

■ Original Article

Non-Coronary Patients with Severe Chest Pain Show More Irrational Beliefs Compared to Patients with Mild Pain

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Background: Despite providing insufficient medical evidence of the existence of a real cardiac condition, patients with non-coronary chest pain still interpret their pain incorrectly. The present study, therefore, sought to compare the irrational beliefs in non-coronary patients with mild chest pain against those with severe chest pain.

Methods: A cross-sectional design was used. The statistical population comprised non-coronary patients who presented to the Heart Emergency Center of Kermanshah city, Iran. Using a matching method, 96 participants were selected and studied in two groups of 48. The instruments used were the Comorbidity Index, Brief Pain Index, and the Jones Irrational Beliefs Test (short-form). The multivariate analysis of variance, chi-square test, and t-test were used for data analysis.

Results: Controlling for the effects of age and comorbid conditions, the severity of three types of irrational beliefs, including emotional irresponsibility ($P < 0.001$), hopelessness changes ($P < 0.001$), and problem avoiding ($P = 0.002$) was higher among patients with severe chest pain (according to effect level). However, in terms of demand for approval, no difference was seen between the two groups ($P = 0.180$).

Conclusion: Non-coronary patients with severe chest pain showed a greater number of irrational beliefs in comparison to patients with mild pain. Irrational beliefs are common mental occurrences in patients with non-coronary chest pain, and they should be attended to by health professionals, especially in severe non-coronary chest pain. Further investigation to determine the association between irrational beliefs and non-coronary chest pain is necessary.

Keywords: Chest Pain; Cognitions; Patients

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INTRODUCTION

Discomfort in the chest is one of the most common complaints reported by patients in clinical practice.¹⁾ This, in many cases, not only does not stem from the heart, as in nearly 66% of the patients, the existence of a clear physical cause could not be determined.²⁾ This can indicate the role of psychological factors^{3,4)} and their impact on the perception of chest pain.⁵⁾ The existing evidence shows that most patients with chest pain indicate an unknown etiology and use avoidant and emotion-focused coping styles,^{6,7)} and the few patients who use problem-bound strategies have less flexible styles than do other people with oppositional styles.⁸⁾ This leads this group of patients to be unsatisfied and uneasy despite the physician's assurance regarding the negativity of the assessment results.⁹⁾ They generally believe this pain will lead to heart attack or the emergence of a serious disease or even death. Therefore, it is quite clear that despite providing enough documentation that their chest pain is not cardiac in origin, such patients still interpret their pain incorrectly.¹⁰⁾ Some studies^{4,11)} confirm the existence of negative automatic thoughts and the inclination towards catastrophic interpretation of bodily feelings in patients with non-coronary chest pain. However, none of these studies has investigated the effect of irrational beliefs in pain intensification in this group of patients. The frequent visiting of these patients to clinics consumes substantial time and money for evaluations and examinations, placing high economic burden on the medical system.¹²⁾ Accordingly, the present study was performed to investigate and compare the irrational beliefs in non-coronary patients with mild chest pain against those with severe chest pain.

METHODS

1. Study Design

In this cross-sectional causal-comparative study, the irrational beliefs of patients with chest pain who presented to the Heart Emergency services of Imam Ali Hospital, Kermanshah, Iran in fall 2014, despite having normal angiography, were studied. Imam-Ali Hospital is a state specialized hospital for cardiology in Western Iran, and patients residing in Western Iran generally visit this hospital.

2. Inclusion Criteria

Inclusion criteria were (1) aged between 35 and 70 years, (2) educational level higher than elementary school, (3) history of at least 3 months of chest pain, (4) normal coronary angiography, and (5) no evidence of chest pain alleviation for at least 1 month after coronary angiography.

3. Patients, Sampling, and Implementation Method

The statistical population of the present study included 143 pa-

tients with non-cardiac chest pain who presented to our hospital. They reported chest pain for at least 1 month after a normal coronary angiography. At first, 27 people were excluded after failing to meet the inclusion criteria. Then, the remaining 116 were requested to participate in the study willingly after providing written informed consent. Five patients did not agree to participate, and so 111 individuals were included. The Comorbidity Index and Brief Pain Inventory were administered to the 111 subjects in order to gather data about their comorbid conditions and pain intensity. According to the results of a 10-degree pain intensity description, 54 people who obtained scores of 1 to 5 were included in a mild pain group and 57 patients who scored 6 to 10 were included in a severe chest pain group. Afterwards, patients in the first group were paired with patients in the second group based on gender, education, and marital status, and there remained 48 people in each group (33 women and 15 men) (Figure 1). Matching was accomplished by excluding 6 patients with severe pain and a high school degree or higher, as there were no counterparts in the group with mild pain. Then, 5 individuals with mild pain and only elementary education, who also did not have counterparts in the other group, were excluded from the study. Two women from the group with severe pain and a man from the group with mild pain were excluded from the study due to the lack of a counterpart. Finally, each group included 48 participants. A demographic information checklist and the Jones Irrational Beliefs Test (short-form) were used to collect the re-

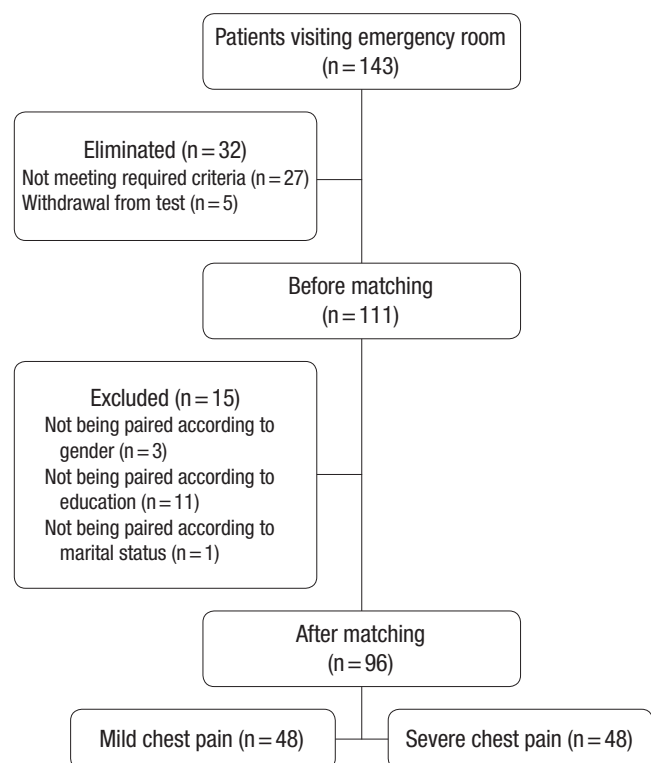


Figure 1. Study implementation method.

quired data. When the groups were specified, the patients were provided with the Jones Irrational Beliefs Test, and after the clinical psychologist presented the required explanations, they were requested to fill out the forms accurately. The forms were collected and the information was analyzed using the statistical methods outlined below.

4. Instruments

1) The Comorbidity Index

This index, designed by Ifudu et al.¹³⁾ in 1998, is a scoring index for evaluating comorbid physical conditions. It consists of 14 components to evaluate 14 main bodily conditions. These conditions are (1) ischemic heart disease; (2) other cardiovascular problems; (3) chronic respiratory diseases such as asthma; (4) autonomic neuropathy; (5) other neurologic problems; (6) muscular-neurologic disorders; (7) infections such as human immunodeficiency virus; (8) pancreas and biliary diseases; (9) blood disorders; (10) backache, spine ache, or joint disorders; (11) vision disorder (decreased vision to complete blindness); (12) limbs disorder; (13) genital and urinary diseases; and (14) psychiatric illness. A number from 0 (no comorbid physical condition) to 3 (high comorbid condition) is assigned to each item.¹³⁾

2) The Brief Pain Inventory

This scale scores pain severity on a 10-degree index where 0 indicates no pain and 10 indicates severe pain. The validity of this inventory has been studied in Iran by Mirzamani et al.,¹⁴⁾ who reported suitable validity in Iranian participants.

3) The Jones Irrational Beliefs Test (short-form)

The questions of the 40-item Jones Irrational Beliefs Test in Iran were extracted and validated based on the original Jones Test by Ebadi and Motamedin (2005). This includes four mini-scales of hopelessness changes (15 items), demand for approval (10 items), problem avoiding (5 items), and emotional irresponsibility (10 items). The scoring of questions is based on a 5-point Likert scale, and those being tested indicate the option that they agree with based on this scoring. In each mini-scale, higher scores indicate greater intensity of irrational beliefs. Cronbach's alpha was reported to be 0.75, and validity was reported to be 0.76 using the split-half method.¹⁵⁾

5. Statistical Analysis

The data were analyzed by multivariate analysis of variance (MANOVA), chi-square test, and t-test using IBM SPSS for Windows ver. 19.0 (IBM Co., Armonk, NY, USA). The chi-square test was used to investigate the non-significance of the difference between the two groups on nominal variables, including job status and smoking and alcohol abuse. The t-test was used to study the non-significance of the difference between the two groups on quantitative variables, including age and comorbidities.

MANOVA was used to compare the two groups in terms of dependent variables. Further, significance was determined with P-values less than 0.05, and eta-square was used to evaluate the effect size for each dependent variable.

RESULTS

Each group included 33 women and 15 men. The mean \pm SD age was 52.21 ± 7.39 years for women with severe pain and 52.36 ± 8.69 for women with mild chest pain. The mean \pm SD age for men with severe chest pain was 54.53 ± 8.39 years and 54.07 ± 9.80 for those with mild chest pain. Moreover, the mean \pm SD pain severity in the group with severe chest pain was 7.01 ± 1.24 , and in the group with mild chest pain, it was 3.33 ± 1.14 . Demographic and behavioral variables are shown in Table 1.

As shown in Table 1, there was no significant difference in any of the demographic or behavioral variables between the two groups. Table 2 presents means and SDs of the studied variables by group. Table 2 shows the results of the MANOVA comparing the two groups.

The F-value for group effects when controlling for confounding variables ($F[4,91] = 5.97$; $P < 0.001$; eta-square = 0.21) showed a significant difference for at least one of the dependent variables between the two groups. According to the table, patients with severe pain showed significantly higher scores than did patients with mild pain in emotional irresponsibility ($F[1,94] = 17.37$; $P < 0.001$; eta-square = 0.16), hopelessness changes ($F[1,94] = 14.66$; $P < 0.001$; eta-square = 0.14), and problem avoiding ($F[1,94] = 10.24$; $P = 0.002$; eta-square = 0.10). Eta-square, which shows the effect size for each variable, suggests that the major differences were in irresponsibility, hopelessness changes, and problem avoiding. However, there was no significant difference between groups in the need for approval variable ($F[1,94] = 1.83$; $P = 0.180$; eta-square = 0.02) (Figure 2). Meanwhile, after applying the Bonferroni correction ($P = 0.012$), because of the four existing dependent variables, and given the significance levels of the variables, the significant difference was confirmed.

DISCUSSION

The present study was carried out to compare the irrational beliefs in non-coronary patients with severe and mild chest pain. In line with van Peski-Oosterbann et al.¹¹⁾ and Achem,⁴⁾ the results showed a significant difference between the two groups in terms of hopelessness changes, problem avoiding, and emotional irresponsibility. The intensity of these variables was higher in patients with severe pain chest compared to those with mild chest pain. However, no difference was seen between the two groups in terms of the need for approval. As irrational beliefs dominate the individual's psyche and determine the

Table 1. Comparison of demographic and behavioral features and comorbidities by group

Variable	Severe pain (n = 48)	Mild pain (n = 48)	Total	t	P-value*
Sex [†]				1.02	0.82
Male	15	15	30		
Female	33	33	66		
Age (y) [‡]	52.25 ± 7.78	52.58 ± 9.95	52.42 ± 8.88	0.18	0.85
Comorbidity [‡]	1.13 ± 4.73	1.27 ± 4.42	1.20 ± 4.58	0.21	0.89
Education level					
Junior school	40	40	80		
High school diploma	7	7	14		
University degree	1	1	2		
Job [†]				1.75	0.59
Housewife	32	32	64		
Office worker	4	4	8		
Self-employed	8	6	14		
Retired	4	4	8		
Marital status					
Married	40	40	80		
Widowed/separated	8	8	16		
Smoking [†]				2.01	0.15
Yes	10	7	17		
No	38	41	79		
Drinking [†]				2.05	0.16
Yes	2	4	6		
No	46	44	90		

Values are presented as number or mean ± SD.

*P < 0.05. [†]By chi-square test. [‡]By t-test.

Table 2. MANOVA comparing between the two groups

Variable	Severe chest pain (n = 48)	Mild chest pain (n = 48)	Total (n = 96)	F	P-value	Eta-square
Hopeless	50.92 ± 8.82	44.01 ± 8.88	47.46 ± 9.46	F(1,94) = 14.66	0.001*	0.14
Demand	37.12 ± 5.38	35.60 ± 5.63	36.36 ± 5.53	F(1,94) = 1.83	0.180	0.02
Problem	16.39 ± 3.12	14.23 ± 3.50	15.31 ± 3.47	F(1,94) = 10.24	0.002*	0.10
Emotional	29.81 ± 5.33	25.33 ± 5.20	27.57 ± 5.70	F(1,94) = 17.37	0.001*	0.16
MANOVA (group)	Pillai's trace (value) = 0.21			F(4,91) = 5.973	0.001*	0.21
	Wilks lambda (value) = 0.79			F(4,91) = 5.973	0.001*	0.21
	Hotelling's trace (value) = 0.26			F(4,91) = 5.973	0.001*	0.21
	Roy's largest root (value) = 0.26			F(4,91) = 5.973	0.001*	0.21

MANOVA, multivariate analysis of variance.

*P < 0.01.

way individuals comment on, interpret, and define the life incidents that can regulate the quantity and quality of the behaviors and emotions,¹⁶⁾ it is somewhat predictable that we would observe higher scores on these beliefs in patients with severe pain. Dysfunctional attitudes and irrational beliefs are known as the underlying and intermediate factors in different disorders. They appear inflexible, resistant to change, and dysfunctional. These beliefs are initiated by environmental stresses and are often experienced by individuals as facts.¹⁷⁾ Therefore, there appears to be a defective communicative cycle between the experience of negative thoughts and dysfunctional beliefs, such that the existence of each one strengthens the other.

One of the results showed that the degree of hopelessness changes seen was higher in patients with severe chest pain than it was in those with mild chest pain. Irrational beliefs affect the

cognitive performance of the individual and weaken the effectiveness of cognition.¹⁸⁾ This leads the individual to incorrectly relate the existing problems to outside factors and forget the importance of his/her role and internal factors.¹⁹⁾ Thus, these patients relate the current problems, and especially the pain, to uncontrollable external factors, including physician's negligence, and they start to feel that doctors are unable to alleviate the pain. Continuing to feel hopeless and establishing it as an irrational belief, pain control becomes more complicated and the patient starts to report the ongoing feeling of pain.

Another finding indicated that the degree of problem avoiding is higher in patients with higher intensity of pain than it is in those with lower pain intensity. As irrational beliefs do not follow synchronization and coordination,²⁰⁾ they result in stressful situations and enhance negative behavior and perfor-

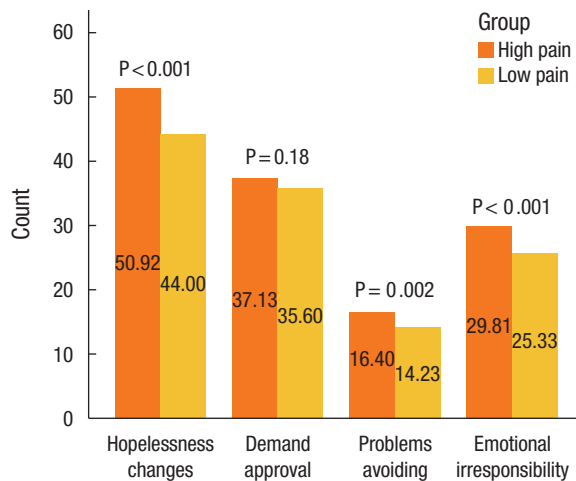


Figure 2. Comparison of irrational beliefs between the two studied groups.

mance.²¹⁾ One of those beliefs that leads to negative performance is problem avoiding. While this leads patients to forget the reality, after a while, patients are overcome by self-dissatisfaction, the current situation, and the guilt of problem evasion. This causes the individuals to lack self-confidence²²⁾ and intensify the existing pain by self-blaming as the main reason for pain intensification and by retelling their irrational thoughts and behavior.¹⁹⁾

Another finding showed that the degree of emotional irresponsibility is higher in patients with severe chest pain than it is in those with mild chest pain. Ellis and Harper²³⁾ believe that appropriate emotional reactions originate from the rational thinking of individuals based on the awareness of the role of feelings in recognition of negative and positive emotions. Although Ellis and Harper²³⁾ emphasized the necessity of negative emotions in our lives and that their existence is not necessarily a serious problem, patients with high-grade emotional irresponsibility believe that their lives should be free of negative emotion, including fear and anxiety. Hence, the existence of these negative emotions indicates a serious problem that could be very dangerous if not resolved. The existence of these negative emotions is so troubling for these patients that its mere existence creates the continuity and intensity of the pain.

Moreover, the results showed that there was no difference in terms of demand for approval between patients with severe and mild chest pain. Those who seek approval from others are generally very anxious and feel insecure,²²⁾ and they are not the exception to this rule. Many of these patients expect the doctor to approve their theory of having heart problems in order to feel relaxed, while the doctor rejects their theory based on the medical evidence and assures them that there is not any kind of heart problem. After some repetitions, the patients begin to conclude that their complaints are not taken seriously. This happens in patients with both severe and mild chest pain, who equally seek

the approval of the doctor and others to feel relaxed.

A limitation to the present study was a lack of consideration of variables that might affect the severity of non-coronary chest pain. Therefore, it is suggested that future studies investigate such variables. On the other hand, we could not match patients' ages due to a small sample size, which seems essential to be considered in future studies. In addition, regarding the sample size that we recruited and the probable loss of many patients because of careful matching, it is recommended to consider the following items in future studies: family history of chest pain, kinds of drugs taken, and history of heart disease in first-degree relatives.

In conclusion, the present study was carried out to compare the irrational beliefs in non-coronary patients with severe and mild chest pain. The results showed that there was a significant difference between the two groups in terms of hopelessness changes, problems avoiding, and emotional irresponsibility and the intensity of these irrational beliefs was higher in patients with severe chest pain. However, no difference was seen in terms of need for approval between the two groups. Therefore, it could be said that irrational beliefs are mental phenomena that should be attended to by health professionals when physical symptoms appear.^{24,25)} Irrational beliefs are common mental phenomena in patients with non-coronary chest pain, and they should be attended to by health professionals, especially in severe non-coronary chest pain. Further investigations to determine the association between irrational beliefs and non-coronary chest pain are necessary.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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