

The Effectiveness of Positive Thinking–Based Therapy Training on Cognitive Emotion Regulation (Positive and Negative), Resilience, and Anxiety in Cardiovascular Patients

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Article type:
Original Research

Article history:
Received 13 August 2025
Revised 19 November 2025
Accepted 23 November 2025
Published online 01 December 2025

ABSTRACT

The present study aimed to investigate the effectiveness of positive thinking–based therapy training on positive and negative cognitive emotion regulation, resilience, and anxiety in cardiovascular patients. This study employed a quasi-experimental method with a pretest–posttest design including experimental and control groups. The statistical population consisted of all cardiovascular patients hospitalized at Imam Reza Hospital. Using an available sampling method, 15 patients were selected as the experimental group and 15 patients were assigned to the control group. In selecting the research sample, an attempt was made to recruit patients who were in relatively stable conditions and in the process of discharge. Subsequently, the experimental group in the third cardiac ward received positive thinking skills training. The instruments used in the present study included the Cognitive Emotion Regulation Questionnaire developed by Garnefski and colleagues (2001), the Resilience Scale developed by Connor and Davidson (2003), and the Beck Anxiety Inventory (1990). Each group was assessed twice. The first assessment was conducted through a pretest, and the second assessment was conducted through a posttest. The experimental group was exposed to the independent variable (positive thinking skills training) in ten 1-hour sessions, whereas the control group received no intervention. The data were analyzed using analysis of covariance (ANCOVA). The results of the covariance analysis regarding the effect of positive thinking–based therapy training on cognitive emotion regulation, resilience, and anxiety in cardiovascular patients showed that, after controlling for the pretest effect, the difference between the two groups at the posttest stage was statistically significant. The findings of the present study indicate that positive thinking skills training is effective in improving cognitive emotion regulation and resilience and reducing anxiety in cardiovascular patients.

Keywords: positive thinking, cognitive emotion regulation, resilience, anxiety, cardiovascular disease

How to cite this article:

Abshary, A., Nourani, M., Masoumi, Sh., Alizadeh, M., Ghorbani, S., & Pourmohammad Ghouchani, K. (2025). The Effectiveness of Positive Thinking–Based Therapy Training on Cognitive Emotion Regulation (Positive and Negative), Resilience, and Anxiety in Cardiovascular Patients. *Mental Health and Lifestyle Journal*, 3(4), 1-13. <https://doi.org/10.61838/mhlj.250>

Introduction

Cardiovascular diseases are among the leading causes of mortality and disability worldwide and are increasingly recognized as multidimensional disorders influenced by biological, psychological, and social

factors. In recent decades, considerable attention has been directed toward the psychological dimensions of cardiovascular disease, particularly the roles of anxiety, emotion regulation, and resilience in the onset, progression, and management of cardiac conditions. Contemporary evidence suggests that psychological distress not only exacerbates cardiovascular symptoms but also negatively affects treatment adherence, self-care behaviors, quality of life, and recovery outcomes (1, 2). Patients with cardiovascular disorders frequently experience persistent worry, fear of disease recurrence, uncertainty about prognosis, and heightened physiological arousal, all of which contribute to elevated anxiety levels and emotional dysregulation (3, 4). Therefore, psychological interventions capable of improving emotional functioning and adaptive coping may play a substantial role in enhancing both psychological and physical health among cardiovascular patients.

Anxiety is one of the most prevalent psychological problems among individuals with cardiovascular disease. The chronic and life-threatening nature of cardiac disorders often leads patients to perceive their condition as uncontrollable and unpredictable, thereby increasing vulnerability to anxiety symptoms. Research has shown that anxiety may intensify cardiovascular complications through physiological mechanisms such as autonomic nervous system activation, increased heart rate, elevated blood pressure, and inflammatory responses (1, 4). Furthermore, anxious individuals often demonstrate maladaptive cognitive patterns, including catastrophic thinking, repetitive negative thoughts, and heightened sensitivity to bodily sensations, which may further worsen psychological distress and health outcomes (5). Studies conducted during recent health crises have also demonstrated that anxiety is strongly associated with maladaptive emotion regulation strategies and reduced distress tolerance (6, 7). In cardiovascular populations, elevated anxiety has been linked to poorer emotional adjustment, reduced treatment compliance, and lower psychological well-being (2).

Emotion regulation has emerged as a fundamental construct in understanding psychological adaptation to chronic illness. Emotion regulation refers to the processes through which individuals monitor, evaluate, and modify emotional experiences and emotional expressions in order to achieve adaptive functioning (8). Cognitive emotion regulation specifically involves the cognitive strategies individuals use in response to stressful or threatening experiences. These strategies may be adaptive, such as positive reappraisal and acceptance, or maladaptive, such as rumination, self-blame, and catastrophizing (9). According to Gross's process model of emotion regulation, the ability to regulate emotions effectively contributes significantly to psychological resilience and mental health (8). Conversely, emotional dysregulation is associated with increased vulnerability to anxiety, depression, stress, and psychosomatic disorders.

In cardiovascular patients, difficulties in cognitive emotion regulation are particularly significant because these individuals often encounter chronic stressors related to illness management, fear of mortality, physical limitations, and lifestyle changes. Emotional dysregulation may intensify physiological stress responses and contribute to negative psychological outcomes (2). Recent evidence indicates that cardiovascular patients with obesity and emotional problems often exhibit maladaptive emotion regulation patterns and reduced ego strength (10). Moreover, repetitive negative thinking and cognitive avoidance have been identified as mechanisms that sustain anxiety and emotional distress over time (5). Thus, interventions targeting cognitive emotion regulation may provide substantial therapeutic benefits for cardiovascular patients by reducing maladaptive emotional responses and promoting adaptive coping strategies.

Resilience is another important psychological factor associated with adaptation to chronic disease. Resilience refers to an individual's capacity to recover, adapt, and maintain psychological functioning in the face of adversity, stress, or traumatic experiences. Individuals with high resilience are generally better able to manage emotional distress, maintain hope, and engage in effective problem-solving strategies (11). In patients with chronic medical conditions, resilience has been associated with greater treatment adherence, improved quality of life, lower psychological distress, and enhanced emotional adjustment (3). Studies have also demonstrated a significant inverse relationship between resilience and anxiety, suggesting that resilient individuals experience lower levels of psychological vulnerability under stressful conditions (12). Consequently, strengthening resilience may serve as a protective factor against the negative emotional consequences of cardiovascular disease.

Positive psychology has increasingly gained attention as an effective framework for promoting psychological well-being and adaptive functioning. Positive psychology emphasizes human strengths, optimism, positive emotions, meaning in life, and psychological flourishing rather than focusing exclusively on pathology and dysfunction (13). According to Seligman and Csikszentmihalyi, fostering positive emotions and optimistic thinking can enhance coping abilities, improve emotional adjustment, and promote resilience in stressful situations (13). Positive thinking interventions aim to modify maladaptive cognitive patterns, encourage constructive interpretations of stressful experiences, and cultivate adaptive emotional responses. Such interventions may be particularly valuable for individuals with chronic illnesses who often struggle with hopelessness, fear, and emotional exhaustion.

Theoretical and empirical evidence suggests that positive thinking may significantly influence cognitive emotion regulation processes. Positive cognitive styles encourage individuals to reinterpret stressful situations more adaptively, thereby reducing negative affect and promoting psychological flexibility (14). Cognitive reappraisal, which involves reframing adverse experiences in a more positive or meaningful manner, has been shown to buffer the effects of stress on depressive symptoms and psychological distress (14). Furthermore, individuals who engage in positive cognitive strategies demonstrate greater emotional stability, lower anxiety, and improved resilience (15). Positive thinking interventions may therefore facilitate healthier emotion regulation patterns by reducing maladaptive strategies such as rumination and catastrophizing while enhancing adaptive processes such as acceptance and positive reappraisal.

Several studies have supported the effectiveness of positive psychology and related interventions in improving emotional functioning and mental health. Positive thinking training has been shown to enhance mental health, social functioning, and emotional well-being among university students and pre-service teachers (16). Similarly, cognitive-behavioral interventions targeting emotion regulation strategies have demonstrated effectiveness in improving coping responses and reducing psychological distress (17). Positive psychotherapy has also been found to reduce alexithymia and recurrent negative thoughts among cardiovascular patients (18). These findings suggest that interventions grounded in positive psychology may effectively address emotional and cognitive vulnerabilities associated with chronic illness.

Recent investigations have further emphasized the role of positive and mindfulness-based interventions in improving emotion regulation capacities. Comparative studies indicate that positive psychology training and mindfulness interventions significantly improve cognitive reappraisal and emotional suppression among individuals with symptoms of generalized anxiety disorder (15). Likewise, positive mindfulness

therapy has demonstrated effectiveness in enhancing emotional capital, self-compassion, self-efficacy, and cognitive emotion regulation (19). These findings underscore the importance of interventions that promote adaptive emotional processing and positive cognitive functioning in reducing psychological distress.

Emotion-focused and transdiagnostic therapeutic approaches have also highlighted the significance of emotion regulation in psychological treatment. The unified protocol for emotional disorders proposed by Barlow and colleagues conceptualizes maladaptive emotional responses as central mechanisms underlying anxiety and related disorders (20). According to this perspective, improving emotional awareness, acceptance, and regulation skills can reduce psychological symptoms across a range of emotional disorders. Similarly, emotion-focused therapeutic approaches have been associated with improvements in cognitive emotion regulation and ego strength among cardiovascular patients (10). Such evidence indicates that targeting emotional processes directly may be particularly beneficial in populations experiencing chronic medical stressors.

Optimism and positive thinking may also strengthen resilience by fostering hope, confidence, and adaptive coping. Seligman's theory of learned optimism proposes that optimistic explanatory styles contribute to psychological resilience and protect individuals from helplessness and emotional distress (21). Individuals with optimistic thinking patterns are more likely to interpret challenges as temporary and manageable rather than permanent and overwhelming. This perspective is especially important in chronic illnesses such as cardiovascular disease, where patients often face ongoing medical uncertainty and lifestyle limitations. Strengthening optimistic thinking may therefore increase resilience and psychological endurance in the face of illness-related adversity.

Despite the growing body of literature on positive psychology and emotion regulation, relatively limited research has specifically examined the effectiveness of positive thinking skills training on cognitive emotion regulation, resilience, and anxiety among cardiovascular patients. Most previous studies have focused on general psychological populations, anxiety disorders, or educational settings rather than medically vulnerable individuals with chronic cardiovascular conditions (15, 16). Moreover, while positive psychotherapy has demonstrated promising outcomes for reducing negative thoughts in cardiovascular patients, further research is needed to evaluate its impact on broader emotional regulation capacities and resilience (18). Given the substantial psychological burden associated with cardiovascular disease and the importance of adaptive emotional functioning for disease management, investigating effective psychological interventions in this population remains highly important.

Considering the significant relationships among anxiety, cognitive emotion regulation, resilience, and cardiovascular health, as well as the increasing emphasis on positive psychology-based interventions, the present study aimed to investigate the effectiveness of positive thinking-based therapy training on cognitive emotion regulation, resilience, and anxiety among cardiovascular patients.

Methods and Materials

Study Design and Participants

The present study employed a quasi-experimental design using a pretest–posttest structure with experimental and control groups. In this design, both groups were assessed at two stages. The first assessment was conducted before the intervention as a pretest, and the second assessment was conducted

after the intervention as a posttest. The experimental group was exposed to the independent variable, namely positive thinking skills training, whereas the control group did not receive any intervention. The statistical population of the study consisted of all cardiovascular patients admitted to the second and third cardiac wards of Imam Reza Hospital. Using an available convenience sampling method, 30 patients were selected and assigned into two groups, including 15 participants in the experimental group and 15 participants in the control group. In selecting the participants, efforts were made to recruit patients who were in relatively stable physical conditions, were close to discharge, or had undergone open-heart surgery several days earlier. After selection, participants were randomly allocated to either the experimental or control group using a random numbers table. Participants were asked to choose a random number; odd numbers assigned participants to the control group, whereas even numbers assigned them to the intervention group. The positive thinking skills training was administered to the experimental group in person and in a group format in the third cardiac ward.

Data Collection

Cognitive emotion regulation was assessed using the Cognitive Emotion Regulation Questionnaire (CERQ) developed by Garnefski and colleagues in 2001. The CERQ is a multidimensional self-report instrument designed for both adults and children and consists of 36 items distributed across nine subscales, with each subscale representing a distinct cognitive emotion regulation strategy assessed through four items. The nine strategies include self-blame, acceptance, rumination, positive refocusing, refocus on planning, positive reappraisal, putting into perspective, catastrophizing, and blaming others. Participants were asked to indicate their reactions to threatening experiences and stressful life events they had recently experienced during the course of chronic illness. Responses were scored on a five-point Likert scale ranging from “never” to “always.” Garnefski and colleagues reported satisfactory validity and reliability for the instrument, with Cronbach’s alpha coefficients ranging from 0.71 to 0.81. The Persian version of the questionnaire was validated by Samani and Jokar. Convergent and divergent validity of the questionnaire in Iran was also confirmed using the Depression, Anxiety, and Stress Scale.

Resilience was measured using the Connor–Davidson Resilience Scale (CD-RISC) developed by Connor and Davidson in 2003. The questionnaire was developed based on a review of resilience research conducted between 1979 and 1991. The CD-RISC consists of 25 items scored on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Higher scores on the scale indicate greater levels of resilience. The psychometric properties of the scale, including construct validity, convergent and divergent validity, test–retest reliability, and internal consistency, have been confirmed across different populations. Previous Iranian studies have also supported the validity and reliability of the Persian version of the instrument. Cronbach’s alpha coefficients for the scale have been reported as 0.89 and 0.93 in different studies, indicating excellent internal consistency. In addition, factor analysis results have demonstrated acceptable construct validity for the scale.

Anxiety levels were assessed using the Beck Anxiety Inventory (BAI) developed by Beck in 1990. This instrument was designed to measure the severity of clinical anxiety symptoms and consists of 21 items corresponding to common symptoms of anxiety. The questionnaire uses a four-point Likert scale with response options ranging from 0 (not at all) to 3 (severely). Therefore, the total anxiety score ranges from 0

to 63, with higher scores indicating greater anxiety severity. The inventory primarily emphasizes the physiological manifestations of anxiety. Previous studies have demonstrated strong psychometric properties for the BAI. Internal consistency coefficients have been reported at 0.93, and test–retest reliability coefficients have ranged from 0.75 to 0.92. Studies conducted in Iran have also confirmed the high validity and reliability of the Persian version of the questionnaire, with Cronbach’s alpha coefficients reported at approximately 0.92.

Intervention

The intervention consisted of positive thinking skills training delivered to the experimental group over 10 one-hour sessions conducted consecutively across five weeks, with two sessions held per week in a group-based and face-to-face format. The educational content was adapted from the books *Positive Thinking and Applied Optimism* by Susan Quilliam and *The Optimistic Child* by Martin Seligman and colleagues. The first session included participant introduction, explanation of group rules, and an overview of thinking processes. The second session focused on the main concepts of positive thinking, identification of signs and indicators of optimism, and analysis of individual perspectives. The third session addressed coping with negative thoughts and anxiety as well as modifying mental imagery. The fourth session emphasized the use of constructive language, reconsideration of beliefs, and maintenance of positive behaviors. The fifth session focused on self-love, self-respect, and avoiding internal negative dialogues. The sixth session aimed to promote optimism, happiness, self-confidence, and goal setting. The seventh session addressed emotional regulation skills, including reducing guilt, anger management, coping with anxiety, avoiding jealousy, and assertiveness. The eighth session focused on essential assertiveness skills, saying no, and managing life events. The ninth session emphasized creating a positive environment, maintaining health and its influence on optimism, and establishing healthy interpersonal relationships. Finally, the tenth session addressed coping with daily life problems and managing life events during illness.

Data Analysis

Data analysis was conducted using IBM SPSS Statistics based on the pretest and posttest scores of both groups on the variables of cognitive emotion regulation, resilience, and anxiety. Descriptive statistics were first calculated for the study variables. Subsequently, analysis of covariance (ANCOVA) was employed to examine the effectiveness of positive thinking skills training while controlling for pretest scores. The significance level for statistical analyses was considered at $p < .05$.

Findings and Results

Table 1 presents the descriptive statistics, including means, standard deviations, minimum scores, maximum scores, and sample sizes for negative emotion regulation, positive emotion regulation, anxiety, and resilience in the experimental and control groups at the pretest and posttest stages.

Table 1. Descriptive Statistics for Negative Emotion Regulation, Positive Emotion Regulation, Anxiety, and Resilience

Variable	Stage	Group	Mean	SD	Minimum	Maximum	n
Negative Emotion Regulation	Pretest	Control	48.06	13.13	31	67	15
		Experimental	47.40	13.60	28	67	15
	Posttest	Control	47.66	13.53	28	67	15
		Experimental	35.66	9.66	24	52	15
Positive Emotion Regulation	Pretest	Control	45.26	14.25	23	65	15
		Experimental	45.26	14.99	23	65	15
	Posttest	Control	45.60	15.22	23	65	15
		Experimental	52.93	16.42	28	75	15
Anxiety	Pretest	Control	36.46	5.75	27	45	15
		Experimental	35.46	5.48	26	44	15
	Posttest	Control	34.46	5.66	25	42	15
		Experimental	21.00	5.02	14	31	15
Resilience	Pretest	Control	48.40	11.17	33	67	15
		Experimental	46.53	11.03	32	65	15
	Posttest	Control	50.53	11.18	35	69	15
		Experimental	67.60	11.93	52	89	15

The descriptive findings indicated that the mean score of negative emotion regulation in the control group changed slightly from 48.06 at pretest to 47.66 at posttest, whereas in the experimental group it decreased from 47.40 to 35.66 following the intervention. Regarding positive emotion regulation, the control group demonstrated relatively stable scores from pretest ($M = 45.26$) to posttest ($M = 45.60$), whereas the experimental group showed an increase from 45.26 to 52.93. In relation to anxiety, the mean score of the control group decreased marginally from 36.46 to 34.46, while the experimental group demonstrated a substantial reduction from 35.46 to 21.00. Furthermore, resilience scores in the control group increased slightly from 48.40 to 50.53, whereas the experimental group showed a marked increase from 46.53 to 67.60 at posttest. Overall, these descriptive findings suggest that positive thinking–based therapy training was associated with reduced negative emotion regulation and anxiety, alongside increased positive emotion regulation and resilience among cardiovascular patients.

Before conducting the main analyses, the assumptions underlying analysis of covariance were examined. The results of the Kolmogorov–Smirnov test demonstrated that all variables had a normal distribution, as the significance levels for all dependent variables in both groups at the pretest and posttest stages were greater than .05. In addition, skewness and kurtosis values for all variables ranged between -2 and +2, indicating acceptable normality. The results of Levene’s test showed that the assumption of homogeneity of variances was met for negative emotion regulation ($F = 0.674, p = .419$), positive emotion regulation ($F = 0.823, p = .372$), anxiety ($F = 3.418, p = .075$), and resilience ($F = 1.789, p = .192$). Moreover, Box’s M test was not statistically significant (Box’s $M = 6.354, F = 0.536, p = .866$), indicating equality of covariance matrices across groups. The interaction between group membership and pretest scores was also non-significant for all dependent variables, confirming the homogeneity of regression slopes assumption. Finally, Bartlett’s test of sphericity was statistically significant ($\chi^2 = 27.728, df = 9, p = .001$), indicating sufficient correlations among the dependent variables and supporting the appropriateness of covariance analysis.

Table 2. Results of Analysis of Covariance for Negative Emotion Regulation, Positive Emotion Regulation, Anxiety, and Resilience

Dependent Variable	Source	SS	df	MS	F	p	η^2
Negative Emotion Regulation	Group	1018.43	1	1018.43	18.74	.001	.41
Positive Emotion Regulation	Group	812.17	1	812.17	12.58	.002	.32
Anxiety	Group	1326.54	1	1326.54	29.46	.001	.52
Resilience	Group	1894.72	1	1894.72	34.81	.001	.56

The results of the analysis of covariance presented in Table 2 demonstrated that, after controlling for pretest scores, there were statistically significant differences between the experimental and control groups in all dependent variables at the posttest stage. Positive thinking–based therapy training significantly reduced negative emotion regulation scores among cardiovascular patients ($F = 18.74$, $p = .001$, $\eta^2 = .41$). In addition, the intervention significantly increased positive emotion regulation scores ($F = 12.58$, $p = .002$, $\eta^2 = .32$). The findings also revealed a significant reduction in anxiety levels in the experimental group compared with the control group ($F = 29.46$, $p = .001$, $\eta^2 = .52$). Furthermore, resilience scores increased significantly following the intervention ($F = 34.81$, $p = .001$, $\eta^2 = .56$). The obtained effect sizes indicated that the intervention had moderate to large effects on the dependent variables. Therefore, the findings support the effectiveness of positive thinking–based therapy training in improving cognitive emotion regulation and resilience and reducing anxiety among cardiovascular patients.

Discussion and Conclusion

The present study aimed to investigate the effectiveness of positive thinking–based therapy training on cognitive emotion regulation, resilience, and anxiety among cardiovascular patients. The findings demonstrated that positive thinking training significantly reduced negative emotion regulation strategies and anxiety while simultaneously increasing positive emotion regulation strategies and resilience in the experimental group compared with the control group. These findings suggest that interventions grounded in positive psychology can significantly improve emotional adjustment and psychological functioning in individuals suffering from cardiovascular disease. The results highlight the important role of cognitive and emotional factors in the management of chronic cardiac conditions and provide further evidence regarding the effectiveness of psychological interventions in improving mental health outcomes among cardiovascular patients.

One of the primary findings of the study was that positive thinking–based therapy significantly improved cognitive emotion regulation among cardiovascular patients. Specifically, the intervention reduced maladaptive cognitive emotion regulation strategies and enhanced adaptive emotional processing. This finding is consistent with theoretical perspectives emphasizing the central role of cognitive appraisal and emotional processing in psychological adjustment (8). According to Gross's emotion regulation framework, individuals who are able to reinterpret stressful events in a constructive and adaptive manner are less likely to experience prolonged emotional distress. Positive thinking interventions appear to facilitate this process by helping individuals replace dysfunctional thought patterns with more constructive interpretations of stressful experiences.

The findings of the present study are consistent with previous research demonstrating the effectiveness of positive and cognitive-based interventions on emotion regulation. For example, cognitive-behavioral

interventions have been shown to improve coping responses and cognitive emotion regulation strategies among individuals experiencing psychological distress (17). Similarly, emotion-focused therapeutic approaches have been associated with significant improvements in cognitive emotion regulation among cardiovascular patients with obesity (10). The current findings also align with the results reported by Nasiri Karbasdehi and colleagues, who found that positive psychology training significantly enhanced cognitive reappraisal and reduced emotional suppression among individuals with symptoms of generalized anxiety disorder (15). These findings collectively suggest that positive thinking interventions may alter maladaptive cognitive schemas and promote healthier emotional processing patterns.

A possible explanation for the observed improvement in emotion regulation is that positive thinking training encourages individuals to adopt more optimistic interpretations of stressful situations. Cardiovascular patients frequently experience uncertainty, fear of disease progression, and concerns regarding physical limitations. Such experiences often contribute to maladaptive cognitive strategies such as catastrophizing, rumination, and self-blame. Positive thinking interventions may help individuals challenge these dysfunctional thought patterns and replace them with adaptive strategies such as positive reappraisal, acceptance, and future-oriented thinking. Troy and colleagues argued that cognitive reappraisal acts as a protective factor against emotional distress by allowing individuals to perceive stressful experiences in a less threatening manner (14). Therefore, the present intervention may have enhanced patients' capacity for adaptive cognitive reappraisal, thereby reducing emotional vulnerability.

Another important finding of the study was the significant reduction in anxiety among cardiovascular patients who received positive thinking training. This finding is highly important because anxiety is among the most prevalent psychological difficulties experienced by individuals with cardiovascular disease. Anxiety in cardiac patients is often associated with fear of death, uncertainty regarding prognosis, recurrent hospitalization, and concerns about physical functioning. Previous studies have demonstrated that anxiety can worsen cardiovascular symptoms through physiological mechanisms such as autonomic activation, elevated blood pressure, and increased inflammatory responses (1, 4). Therefore, reducing anxiety may not only improve psychological well-being but also contribute to better physical health outcomes.

The reduction in anxiety observed in the present study is consistent with prior literature emphasizing the beneficial effects of positive psychological interventions on emotional distress. Positive psychotherapy has previously been shown to reduce recurrent negative thoughts and emotional difficulties among cardiovascular patients (18). Furthermore, studies conducted during periods of heightened public stress have shown that maladaptive cognitive emotion regulation strategies are strongly associated with anxiety symptoms (6, 7). Positive thinking interventions may therefore reduce anxiety by weakening maladaptive cognitive processes such as rumination, catastrophic thinking, and excessive worry.

The findings are also consistent with the transdiagnostic perspective proposed by Barlow and colleagues, which conceptualizes emotional dysregulation as a core mechanism underlying anxiety disorders (20). From this perspective, interventions that improve emotional awareness, cognitive flexibility, and adaptive coping skills can reduce anxiety symptoms across a broad range of psychological conditions. Positive thinking training may have helped participants reinterpret illness-related stressors in a more manageable and less threatening manner. As a result, patients may have experienced greater emotional control and reduced physiological arousal associated with anxiety.

The improvement in resilience among cardiovascular patients following positive thinking training represents another significant finding of the study. Resilience is widely recognized as a protective psychological factor that enables individuals to adapt successfully to stressful and adverse conditions. Chronic cardiovascular disease imposes substantial psychological burdens on patients, including physical limitations, dependency concerns, and uncertainty regarding future health. Consequently, resilience plays a crucial role in maintaining psychological adjustment and treatment adherence among these individuals (3). The current findings suggest that positive thinking training may strengthen resilience by promoting optimism, self-confidence, hope, and adaptive coping strategies.

The present results are consistent with studies demonstrating a significant relationship between resilience and lower psychological distress. Seyedolshohadaei and colleagues reported an inverse relationship between resilience and anxiety, suggesting that resilient individuals are less vulnerable to emotional disturbances under stressful conditions (12). Similarly, Anticich and colleagues found that interventions promoting resilience contributed to improved psychological adjustment and anxiety prevention (22). Positive thinking interventions may therefore strengthen resilience by increasing individuals' perceived ability to cope effectively with illness-related challenges.

The theoretical foundations of positive psychology also provide a n explanation for the observed increase in resilience. According to Seligman and Csikszentmihalyi, positive emotions broaden cognitive and behavioral repertoires, thereby enhancing individuals' psychological resources and adaptive capacities (13). Positive thinking training encourages individuals to focus on strengths, opportunities, and sources of meaning rather than exclusively attending to limitations and threats. This shift in cognitive orientation may increase hopefulness and emotional endurance in the face of chronic illness. Furthermore, Seligman's theory of learned optimism suggests that optimistic explanatory styles reduce helplessness and increase perseverance during adversity (21). Thus, cardiovascular patients who developed more optimistic thinking patterns may have become psychologically more resilient when confronted with illness-related stressors.

The findings of the present study also support the biopsychosocial model of cardiovascular health. According to this perspective, cardiovascular functioning is influenced not only by biological variables but also by psychological and social processes (2). Emotional dysregulation, chronic stress, and anxiety may contribute to physiological dysregulation, whereas adaptive emotional functioning and resilience may facilitate healthier behavioral and physiological responses. Therefore, interventions designed to improve emotional regulation and positive thinking may indirectly contribute to improved cardiovascular functioning and quality of life.

Another explanation for the effectiveness of positive thinking training may involve its influence on repetitive negative thinking processes. McEvoy and colleagues identified repetitive negative thinking and cognitive avoidance as important mechanisms underlying emotional distress and anxiety (5). Cardiovascular patients often engage in persistent worry about health status, future complications, and mortality. Positive thinking training may interrupt these maladaptive cognitive cycles by encouraging constructive self-talk, adaptive problem-solving, and optimistic future expectations. As a result, patients may experience reduced emotional exhaustion and greater psychological stability.

The findings of the present study further align with evidence suggesting that positive psychological functioning contributes to better mental health outcomes. Research has demonstrated significant

relationships between psychological well-being, resilience, hope, and emotional adjustment among cardiovascular patients (3). Moreover, positive thinking interventions have been associated with improvements in mental health and emotional functioning in different populations (16). Collectively, these findings suggest that interventions emphasizing positivity, optimism, and adaptive cognitive functioning may be particularly beneficial for individuals experiencing chronic medical conditions.

Although the findings of the present study provide important evidence regarding the effectiveness of positive thinking training among cardiovascular patients, several limitations should be acknowledged. First, the sample size of the study was relatively small, which may limit the generalizability of the findings to broader cardiovascular populations. Second, participants were selected using convenience sampling from a single hospital setting, and therefore the results may not fully represent patients from different socioeconomic or cultural backgrounds. Third, the study relied on self-report questionnaires, which may be influenced by response biases and subjective perceptions. Additionally, the absence of long-term follow-up assessments limits conclusions regarding the durability and stability of the intervention effects over time.

Future studies are recommended to replicate the present research using larger and more diverse samples drawn from multiple clinical centers. Longitudinal follow-up assessments should also be conducted to determine whether the beneficial effects of positive thinking training remain stable over extended periods. Future researchers may additionally compare positive thinking interventions with other psychological approaches such as mindfulness-based therapies, acceptance and commitment therapy, or compassion-focused interventions. Investigating mediating variables such as optimism, self-efficacy, social support, and illness perception may also contribute to a deeper understanding of the mechanisms underlying treatment effectiveness in cardiovascular populations.

From a practical perspective, the findings of the present study suggest that positive thinking-based interventions may serve as valuable complementary treatments in cardiovascular care settings. Mental health professionals, psychologists, nurses, and rehabilitation specialists may integrate positive thinking skills training into psychological rehabilitation programs for cardiovascular patients. Such interventions may help patients improve emotional adjustment, reduce anxiety, and strengthen resilience during illness management and recovery. Furthermore, implementing psychoeducational workshops and group-based psychological support programs within cardiac rehabilitation centers may enhance patients' overall psychological well-being and quality of life.

Acknowledgments

The authors express their deep gratitude to all participants who contributed to this study.

Authors' Contributions

All authors equally contributed to this study.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

Funding

This research was carried out independently with personal funding and without the financial support of any governmental or private institution or organization.

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