurses, to pay closer attention to their use during therapies..

Conflict of Interests

Authors have no conflict of interests.

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