

How Effective Is the Use of Metaphor Therapy on Reducing Psychological Symptoms and Pain Discomfort in Patients with Non-Cardiac Chest Pain: A Randomized, Controlled Trial

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ARTICLE INFO

Article type:
Original Article

Article history:
Received: 12 Jan 2016
Revised: 10 Apr 2016
Accepted: 15 Apr 2016

Keywords:
Metaphor Therapy
Non-Cardiac Chest Pain
Pain Discomfort
Psychological Symptoms

ABSTRACT

Introduction: Psychological symptoms of non-cardiac chest pain (NCCP) including perceptual, emotional, and behavioral problems can affect patient perception of chest pain. This study was conducted to determine the effect of metaphor therapy on mitigating depression, anxiety, stress, and pain discomfort in patients with NCCP.

Materials and Methods: This randomized, controlled, trial was conducted on 28 participants, who had visited the emergency department of Kermanshah Imam Ali Heart Hospital because of experiencing NCCP during the June to September 2014. The patients were randomly assigned to metaphor therapy and control groups (n=14 for each group) during a four-week period. Our data collection questionnaires included Pain Discomfort Scale (PDS) and Depression, Anxiety and Stress Scale (DASS). Chi-square and MANCOVA tests were run, using SPSS version 20.

Results: Twenty patients (71.4%) completed the trial period until the final assessment. Our findings showed that metaphor therapy couldn't lower depression, anxiety, stress, and pain discomfort; In fact, there was not a significant difference between the metaphor therapy and control groups regarding the aforementioned variables ($P>0.05$).

Conclusions: Although the study results did not support the effectiveness of metaphor therapy for NCCP, further studies on the potential role of metaphor therapy in attenuating NCCP symptoms seem to be necessary.

► *Please cite this paper as:*

Bahremand M, Saeidi M, Komasi S. How Effective Is the Use of Metaphor Therapy on Reducing Psychological Symptoms and Pain Discomfort in Patients with Non-Cardiac Chest Pain: A Randomized, Controlled Trial. *J Cardiothorac Med.* 2016; 4(2): 444-449.

Introduction

Non-cardiac chest pain (NCCP) is the pain experienced in the chest that does not have a clear etiology (1). NCCP is a common disorder in the USA where nearly 23% of the general population suffer from this condition (2). Patients with this condition report various types of pain in the chest (e.g., tingling, pressure, hot flashes and burning, and choking sensation when in public places), which are different in terms of duration and severity. Various physiological and psychological factors can affect etiology and continuity of NCCP

(3). The physiological factors include pulmonary (e.g., respiratory infections), musculoskeletal (e.g., cramping and spasm of the chest wall), and gastric (e.g., gastro-esophageal reflux or esophageal irrational disorders) problems. Moreover, the psychological factors influencing patient perception of chest pain are perceptual, emotional, and behavioral problems (4, 5). Chest pain, especially when it is indicative of serious cardiac problems (e.g., myocardial infarction), result in a feeling of apprehension followed by obvious complaints (6).

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This concern causes NCCP patients to pay repeated visits to healthcare providers, which in turn, leads to time-consuming examinations and imposing huge economic burdens on the healthcare system (7).

However, evidence suggests that there is a direct relationship between psychological disorders and poor future outcomes in NCCP patients (8, 9). Cross-sectional studies on NCCP patients demonstrated a positive relationship between NCCP and psychological distress, high rates of psychiatric disorders, disruption in quality of life, occupational disability, suicidal thoughts, and excessive use of medications (10, 11). High prevalence of depression symptoms and anxiety are associated with psychiatric disorders in NCCP patients (12-14), which highlights the need for implementing interventions to help NCCP patients (15).

Randomized, controlled trials performed on the treatment of NCCP showed that the variety of implemented interventions to reduce psychological distress are the most effective strategies in shortening periods of chest pain and mitigating functional problems (16). Several studies were conducted on the effectiveness of behavioral and cognitive methods (17-19), and the current study was carried out to determine the efficacy of metaphor therapy, a cognitive method, in assuaging stress, anxiety, depression, and pain discomfort in NCCP patients.

Materials and Methods

This randomized, controlled, trial was performed on the patients who, despite prior normal angiography, presented to Cardiac Emergency Department of Imam Ali Hospital, Kermanshah, Iran, due to experiencing pain in the chest during the summer in 2014. The participants were sample randomly allocated to control and metaphor therapy groups. This research trial was registered at Kermanshah Medical Sciences Research Center (RCT Code: 92464), Iran, and received approval of the Ethics Committee of the university.

Inclusion and Exclusion Criteria

The inclusion criteria included: 1) aged 30-65 years old; 2) experiencing chest pain for at least three months; 3) having had normal angiography; 4) absence of physical cause for the pain; and 5) unreduced pain one month after normal angiography. The exclusion criteria included: 1) unwillingness to continue the treatment and 2) simultaneous psychological intervention, initiated at any part during the intervention.

Samples and Procedures

During June-September 2014, all 157 patients presented to the Emergency Department of Imam

Ali Heart Hospital due to experiencing chest pain. A total of 129 patients met the exclusion criteria (Figure 1. shows the reason for the exclusion of each patient). At first obtained written consent from the patients to participate in the study; after a preliminary interview with a treating cardiothoracic surgeon and a clinical psychologist and establishing a treatment relationship between them, the pre-intervention was performed in the participants, as a group, by an independent expert psychologist, who was not aware of the study procedure. Thereafter, the patients were sample randomly assigned to control (n=14) and metaphor therapy (n=14) groups using the technique of allocation concealment. It should be noted that the patients were blind too. In the intervention stage, the patients in the experimental group participated four two-hour sessions on a weekly basis. At the end of each session, forms related to their homework assignment were distributed among the patients, and they were asked to complete their form according to the given instructions. In the control group, discussions were strictly limited to patients' physical condition and assessment of their future problems, and no particular training or treatment procedures were followed. Finally, one week after the intervention, the results were collected from all submitted data. During the intervention, four patients dropped out of the study (Figure 1).

Data collection instruments

Pain Discomfort Scale: This instrument was designed by Jensen, Karoly, and Harris (1991), using short version of Jones Irrational Belief Test. The 10-question scale of pain discomfort by Jensen et al. (1991) measures the level of emotional distress as a result of pain. In this scale, questions 4, 5, 7, 8, and 9 are reversing scored; the questions are responded to using a 4-point Likert type scale. Higher scores demonstrate high levels of emotional distress and depression. The questionnaire was completed a week before the intervention within 10 minutes. Jensen et al. (1991) had appropriately reported the reliability and validity of this scale test. The test-retest reliability of the PDS was 0.76 and the construct validity of it was report 0.58 and 0.38 by examining the measure's relationship with the Beck Depression Inventory and the Affective Pain scale from the McGill Pain Questionnaire (20).

The Depression, Anxiety, and Stress Scale: This scale was designed by Lovibond and Lovibond (21), and includes 21 items measuring three subscales of depression, anxiety, and stress (n=7 for each subscale). The questions are rated on a 4-point Likert scale ('Never', 'Low', 'High', or 'Very high'). The Cronbach's alpha coefficients for the subscales of depression, anxiety, and stress were 0.81, 0.81, and 0.81, respectively. According to

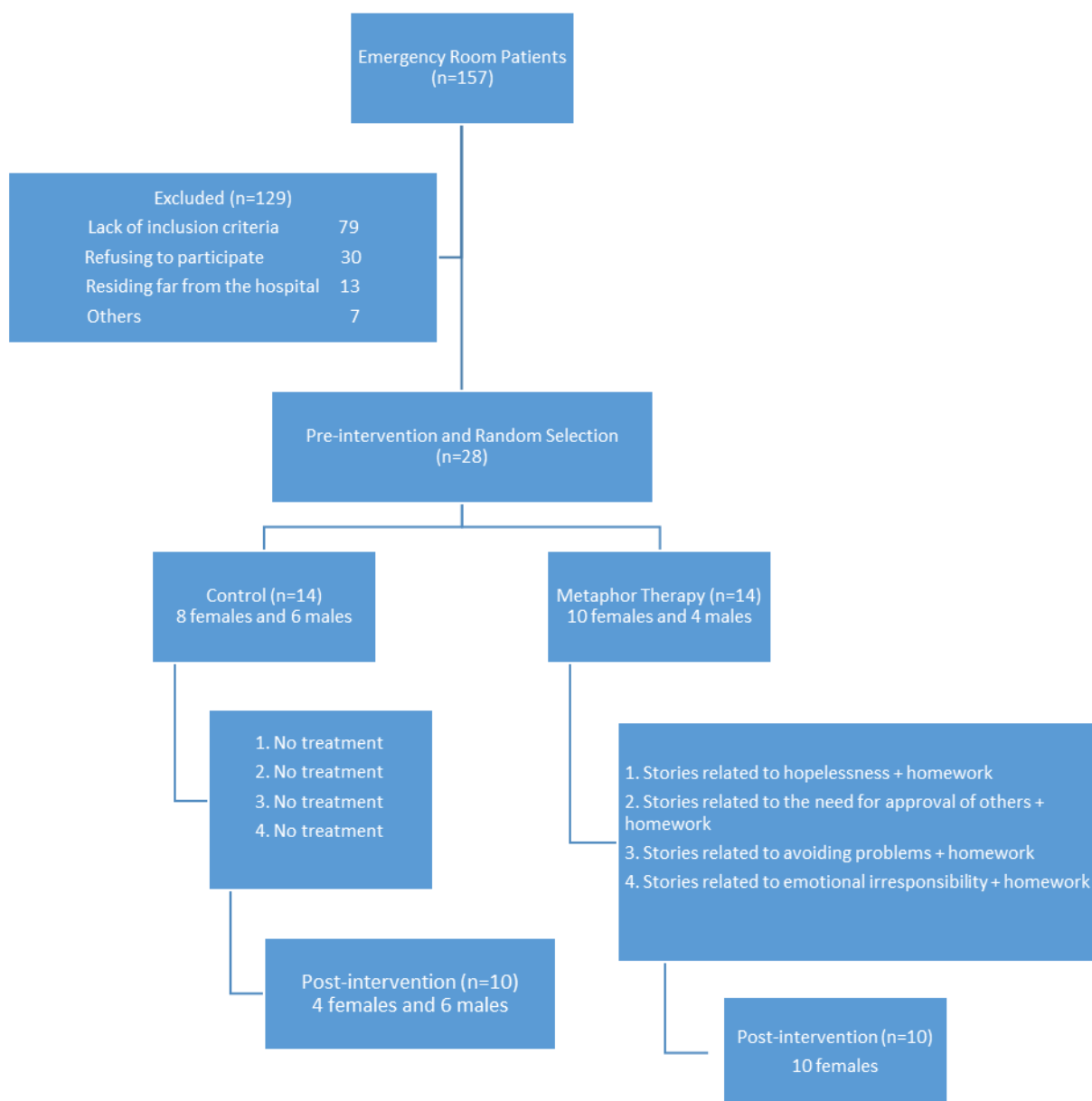


Figure 1. Diagram of patient selection and content of the intervention session

Sahebi (22), the Cronbach's alpha coefficients for depression, anxiety, and stress subscales were 0.70, 0.66, and 0.76, respectively. In addition, the correlation coefficient for Depression Inventory and depression (0.66), anxiety (0.67), and stress (0.49) subscales was significant.

Treatment protocol

Metaphor therapy was conducted in four two-hour sessions, where in the first session, after challenging the patient's beliefs regarding their own current physical conditions, two metaphoric stories related to the feelings of hopelessness in the face of change were presented to the patients, and then the patients were invited to state their impressions and conclusions regarding the story. Later, they were asked to establish a connection

between the metaphors and their own current condition at the time. At the end of each session, an assignment form was presented to the patients, and they were asked to not only do a mental rehearsal of the metaphors on a daily basis, but also write them down, indicate how it helped them, and how the changes influenced their behaviors.

On the second session, after reviewing the homework from the previous session, and a discussion on the obtained conclusions, stories related to the needs for approval of others were presented, and similar to the previous session, the patients were asked for their feedback. On the third and fourth sessions, after reviewing the homework assignments, metaphoric stories regarding problem avoidance, and emotional

irresponsibility, respectively, were presented to the point of challenging the patients' beliefs (23, 24). At the end of the sessions, the patients were asked to always remember the cited metaphors and how they benefited from the results.

Statistical Analysis

For analysis of data collected from 20 samples, MANCOVA and Chi-square tests were run to analyze the data, using SPSS version 20. Our sample size is appropriate with regard to the average of patients the three related studies ($n = 13$ for each group) (23, 24, 25). With regard to the presence of four variables, which might affect each other, MANCOVA was used. All the pre-intervention independent variables were covariates and their impact on the other variables was controlled for using MANCOVA. Firstly, all the pre-assumptions for MANCOVA including normality, outliers, linearity, multicollinearity, and singularity, and homogeneity of variance-covariance were examined. The mean and standard deviation of continuous variables were also reported. Moreover, the fixed effect of gender was controlled for, and P-value of less than 0.05 was considered statistically significant.

Results

Twenty patients (71.4%) completed the trial period until the final assessment. Mean ages of the participants in the metaphor therapy and control groups were 50.1 ± 8.7 and 48.3 ± 6.3 years,

respectively ($P=0.38$). In addition, the age range was 37-56 years in the metaphor therapy group and 37-74 years in the control group. Table 1 presents the demographic characteristics of the samples.

The data presented in Table 1 show that there was no significant difference between the two groups regarding educational level, occupation, or marital status. To compare pre- and post-intervention scores of depression, anxiety, stress, and pain discomfort between the two groups, MANCOVA was used and the results are presented in Table 2.

Regarding the calculated F score [$F(4, 10)=0.815$; $P=0.54$], it can be stated that the intervention was not effective in mitigating depression, anxiety, stress, and pain discomfort. Table 2 demonstrates that treatment was not effective in reducing depression [$F(1, 13)=0.396$; $P>0.05$], anxiety [$F(1, 13)=0.012$; $P>0.05$], stress [$F(1, 13)=1.718$; $P>0.05$], and pain discomfort [$F(1, 13)=0.733$; $P>0.05$]. Also, regarding no significant interaction between gender and the group ($P>0.05$), it can be stated that gender did not affect the results of the intervention.

Discussion

The current study was conducted to determine the efficacy of metaphor therapy in attenuating depression, anxiety, stress, and pain discomfort in patients with NCCP. The results showed that

Table 1. Comparison of demographic information between the groups

Variability	Metaphor therapy N (%)	Control N (%)	Test a&b	P-value
Age (Mean \pm SD)	48.3 ± 6.3	51.8 ± 10.7	1.02	0.38
Sex				
Female	10	8	2.63	0.21
Male	4	6		
Educational level				
Junior school	9 (90)	6 (60)	5.24	0.073
High school diploma	1 (10)	4 (40)		
University degree	0	0		
Occupation				
Housewife	9 (90)	2 (20)	13.33	0.004
Clerk	1 (10)	2 (20)		
Market	0	4 (40)		
Farmer	0	0		
Unemployed	0	0		
Retired	0	2 (20)		
Marital status				
Married	7 (70)	9 (90)	4.25	0.12
Single	0	1 (10)		
Widow	3 (30)	0		
Divorced	0	0		

a = t-test was used for the age

b = Chi-square test was used for the other variables

Table 2. Results of the effectiveness of the intervention

Dependent Variables	Metaphor therapy (n=10)		Control (n=10)		F (1, 13)	P-value
	Pre-intervention	Post-intervention	Pre-intervention	Post-intervention		
Depression	10.60 ± 3.60	9.90 ± 3.51	7.90 ± 3.66	6.60 ± 4.03	0.396	0.54
Anxiety	11.80 ± 2.30	9.40 ± 3.13	7.70 ± 3.92	6.40 ± 3.50	0.012	0.92
Stress	16.40 ± 3.17	14.10 ± 3.96	10.40 ± 5.01	10.0 ± 2.79	1.718	0.21
Pain discomfort	23.70 ± 6.25	19.50 ± 6.38	19.40 ± 5.25	17.60 ± 4.25	0.733	0.41

metaphor therapy was not effective in lowering depression, anxiety, stress, and pain discomfort. Despite the results of the current study, former studies on this subject demonstrated efficiency of the cognitive behavioral therapy (CBT) in reducing psychological symptoms and pain (19, 23, 25, 26). One justification for this result could be the appearance of effectiveness of CBT as moderate-long term therapy (27); that is, in stressful and emergency situations, patients could correctly employ rapid methods, and with the persistent practices used in this method, they would trust in its effectiveness. Another explanation could be patient's own negligence in completing their assignments (27).

Upon reviewing the behavioral assignments of the patients on each session, it became evident that more than half of the patients did not complete their daily behavioral homework on at least three sessions of each week. The patients cited the reasons for their negligence as having to deal with crowded household and lack of adequate concentration for completing homework. False beliefs of the Iranian patients, specifically patients from the western regions of the country, regarding therapy can play a role in achieving this result, since most patients believe that the best therapy is the one that immediately relieves pain and eliminates symptoms.

Although psychological interventions take time to show their effects and require cooperation of the patients in the therapy procedure, our patients did not take the therapy sessions seriously and often times showed resistance against it. In fact, many of the patients did not see themselves directly involved or responsible in creating or improving their own situation, and only looked for a passive recovery through using chemical medications. Hence, it was predictable that homework assignments and their future application were not seriously followed.

Despite the findings of some of the previous studies on the effectiveness of metaphor therapy and other cognitive approaches (19, 28), the results of the current study showed that metaphor therapy, as a cognitive approach, could not assuage depression, anxiety, stress, and pain discomfort in NCCP patients. This finding was in agreement with results of the study by Bahremand et al. (23). The reason for this discrepancy might be the fact that generalization of a metaphor is greatly dependent on an individual's power of imagination and visualization (29).

Therefore, visualization of the implications of the stories, perception of the presented non-cardiac justifications for chest pain, and challenging dysfunctional beliefs (29), were dependent on the individual patients' frames of thought and abilities. Another reason for our results might be the fact

that our samples were from western regions of the country where the general population have a low economic status.

In the intervention sessions, most of the participants indicated to their family's low income, daily problems in their household, and aggressive behavior of their spouse as the reasons for experiencing chronic chest pain and extreme anxiety. The patients had paid repeated visits to their treating physician and had received medications, they also had undergone angiography and yet their pain did not reduce, which led them to believe they are suffering from a serious cardiovascular condition, and their subsequent death was not unexpected.

Finally, it should be noted that our samples were from the western regions of Iran where the general population have a low socioeconomic status. Future studies are recommended to include patients with average to high socioeconomic status, and if possible, use larger sample sizes. Furthermore, our study did not include a follow-up; thus, future studies are suggested to follow up the samples.

Conclusion

The results of our study demonstrated that metaphor therapy was not effective in reducing depression, anxiety, stress, and pain discomfort in patients with NCCP. These findings can be secondary to several issues including the long time the intervention requires to show its effects, negligence of patients in completing their assignments, low patient accountability for reducing symptoms, inability of patients in using their power of imagination or visualization, low socioeconomic status, and false beliefs such as existence of serious cardiovascular problems. At the end, we recommend conducting a review on the efficacy of metaphor therapy method in treating NCCP patients.

Conflict of Interest

None declared.

Funding/Support

The study was supported by Kermanshah University of Medical Sciences, Kermanshah, Iran (grant No.: 92464).

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