

The Effectiveness of Stress Inoculation Group Training on the General Health of the Coronary Heart Disease Patients in Ahwaz

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ABSTRACT

Background and Objective: The purpose of this study was to determine the effectiveness of stress inoculation training on the Somatization and Anxiety of coronary heart disease patients.

Subjects and Methods: Subjects were consisted of 40 patients with coronary heart disease, who were randomly selected from the hospitals Golestan, Mehr, Naft and Tapes Clinic of Ahwaz, through systematic sampling method. These patients were randomly assigned to experimental (N=20) and control (N=20) groups. There was 10 females and 10 males in each group. The experimental group received 8 weekly sessions of stress inoculation training that the control group did not received it. It was hypothesized that training would increase the general health of the training group as compared with the control group. The GHQ-28 was administered to both groups before and after training.

Results: The results of analysis of covariance showed that training significantly improved the general health in the experimental group as compared with the control group ($P<0.0001$). Also, compared with the control groups, the experimental group showed significantly lower scores on the somatization ($P<0.0001, F=154.73$), Anxiety disorder and insomnia ($P<0.0001, F=208.20$).

Conclusion: The result of research showed the stress inoculation training effected on the amount of general health in coronary heart disease and this method can be used with usual medicine care in improvement and rehabilitation in cardiovascular diseases.

KEYWORDS: stress inoculation training, stress, general health, heart disease.

INTRODUCTION

Stress, psychological or behavioral factors have a potential role in the incidence of any physical disease and also significantly affect the progress and result of physical disease. However it might be impossible to prove the direct cause and effect relationship or the structural mechanisms (1). But this relationship is so important that in psychopathology it is considered as psychosomatic disorders, and this relationship led to the creation of an interdisciplinary field called "Health psychology" which is between psychology and medicine (2). Stress can have its negative effects on any part of the body, such as the cardiovascular, respiratory, endocrine, gastro-intestinal tract, reproductive and immune systems of men and women (3). Stress often leads to many physiological responses and the responses are essential to maintain life balance in short term. But if it continues and changes into chronic stress it can change the body biologically in and cause disease, including coronary heart disease (2).

Stress may cause irregularities in heart rate (3) and also due to increased blood pressure result in high levels of low-density lipoprotein cholesterol in blood (4). And increase the possibility of the formation of atherosclerosis and this can result in heart attack and angina or chest pain in people who have heart disease (5).

In addition, stress could increase the risk of coronary heart disease through affecting risky health behaviors such as eating too much and increased risk of obesity, smoking and lack of exercise (4).

Psychological disorders such as: depression, anxiety and anger are associated with the increased mortality in the patients with or without coronary heart disease. It is clear that these factors are independent of biological risk factors. Research has shown that depression, anxiety and other psychological distress in patients with coronary artery disease could increase the severity of symptoms and the likelihood of recurrence of heart attack (6).

The studies also show that the following 5 psychological - social factors cause outbreak and persistence of coronary artery disease in people: 1 - Depression 2 - Anxiety 3 - Hostility 4 - social isolation 5 - chronic life stress (5). Among these factors, depression and anxiety are the most important ones that appear after the stage of coronary

artery disease and influence the risk or improvement of recurrence of heart attack in patients. It is estimated that approximately 30% of all patients after infarction develop clinical depression and anxiety (7). Depression is a psychological factor seen in the development and improvement of CHD (coronary heart disease) usually it seems that depression worsens coronary heart disease. Depression increases mortality in patients with coronary artery disease and depressed patients within 6 months of recovery are greatly at risk of death (8).

On the other hand depression could increase the risk of heart attack through influencing anti-health behaviors such as smoking, eating fatty foods, drinking too much alcohol or lack of exercise (3). As well as depression, anxiety increases the risk of progression of coronary heart disease. Especially anxiety in women increases the likelihood of coronary heart disease and heart attack more than men (7).

Anger and hostility are among other factors that affect patients with coronary heart disease and the risk of heart attack recurrence. So the mechanisms intensified by anger at those who already suffering from heart disease become lethal factors and increase the chance of mortality among patients (3).

In addition to the above-mentioned psychological factors, social isolation is a predictor of sudden death in men who have had myocardial infarction (MI) recently (8). But studies show that the chance of above 1 year survival of the people who had heart attacks but there were more than 2 people to emotionally support them was twice more than the patients who did not enjoy such support (3).

Stress inoculation training (SIT): Cognitive-behavioral intervention has had a large scope in the last 20 years. These types of stress reductive interventions are based on the role of cognitive intermediates in creation and perseverance of stress. This course of training is like a measles vaccine, with a little pressure biological systems, the body is protected against greater and larger risks; therefore, this is an opportunity for patients to fight on until they win. The principle of stress inoculation training program is that people should change their own opinions about stressful behaviors and self-treatments of coping with stress. It has a broad scope including information gathering, relaxation training, cognitive training, problem solving, behavioral training techniques and behavioral – cognitive methods (9). Previous study on 78 coronary heart disease patients, showed that relaxation training based on stress management results in significant reduction of anxiety and depression and improves patients' general health after the treatment; the results of the follow up were the same (10). The results of the meta-analysis that performed on the effects of psychological interventions and stress management on 36 survey conducted on 12,841 patients showed that psychological interventions followed by stress management programs reduced depression and anxiety of individuals (11).

Also in a study, they showed the effectiveness of psychological therapy in reducing anxiety and depression in patients with cardiovascular disorders. The researchers believe that the treatment of psychiatric disorders should be added to the clinical treatment of coronary artery diseases (12).

The overall purpose of study was to determine the effectiveness of stress inoculation training on general health and reducing its components in coronary heart disease patients (13).

Research question: Does stress inoculation training affect general health and reduce its components?

Research hypothesis: stress inoculation training affects reducing the components related to absence of general health of (social dysfunction and depression) coronary heart disease patients.

Method: This study was administered using quasi-experimental method (pre-test, post-test, and control group). The population included all coronary heart disease patients of Ahwaz city. The subjects were 40 people selected by cluster sampling out of the population. First 90 patients in Golestan, Mehr, Naft and Tapes heart clinic took general health tests. Then 40 people were selected whose scores were above 41 (indicating subject's deterioration) and randomly divided into experimental and control groups of 20 subjects. Each group consisted of 10 women and 10 men, 38 – 72 years old. All were married and using routine medical care during the study. The General health Questionnaire -28 was used for data gathering. This questionnaire was designed by Goldberg & Hiller (2006) for screening non-psychotic mental disorders in treatment centers (14). Different versions of the questionnaire have been translated to and applied in at least in 36 different languages around the world. Similar to the initial form the questionnaire consists of four minor scales, each of them containing 7 questions. General Health Questionnaire -28 constituent scales are: 1 physical symptoms 2-anxiety, 3 - social dysfunction 4 - severe depressions.

The validity of the General Health Questionnaire -28 is confirmed in different translations. As an example Shigemi, Mino and Tsuda (2005) after conducting this test on Japanese workers reported reliability coefficient (Cronbach's alpha) of 0.90 (15). After sampling, all selected subjects for the study were invited to pretest in a single session. At this session all subjects filled the General Health Questionnaire -28 and at the end of the session the selected participants were randomly assigned into two experimental and control groups.

Based on this classification, the subjects of experimental group had group stress inoculation training sessions once a week. There were 8- an hour and half sessions held weekly. After the eighth training session, the

experimental group and the control groups were invited to answer General Health Questionnaire – 28. After one month the follow-up tests were conducted to evaluate the sustainability of education.

Data analysis Methods: (1) descriptive statistics such as frequency, percentage, mean, standard deviation. 2 one-way analysis of covariance (ancova): During the analysis of covariance intervening variables are controlled, (i.e. their effect on test scores is removed) and then the means of the research groups' remaining scores, are compared.

In this study in testing hypotheses, the pre-test variable is controlled in the post-test. This means that after the removal of its effect from the post-test scores, the means of the research and control group's remaining scores were compared. 3. Multivariate analysis of covariance (macnova). 4. Cronbach's alpha and Split-half methods to calculate reliability coefficients.

In order To analyze the collected data «SPSS» software V17 is used. Besides the level of significance is $\alpha=0.05$ for all hypotheses.

Findings:

1. Descriptive findings:

The descriptive findings of this study include descriptive statistics such as mean, standard deviation and number of subjects for all variables presented in Table 1.

Table 1: Mean and standard deviation scores of physical symptoms and anxiety among control and experimental groups at pre-test and post-test

Variable	stage	Statistic index	mean	Standard deviation	No
Physical symptoms	Pre-test	Group			
		Experiment	15.00	1.80	20
	Post-test	Control	13.45	2.87	20
		Experiment	7.30	1.52	20
	Follow-up	Control	12.30	2.67	20
		Experiment	5.95	1.73	20
Anxiety	Pre-test	Control	14.55	2.85	20
		Experiment	13.15	2.85	20
	Post-test	Control	13.05	2.21	20
		Experiment	6.10	1.29	20
	Follow-up	Control	12.65	2.05	20
		Experiment	10.95	1.70	20
Social dysfunction	Pre-test	Control	11.20	1.81	20
		Experiment	5.15	2.28	20
	Post-test	Control	12.05	2.84	20
		Experiment	10.95	1.56	20
	Follow-up	Control	12.05	3.01	20
		Experiment	7.40	2.08	20
Depression	Pre-test	Control	8.35	3.24	20
		Experiment	8.85	2.47	20
	Post-test	Control	2.65	1.72	20
		Experiment	9.70	2.22	20
	Follow-up	Control	2.85	1.78	20
		Experiment	7.87	2.32	20

B) Findings of the research hypotheses

This study include the following hypothesis, each hypothesis is presented along with the results of analysis in this section.

Hypothesis 1: Stress inoculation training has an impact on general health of coronary artery disease patients.

Hypothesis 1-1: Stress inoculation training has an impact on reducing the physical symptoms of coronary heart disease patients.

Hypothesis 1-2: Stress inoculation training has an impact on anxiety reduction of coronary heart disease patients.

Hypothesis 1-3: Stress inoculation training has an impact on improving social function of coronary artery disease patients.

Hypothesis 1-4: Stress inoculation training has an impact on reducing the depression of coronary artery disease patients.

Table.2 Results of one-way covariance analysis (ancova), comparing the post-test mean scores related to general health of the control and experimental groups of coronary heart disease patients under pretest control.

Source of change	sum of squares	Degree of freedom	mean square	F	Level of significance	Squares	Statistical power
Pre-test	260.14	1	260.14	24.23	0.0001	0.39	1.00
Group	6673.88	1	6673.88	621.60	0.0001	0.94	1.00
Error	397.25	37	10.73				

It is obvious from the table 2 that under pre-test control situation there is a significant difference in general health of control and experimental groups with coronary heart disease $p < 0.0001$, $F=60.621$. So the first hypothesis is confirmed.

Table.3 Results of multivariate analysis of covariance (macnova), comparing the post-test mean scores related to lack of general health of the control and experimental groups of coronary heart disease patients under pretest control.

name	amount	DF	DF error	F	Level significance P	of squares	Statistical power
Pylapy effect test	0.995	4	31	164/20	0/0001	0/95	1/00
Wilks' lambda test	0.045	4	31	164/20	0/0001	0/95	1/00
Hotelling test	21.18	4	31	164/20	0/0001	0/95	1/00
Roy's Largest Root test	21.18	4	31	164/20	0/0001	0/95	1/00

It is obvious from the table 3 that under pre-test control situation the level of significance of all tests indicate that there is a significant difference between control and experimental groups regarding at least one variable. So the second hypothesis is confirmed.

Table. 4 Results of one-way covariance analysis (ancova), on the post test mean scores related to general health of the control and experimental groups of coronary heart disease patients under pretest control.

Variable	Pre-test source of changes	sum of squares	Degree of freedom	mean square	F	Level of significance	Squares	Statistical power
Physical symptoms	Pretest	100/89	1	100/89	45/31	0/0001	0/57	1/00
	Group	335/73	1	335/73	150/80	0/0001	0/81	1/00
	Error	75/69	34	2/22				
Anxiety	Pretest	25/35	1	25/35	11/25	0/002	0/25	0/903
	Group	395/80	1	395/80	175/75	0/0001	0/83	1/00
	Error	76/75	34	2/25				
Social dysfunction	Pretest	46/01	1	46/01	9/54	0/004	0/22	0/851
	Group	405/80	1	405/80	184/17	0/0001	0/71	1/00
	Error	163/91	34	4/82				
depression	Pretest	57/69	1	57/69	25/11	0/0001	0/42	0/998
	Group	435/51	1	435/51	189/57	0/0001	0/84	1/00
	Error	78/10	34	2/29				

It is obvious from the table 4 that under pre-test control situation there is a significant difference in physical symptoms of control and experimental groups with coronary heart disease $p < 0.0001$, $F=150.80$. So the 1-1 hypothesis is confirmed.

Also under pre-test control situation there is a significant difference in anxiety of control and experimental groups with coronary heart So the 1-2 hypothesis is confirmed.

Also under pre-test control situation there is a significant difference in social dysfunction of control and experimental groups with coronary heart. So the 1-3 hypothesis is confirmed.

Also under pre-test control situation there is a significant difference in depression of control and experimental groups with coronary heart disease. So the first hypothesis is confirmed. So the 1-3 hypotheses confirmed.

Additional findings

Table.5 Results of one-way covariance analysis (ANCOVA), comparing the follow-up mean scores related to general health of the control and experimental groups under pretest control.

Pre-test source of changes	sum of squares	Degree of freedom	mean square	F	Level of significance	Squares	Statistical power
Pretest	10/70	1	10/70	0/347	0/559	0/01	0/089
Group	6501/70	1	6501/70	210/78	0/0001	0/85	1/00
Error	1140/79	37	30/83				

It is obvious from table 5 in the follow up stage that under pre-test control situation there is a significant difference in general health of control and experimental groups with coronary heart disease $p < 0.0001$, $F=210.78$. In other words this training course has caused continuous decline in general health problems event one month later in the follow up test.

Table. 6 Results of multivariate analysis of covariance (macnova), of the follow up teast mean scores related to lack of general health of the control and experimental groups of coronary heart disease patients under pretest control.

name	amount	DF Of hypothesis	DF error	F	Level of significanceP	of squares	Statistical power
Pylapy effect test	0/917	4	31	85/10	0/0001	0/91	1/00
Wilks' lambda test	0/083	4	31	85/10	0/0001	0/91	1/00
Hotelling test	10/98	4	31	85/10	0/0001	0/91	1/00
Roy's Largest Root test	10/98	4	31	85/10	0/0001	0/91	1/00

It is obvious from the table 6 that in follow-up stage under pre-test control situation the levels of significance of all tests indicate that there is a significant difference between control and experimental groups regarding at least one dependent variable. $p < 0.0001$, $F=85.10$

Table. 7 Results of one-way covariance analysis (ANCOVA), on the follow-up mean scores related to lack of general health of the control and experimental groups under pretest control.

Variable	Pre-test source of changes	sum of squares	Degree of freedom	mean square	F	Level of significance	Squares	Statistical power
Physical symptom	Pretest	30/64	1	30/64	6/37	0/016	0/16	0/689
	Group	743/69	1	743/69	154/73	0/0001	0/82	1/00
	Error	163/40	34	4/80				
Anxiety	Pretest	2/02	1	2/02	0/672	0/418	0/02	0/125
	Group	626/66	1	626/66	208/20	0/0001	0/86	1/00
	Error	102/33	34	3/01				
Social dysfunction	Pretest	6/87	1	6/87	1/22	0/276	0/04	0/189
	Group	118/49	1	118/49	21/11	0/0001	0/38	0/994
	Error	190/80	34	5/61				
Depression	Pretest	0/918	1	0/918	0/247	0/622	0/01	0/077
	Group	190/42	1	190/42	51/26	0/0001	0/60	1/00
	Error	426/28	34	3/71				

It is obvious from the table 7 under pre-test control there is a significant difference between control and experimental groups regarding physical symptoms ($p < 0.0001$, $F=157.73$). The effect of training course continued until the follow up test taken a month later with 0.82 differences. Statistical power equals 1 which indicates that there was no 2nd type error.

Under pre-test control there is a significant difference between control and experimental groups regarding anxiety ($p < 0.0001$, $F=208.20$). The effect of training course continued until the follow up test taken a month later with 0.86 difference. Statistical power equals 1 which indicates that there was no 2nd type error.

Under pre-test control there is a significant difference between control and experimental groups regarding social dysfunction ($p < 0.0001$, $F=21.11$). The effect of training course continued until the follow up test taken a month later with 0.38 differences. Statistical power equals 1 which indicates that there was no 2nd type error.

Under pre-test control there is a significant difference between control and experimental groups regarding depression ($p < 0.0001$, $F=51.26$). The effect of training course continued until the follow up test taken a month later with 0.60 differences. Statistical power equals 1 which indicates that there was no 2nd type error.

DISCUSSION AND CONCLUSIONS

Nowadays, coronary heart disease is among the main causes of death in the world. The disease is caused by congestion or narrowing of the coronary arteries. There are various factors influencing the development and progression of diseases, one of which is stress. Stress can cause the congestion or narrowing of arteries or increase the risk of heart attack and stroke through creating physiological responses.

Therefore, stress inoculation training can help people to decrease the risk of this disease, heart attack or sudden death through providing an opportunity for individuals to cope with stressful situations.

In addition, the individual's coronary heart disease causes depression, anxiety and other negative psychological due to restrictions imposed on him. Reducing the negative psychological states can lead to better performance and personal satisfaction in life.

As the results show, the two main hypotheses about the impact of stress inoculation training on reducing anxiety physical symptoms of coronary heart disease was confirmed.

Concerning the first hypothesis, the research shows that psychological therapies can improve physical function in these patients. According to previous study on the effectiveness of these interventions in reducing physical symptoms of coronary heart disease it can be said: Identifying signs of stress and the ability to reduce these signs as well as general health improvement by reducing the negative psychological states can cause the reduction of physical symptoms (which are the manifestation of psychological state of individual) through reduction of psychological factors. Also the results of studies about psychosomatic illnesses are consistent with these results (16). So, the stress inoculation training can reduce the physical symptoms of patients.

Generally the effect of stress inoculation training on reducing anxiety and insomnia can be justified as follows:

1. Through learning stress inoculation methods the person's ability to cope effectively with stressful events increases and encouraging him to use this method in everyday life causes positive feedback and this reduces avoidance of situations. Then people control their environment more effectively which results anxiety reduction.
2. One of the causes of anxiety is to assess the situations as threatening, which itself is a result of automatic negative thoughts. Identifying and challenging negative thoughts provide an opportunity for individuals to re-evaluate their thoughts and change them and eventually reduce anxiety.
3. Inoculation training helps individuals to relax and using anti-tension signs and thereby gain greater control and therefore reduce their anxiety. In addition, this method increases achieving positive information in memory; therefore, their access to non- threatening thoughts options becomes easier.
4. Patient's Stress, anxiety and depression symptoms reduction, improves his sleep.
5. Through the application of those methods in everyday life, individuals will have greater ability to solve everyday life problems. And because of their ability to solve problems, they feel more satisfied so their social life quality increases.
6. Regarding the impact of the intervention on depression in patients with coronary artery disease it can be stated that many patients after myocardial infarction, angiography or bypass surgery usually feel helpless or depressed due to loss of some of their abilities to do things in life, since this case is a cognitive behavioral intervention, there is an opportunity to identify and challenge automatic negative thoughts and cognitive errors. This causes the patient to set himself free from dos and don'ts and ideal thinking, and accept his illness and inability to do a part of his responsibilities and encounter the situation reasonably.

Finally, the results of this study indicate that stress inoculation training affects general health, physical symptoms, anxiety and insomnia in coronary heart disease patients. This method combined with conventional medical cares can help recovery and rehabilitation of patients with cardio – vascular problems.

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