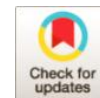




The effectiveness of group schema therapy on health anxiety and treatment adherence in coronary heart disease patients

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ABSTRACT

This study aimed to determine the effectiveness of group schema therapy on health anxiety and treatment adherence in coronary heart disease patients. This study was a quasi-experimental design with pre-test, post-test, and two experimental and control groups. The statistical population included all patients with coronary heart disease referred to hospitals in Mashhad. The research sample was 30 people using the available sampling method, including attrition, who were randomly assigned to the experimental and control groups (15 people in each group). In order to measure the research variables, the health anxiety questionnaires of Warwick & Salkovski (2002) and treatment adherence questionnaires of Morisky et al. (2008) were administered to the sample group members. The experimental group members underwent Young's (2003) group schema therapy for 8 sessions of 90 minutes, and the control group did not receive any training. The data were analyzed using the multivariate analysis of covariance test using SPSS-27 software. The findings showed that the pre-test probability value for the variables of health anxiety and treatment adherence compared to the post-test values of those variables was less than 0.05, indicating their significant effect at the five percent error level ($P < 0.005$). The results showed that group schema therapy is effective for health anxiety and treatment adherence in coronary heart disease patients, so it is suggested that the group schema therapy program be considered as an effective treatment in coronary heart disease patients.

Keywords: Group schema therapy, health anxiety, treatment adherence, coronary heart disease patients.

Introduction

Cardiovascular diseases are among the most significant causes of mortality worldwide, with coronary heart disease (CHD), as one of its most common types, imposing a heavy burden on public health and healthcare systems [1]. These diseases constitute a health problem in both developing and developed countries and are considered primary causes of death globally, including in Iran [2]. Cardiovascular diseases are the leading cause of death and disability worldwide. Research indicates that psychological factors play a fundamental role in the persistence of heart diseases [3]. Studies suggest these diseases are increasing globally, occurring more

frequently in developing countries [4]. Cardiovascular rehabilitation guidelines in various societies consistently emphasize the importance of preventing the onset of this disease over treatment; however, the expansion of physical health through the rehabilitation process is only effective when individuals' psychological conditions are considered, leading to the empowerment of these patients for self-care [5].

One of the primary concerns in health psychology is patient adherence to treatment recommendations. Treatment adherence refers to the degree of success a patient has in implementing therapeutic and preventive recommendations provided by health professionals. It also indicates situations where an individual forgets, ignores, or lacks a proper understanding of the



physician's recommended plan and consequently fails to follow it correctly [6]. In 1976, Sackett and Haynes published a standard and important document. Today, treatment adherence remains a significant issue in chronic diseases and is also observed in heart disease. Modifying medication choices for cardiac patients within a complex regimen has been effective for most patients [7]. In the context of healthcare, treatment adherence is typically associated with an individual's ability to maintain behaviors consistent with a care plan, including complete medication consumption, timely attendance at scheduled appointments, disease follow-up, and adherence to necessary health behavior changes; otherwise, non-adherence exists. Indeed, non-adherence is a voluntary and conscious decision for the patient not to follow or to disobey the professional's instructions [8].

Numerous factors influence treatment adherence. Based on the biopsychosocial model and the integrated medical-psychology model, which are among the dominant models in health psychology, several psychological factors affecting treatment adherence can be mentioned, including the doctor-patient relationship, memory error, and health locus of control [9]. Researchers have found that heart diseases essentially have a psychosomatic nature, and the role of psychological factors, especially personality, in their emergence is clear. The reality is that these factors, directly or indirectly by affecting somatic factors, place heart disease at high risk, and instances of sudden cardiac death following emotional disturbances are always found across all cultures and histories [10]. Considering psychological, personality, and behavioral factors is very important in the onset, persistence, and severity of heart disease, to the extent that in recent decades, researchers have facilitated the integration of the two fields of cardiology and psychology to achieve more successful prevention and treatment of heart disease with the help of psychology. This new research field, named psychocardiology, continually attracts the attention of more researchers [11].

One of the personality, psychological, and behavioral factors previously mentioned for its role in heart disease and treatment adherence is early maladaptive schemas (EMS), which include memories, bodily sensations, emotions, and cognitions believed to originate from childhood and adolescence and are elaborated throughout an individual's life [12]. According to studies, schemas are influential in various areas of life, one of which is marital relationships. Young believes that schemas arise due to the unmet basic emotional needs of childhood, which are: secure attachment to others, autonomy, competence and identity, freedom to express needs and healthy emotions, spontaneity and play, and realistic limits and self-control [13]. Study results show that patients whose schemas are in the impaired limits domain lack the ability to control their

impulses, cannot delay gratification of their immediate needs for future benefits, and cannot control the expression of their emotions and impulses [14].

One dimension affecting psychological health is anxiety, such that today anxiety disorders have the highest prevalence in the classification of mental disorders. The lifetime prevalence of anxiety disorders ranges from 8% to 29% [15]. One type of anxiety disorder is health anxiety. Health anxiety is defined as a wide range of worries individuals can have about their health [16] and is often experienced by patients in primary care [17]. Health anxiety is a broad cognitive disorder formed as a misinterpretation of symptoms and bodily changes resulting from an individual's beliefs about illness and health [18]. Health anxiety is a continuum with mild worries related to bodily sensations at one end and intense fears related to health and preoccupation with bodily sensations at the other [19]. These thoughts are often reinforced by emotional mental imagery, leading the individual to experience severe health anxiety. Individuals experiencing severe health anxiety meet the diagnostic criteria for illness anxiety disorder based on the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) [20]. Health anxiety has a strong association with cognitive worries and anxiety sensitivity in primary care centers [21].

Given that alongside biological factors, psychological factors and variables influence the onset and exacerbation of coronary heart diseases, psychotherapies are also used alongside pharmacological and medical treatments. One such method is schema therapy, a cognitive-behavioral approach. Schema therapy, developed by Young et al. [22], is a novel and integrated therapy based primarily on the expansion of concepts and methods of classic cognitive-behavioral therapy. Schema therapy integrates the principles and foundations of cognitive-behavioral, attachment, Gestalt, object relations, constructivist, and psychoanalytic schools into a valuable therapeutic and conceptual model [23].

Now, based on the reviewed literature, researchers believe that by 2040, cardiovascular diseases and stroke will be the first and fourth causes of disability, respectively, on the list of disabling diseases [24]. According to the World Health Organization (WHO) report (2021) [1] and the latest published statistics, cardiovascular diseases were the cause of 22% of deaths worldwide and 35% of deaths in Iran. Furthermore, currently, coronary heart diseases are the leading cause of death in individuals over 35 years old in Iran [25]. Hence, the importance of addressing this issue can be understood. Additionally, previous research has mostly investigated the components of Type D personality and treatment adherence in cardiovascular patients [26, 27, 28] or examined the modeling of early maladaptive schemas in treatment adherence [29, 30].

However, no research has directly investigated health anxiety, and particularly, foreign studies have not simultaneously examined the variables under investigation in the present research. Accordingly, and considering the negative psychological consequences of health anxiety and non-adherence to treatment, the question arises: Is group schema therapy effective on health anxiety and treatment adherence in coronary heart disease patients?

Methods

This The present research is applied in terms of purpose and quasi-experimental in terms of methodology, following a pre-test-post-test design with control and experimental groups. Group members were selected via convenience sampling and randomly assigned to one experimental and one control group. Patients underwent group schema therapy (two sessions per week) for eight 90-minute sessions for the experimental group in Mashhad hospitals (Razavi, Jawad al-A'immah, and Imam Reza). The control group in this study was on a waiting list and received no intervention until the end of the experimental group's treatment. Finally, the post-test was administered to both groups after the completion of therapy sessions.

The statistical population of the research included all CHD patients referred to hospitals in Mashhad from Dey 1403 to Ordibehesht 1404 (December 2024 to May 2025). The research sample was selected via convenience sampling from among visitors to cardiovascular hospitals in Mashhad who met the inclusion criteria. Initially, 32 volunteers were selected accounting for attrition, and finally, due to attrition based on exclusion criteria, 30 individuals were randomly placed into two groups of 15 (control and experimental).

Inclusion criteria were as follows: consent to participate in the research, age between 30 and 55 years, diagnosis of CHD based on medical records, minimum education of third-grade middle school (guidance cycle), not receiving psychotropic medications, and not receiving concurrent other psychotherapy.

Exclusion criteria were as follows: acute physical illnesses (cancer, diabetes, etc.), absence from more than two sessions, and substance abuse (based on medical history and records).

A) Short Health Anxiety Inventory (HAI):

The Short Health Anxiety Inventory was designed by Warwick & Salkovskis [31] to assess exaggerated evaluations of the severity and likelihood of having a serious illness. This inventory is sensitive to a wide range of health anxiety. The 18-item version of the HAI is the short form of the 64-item scale, covering illness likelihood, illness severity, and bodily vigilance. Each item contains four statements scored from 0 to 3, and the respondent must choose the statement that best describes them. Higher scores (between 0 and 54)

indicate greater health anxiety in the respondent. Asmundson et al. [32] reported convergent validity coefficients of the Short Health Anxiety Inventory with the Illness Attitude Scale, Anxiety Sensitivity Index, and Intolerance of Uncertainty and Beck Anxiety Inventories as 0.63, 0.56, 0.41, and 0.42, respectively. Domestically, Bagheri Sheikhangafshe et al [33] in a study reported the validity and Cronbach's alpha coefficient of this scale as 0.74 and 0.82, respectively. In the present study, the total Cronbach's alpha coefficient of the inventory was 0.86.

B) Morisky Medication Adherence Scale (MMAS):

The Morisky Medication Adherence Scale is a self-report questionnaire designed by Morisky, Ang, Krousel-Wood et al [34] and contains 8 items. In this scale, high treatment adherence is indicated by a score of 8 out of 8, medium adherence by a score of 6 out of 8, and low adherence by a score less than 6 [34] The scoring method is such that for questions 1 to 7, a "yes" response receives a score of 1 and a "no" response receives a score of 0. Question 5 is reverse-scored. For question 8, the response "never" receives 1, "sometimes" 0.75, "usually" 0.5, "often" 0.25, and "always" 0. In the study by Morisky et al. (2008), the Cronbach's alpha coefficient of this questionnaire was calculated as 0.83. In the study by Mehrtak, Hemmati, Bakhshzadeh [35], while assessing the face and content validity of this tool by expert professors, its reliability via Cronbach's alpha method was reported as 0.68.

Considering the research method, population, and sample described, to conduct the research after obtaining execution permission (university ethics committee approval), from Dey 1403 to Ordibehesht 1404 (December 2024 to May 2025), referrals were made to Mashhad hospitals (Razavi, Jawad al-A'immah, and Imam Reza), and after providing explanations to officials, the sampling and research execution process began. Based on inclusion and exclusion criteria, 32 individuals were selected accounting for attrition, and finally, due to attrition based on exclusion criteria, 30 individuals (15 in the experimental group and 15 in the control group) were randomly assigned. Health anxiety and treatment adherence questionnaires were administered to both groups before the intervention (pre-test). The experimental group underwent group therapy according to Young's (2003) schema therapy model for eight 90-minute sessions. The session protocol, which was reviewed and content-validated by relevant specialists, was implemented by the executive researcher in the mentioned hospitals. The control group was placed on a waiting list and received no intervention. After the end of the treatment period (post-test), both groups were called for attendance, and the aforementioned questionnaires were completed again.

Brief Description of Therapy Sessions Based on Young's (2003) Therapeutic Model

Session 1:

Session Title: Group members getting acquainted with each other and introducing

Session Objectives: stating governing rules of sessions Creating a spirit of self-awareness and self-confidence considering individual talents and abilities, and emotional involvement between the examiner and other members.

Session 2:

Session Title: Recognizing mood, physiological, and emotional states

Session Objectives: 1. Participants' ability to identify mood states. 2. Participants' ability to identify physiological states of the body. 3. Participants' ability to identify emotions.

Session 3:

Session Title: Understanding one's own issues and five main aspects of life

Session Objectives: 1. Guiding participants in understanding their own and their children's issues. 2. Recognizing the connection between thought and behavior, thought and physical reactions, thought and environment, and thought and mood states.

Session 4:

Session Title: Focusing on the present time and one's own behavior with emphasis on meditation and systematic desensitization methods

Session Objectives: 1. Attention and emphasis on the present time and one's current behavior. 2. Using effective techniques in reducing anxiety and depression resulting from parenting challenges and marital life, and methods for greater acceptance of rules and stress management.

Session 5:

Session Title: Recognizing goals, values, and personal beliefs and reconstructing mental schemas

Session Objectives: Recognizing short-term and long-term goals and examining one's own value system (growth and better self-knowledge, greater recognition of one's strengths and weaknesses through self-expression and frankness, practicing active listening, realizing the effect of one's thoughts on other family members, seeing oneself through the eyes of family members, helping to reduce anxiety at home).

Session 6:

Session Title: Teaching techniques to reduce and eliminate maladaptive schemas

Session Objectives: 1. Each member committing to performing practical steps in a responsible manner to increase happiness and vitality. 2. Recognizing signs of despair and hopelessness and acquiring some skills in facing despair-inducing situations.

Session 7:

Session Title: Acquiring patterns of treatment adherence through previous session trainings

Session Objectives: Greater recognition of basic needs and striving to achieve treatment adherence and reduce anxiety regarding one's behavior and beliefs.

Session 8:

Session Title: Summarizing sessions

Session Objectives: Summarizing sessions and administering Young's Schema Questionnaire, Health Anxiety Inventory, and Treatment Adherence Questionnaire.

Ethical considerations including informed consent, confidentiality, and protection of participants were fully observed. After the research ended, upon request, the educational intervention was provided free of charge to the control group. After data collection, analysis was performed using descriptive statistics (mean and standard deviation) and inferential statistics (multivariate analysis of covariance) with SPSS version 27 software to examine the effectiveness of the intervention on the research variables.

Results

After data collection and analysis, in the descriptive section, the frequency distribution of age groups in the two control and experimental groups indicated relative balance in the age composition of the examined samples. The largest share in the control group was related to the age group 30-35 years (33.4%) and in the experimental group to the age group 35-40 years (33.4%). Regarding education level, in the control group, 53.3% of individuals had a diploma or associate degree, 33.3% had a bachelor's degree, and 13.4% had a master's degree. In the experimental group, 66.7% had a diploma or associate degree, 26.7% had a bachelor's degree, and 6.6% had a master's degree. Before answering the research hypothesis, the results of the Kolmogorov-Smirnov test to examine the normality of the distribution of research variables are reported (Table 1).

Table 1: Descriptive Indices and Kolmogorov-Smirnov Test of Research Variables

Variable	Time	Control Group		Experimental Group	
		Test Statistic	p-value	Test Statistic	p-value
Health	Pre-test	0.113	0.200	0.099	0.200
	Post-test	0.114	0.200	0.141	0.200
Treatment Adherence	Pre-test	0.111	0.200	0.126	0.200
	Post-test	0.177	0.200	0.207	0.085

If the *p*-value of the Kolmogorov-Smirnov test is greater than 0.05, there is no reason to reject the null hypothesis (normality). Consequently, the distribution of health anxiety and treatment adherence variables in both groups and both times examined is normal at the five percent error level.

Another necessary assumption for performing this analysis is the test of homogeneity of the variance-covariance matrix of health anxiety and treatment adherence variables, which is performed by the M-Box test, and its results are presented in Table 2.

Table 2: Results of M-Box Test to Examine Homogeneity of Variance of Health Anxiety and Treatment Adherence Variables in Post-test Between Control and Experimental Groups

M-Box Statistic	Fisher Statistic	df1	df2	p-value
1.465	0.451	3	141120	0.717

The *p*-value obtained by the M-Box test is greater than 0.05, and there is no reason to reject the hypothesis of homogeneity of the variance-covariance matrix of these variables in the post-test between the two control and experimental groups; consequently, the assumption of

homogeneity of the variance-covariance matrix for covariance analysis is also established.

The last assumption of covariance analysis is the assumption of homogeneity of regression slopes. For this purpose, the significance of the interaction effect of the group variable and health anxiety and treatment adherence variables is shown in Table 3, indicating that the interaction effects are not significant, and therefore the assumption of homogeneity of regression slopes is established.

In Table 4, the between-group effects of pre-test and group (independent variables) on all dependent variables in the post-test are examined.

Table 3: Results of Examining the Assumption of Homogeneity of Regression Slopes

Independent Variable	Dependent Variable	Sum of Squares	df	Mean Square	Fisher Statistic	p-value
Group × Health Anxiety (Pre-test)	Health Anxiety (Post-test)	14.105	1	14.105	16.667	0.000
	Treatment Adherence (Post-test)	0.492	1	0.492	0.674	0.419
Group × Treatment Adherence (Pre-test)	Health Anxiety (Post-test)	0.005	1	0.005	0.006	0.939
	Treatment Adherence (Post-test)	18.255	1	18.255	25.004	0.000

Table 4: Between-Group Effects in Multivariate Analysis of Covariance for Examining the Effect of Group Schema Therapy on Health Anxiety and Treatment Adherence

Independent Variable	Dependent Variable	Sum of Squares	df	Mean Square	Fisher Statistic	p-value	Effect Size
Health Anxiety (Pre-test)	Health Anxiety (Post-test)	14.105	1	14.105	16.667	0.000	0.391
	Treatment Adherence (Post-test)	0.492	1	0.492	0.674	0.419	0.025
Treatment Adherence (Pre-test)	Health Anxiety (Post-test)	0.005	1	0.005	0.006	0.939	0.000
	Treatment Adherence (Post-test)	18.255	1	18.255	25.004	0.000	0.490
Group	Health Anxiety (Post-test)	11.865	1	11.865	14.020	0.001	0.350
	Treatment Adherence (Post-test)	3.887	1	3.887	5.324	0.029	0.170
Error	Health Anxiety (Post-test)	22.004	26	0.846			
	Treatment Adherence (Post-test)	18.982	26	0.730			

In Table 4, the pre-test rows are for examining the significance of the effect of the variables' background, and the group row is for comparing the variables in the two control and experimental groups in the post-test state. In the last column, the effect size value is shown, which specifies the degree of influence of sample size on the obtained results. Also, the *p*-value of the pre-test for health anxiety and treatment adherence variables is less than 0.05 only for the post-test values of the same variables, indicating the significance of their effect at the five percent error level. In other words, the background of each variable only has a significant effect on its corresponding variable in the post-test. Furthermore, the *p*-value of the group row for both examined variables at the post-test time is less than 0.05, and consequently, the mean of the variables in the post-test between the two control and experimental groups has a significant difference at the five percent error level. In other words, with 95% confidence, it can be claimed that group schema therapy has a significant effect on reducing health anxiety and increasing treatment adherence in coronary heart disease patients, and the answer to the research hypothesis is positive.

Discussion

This research was conducted with the aim of examining the effectiveness of group schema therapy on health anxiety and treatment adherence in coronary heart disease patients. The findings showed that there is a significant difference between the mean scores of health anxiety and treatment adherence in the experimental and control groups after the intervention ($p < 0.05$). In other words, group schema therapy was able to significantly reduce health anxiety and increase treatment adherence in coronary heart disease patients. The findings of this research are consistent with the results of numerous studies. Mohaghegh et al [36], Zarei and Fooladwand [37], Khosrowshahi et al [38], Azizi et al. [39] in domestic research; and Baljé et al [40], Kort et al [41], Lodder et al [42], Halford et al [43], Yu et al [44], Kauw et al [45], Bamelis et al [46], Chang et al [47], Berg et al [48], Zhang et al [49], Silarova et al [50], Denollet [51] in foreign research have shown that psychological interventions based on schema therapy can be effective in reducing anxiety and improving treatment adherence. To explain the obtained finding, it can be said that maladaptive schemas are often the result of detrimental experiences that the individual has constantly faced during childhood and adolescence.

The effect of these adverse experiences accumulates during development and leads to the formation of a maladaptive schema. Of course, not all schemas are formed based on traumatic events or childhood maltreatment. In an individual's mind without experiencing traumatic childhood events, a dependency maladaptive schema may arise because during childhood, they were completely under the domination and support of parents. Although not all schemas have developmental roots in traumatic events, all of them disrupt healthy living. Schemas have a dimensional state, meaning they differ from each other in terms of (intensity) and (scope of activity in the mind) [52].

Therefore, schema therapy strives to improve schemas, because a schema is a set of memories, emotions, bodily sensations, and cognitions; improving a schema relates to reducing all of these: the intensity of memories related to the schema, emotional activation of the schema, the strength of bodily sensations, and maladaptive cognitions. Improving a schema will also bring about a series of behavioral changes, such that the individual learns to replace adaptive coping styles with maladaptive coping styles [53].

The mental and physical health of cardiac patients is always influenced by numerous factors. One common problem in these patients is health anxiety, which can negatively affect their quality of life, treatment adherence, and ultimately their physical health. Schema therapy as a psychological approach can help identify and change patients' inefficient thought and behavior patterns [54].

Health anxiety is a key factor that can affect the treatment process and quality of life of coronary heart disease patients. These patients usually face psychological stresses resulting from disease diagnosis, lifestyle changes, and concerns related to the future [55]. Being anxious can lead to reduced adherence to treatment programs and medication consumption and ultimately worsen their health status [56]. Therefore, schema therapy as a psychological intervention, aiming to identify and change inefficient thought and emotional patterns, can have a positive effect on health anxiety and treatment adherence. Thus, it can be said that schema therapy helps patients identify and change negative thought patterns that may lead to health anxiety. As Halford et al. [43] showed, schema therapy, whether alone or combined with cognitive-behavioral therapies, reduces anxiety symptoms, intrusive thoughts, and improves quality of life. This method allows patients to have a better understanding of their disease and feel more control over their health status. Group therapy sessions provide an opportunity for patients to share their feelings and experiences with others and benefit from each other's experiences. This type of social interaction strengthens social support and reduces feelings of loneliness, which itself can lead to reduced anxiety and increased treatment adherence. Therefore,

increasing patients' awareness about the importance of treatment adherence and improving stress management can help improve their health outcomes.

Conclusion

The findings of this research showed that group schema therapy has a significant effect on reducing health anxiety and increasing treatment adherence in coronary heart disease patients. This intervention, by identifying and modifying early maladaptive schemas and strengthening adaptation mechanisms, can serve as a complementary method alongside standard medical treatments to improve psychological and physical outcomes of patients. The group environment also plays an important role in increasing motivation and commitment to treatment by creating social support and reducing feelings of isolation.

This research had limitations that should be considered in interpreting and generalizing the results. Time and financial limitations did not allow for follow-up studies. Sampling was only from among coronary heart disease patients, and therefore generalizing the findings to other patient groups requires caution. Potential confounding variables such as socioeconomic status were not controlled. Limited research background regarding the integration of schema therapy with health anxiety and treatment adherence variables in this specific population is another limitation. Also, the use of convenience sampling may have affected the generalizability of the results. It is suggested that future research consider long-term follow-up periods to examine the durability of the effects of this intervention. Comparing the effectiveness of group schema therapy with other common psychological interventions in this field can help choose the best treatment method. Controlling important confounding variables such as demographic characteristics and disease severity is essential in designing future studies. Conducting qualitative studies to explore participants' subjective experiences of the treatment process more deeply is also suggested. Furthermore, using random sampling methods in subsequent research can enhance the external validity of the findings.

Considering the observed effectiveness in this research, training mental health professionals (psychologists and counselors) working in cardiovascular centers in the principles and techniques of group schema therapy is suggested. Also, integrating this intervention as a complementary component in comprehensive, multidisciplinary care programs for coronary heart disease patients in hospitals and specialized clinics can lead to overall improvement in treatment outcomes and quality of life for these patients.

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