

# A Perceived Risk Factor May Lead to Increased Anxiety and Depression in Cardiovascular Patients

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## Abstract

**Background:** The way that patients perceive their cardiac condition and their attitude toward its causes are effective in education and in the primary and secondary prevention of cardiovascular diseases (CVDs).

**Objectives:** The current study was conducted to compare anxiety and depression among cardiovascular patients with and without a perceived risk factor toward CVD.

**Methods:** The administrative data of this retrospective cross-sectional study were obtained from the database of the cardiac rehabilitation (CR) ward of a hospital in Iran. The data of 745 patients were obtained from January 2005 to 2011 using the compiled forms of this database, the Beck Anxiety Inventory, the Beck Depression Inventory, and the Structured Clinical Interview for Axis I Disorders. Multivariate analysis of variance was used for data analysis.

**Results:** After adjusting for gender and age and at the beginning of the CR program, anxiety ( $P = 0.006$ ) and depression scores ( $P = 0.016$ ) were significantly higher among those with a perceived risk factor ( $N = 602$ ) than among those without such perceived risk factor ( $N = 143$ ). Although males with a perceived risk factor experienced higher anxiety ( $P = 0.01$ ) and depression ( $P = 0.02$ ) than males without such perceived risk factor, the difference was not detected in females.

**Conclusions:** As perceived risk factors may not always translate to a real risk factor, patients with a perceived risk factor toward CVD may experience anxiety and depression. The results found in females are discussable.

**Keywords:** Cardiovascular, Risk Factor, Anxiety, Depression, Attitude, Rehabilitation

## 1. Background

Anxiety and depression are considered triggers for cardiovascular diseases (CVDs). About one-fourth of patients attribute their cardiac condition development and establishment to these factors (1, 2).

Anxiety, as the most primitive and common reaction to a cardiac event, can lead to tachycardia, hypertension, and increased cardiac output, and it can adversely affect physical performance and quality of life among cardiac patients. A high anxiety level can increase sudden cardiac death up to three folds and can affect the adherence of patients in terms of participation in cardiac rehabilitation (CR) (3). According to a study, an association exists between anxiety and incident cardiac disease with a 26% increase in risk, and anxiety is also specifically associated with cardiac mortality, with anxious persons having a 48% increased risk of cardiac death (4).

Depression is highly prevalent in cardiac patients. About 31% - 45% of patients with coronary artery disease

(CAD), including those with stable CAD, unstable angina, or myocardial infarction (MI), suffer from clinically significant depressive symptoms (5). Patients with CVD, who are also depressed, have a worse outcome than those who are not depressed (6). Depression is associated with cardiac stress reactions (7, 8) and can adversely affect the compliance of patients who actually require CR. Depression can lead to slow activity beginning, poor social adaptability, lower chance of return to work, and lower level of quality of life after a cardiac event. This psychiatric disorder can lead to future cardiac conditions and considerable morbidity and mortality in patients with established coronary artery disease (9).

According to the results of a study (2), psychological factors such as anxiety and depression have an important role in the attitude of patients toward CVDs risk factors. These risk factors are categorized into five classes, namely, biological, environmental, physiological, behavioral, and psychological (3). The attitude of patients with awareness

of any of the mentioned risk may likely have an important role in their health behavior (10). The study by Saeidi et al. (3) showed that patients who attribute their condition to physiological or psychological factors experience more anxiety than those who attribute the disease to behavioral factors. Therefore, patients' cognitions in all stages of disease experience, including symptom perception, looking for a factor to attribute the disease to that particular factor, and change in personal behaviors, may extremely affect the progression of the disease and its treatment (11).

In recent years, the association between disease risk factors and causative beliefs about CVDs has been investigated in several studies (12, 13). Patients with more false beliefs and misconceptions about disease risk factors have been determined to have poorer physical performance (14) and to experience more anxiety and depression than other patients (15).

Although these studies have investigated the relationship between myths and misconceptions about the causes of the disease with anxiety and depression, note that a wide range of patients do not have a clear view about the cause of their disease (1, 16). Thus, as indicated in the abovementioned studies, the assessment of these patients and their mental state, especially anxiety and depression, has been neglected.

In a recent study that examined 901 cardiac patients, 10.5% of the patients, especially older patients, were unaware of the causes of their CVD (17). Thus, previous studies neglected the evaluation of the mental state of a wide range of patients and considered only patients' misconceptions with a perceived risk factor.

## 2. Objectives

Therefore, in this study, we attempted to examine anxiety and depression in patients without a perceived risk factor toward CVD and the severity of these symptoms compared with patients with a perceived risk factor.

## 3. Methods

### 3.1. Study Design

The administrative data of this retrospective cross-sectional study were obtained from the CR ward of Imam-Ali hospital in Kermanshah, Iran. The database of this government heart specialized center is composed of information about cardiovascular patients who have been registered in the CR. The demographic and clinical information of patients, including the psychological condition, comorbidities, and patients' attitude regarding the risk factors, is registered in the database. The registration forms

were designed by cardiologists and health professionals and experts under the supervision of the Kermanshah University of Medical Sciences. To evaluate the psychological state of patients such as anxiety and depression, standard tools were used at the beginning and at the end of CR. These scales were carefully explained and implemented by the experienced clinical psychologist of CR. One question was asked by the clinical psychologist on the attitude of patients regarding the main cause of their illness: "What do you think is the main cause of your illness?" The attitudes were recorded into six categories: 1) Biological, 2) Environmental, 3) Physiological, 4) Behavioral, 5) Psychological factors, and 6) I don't know. Therefore, those who answered heredity, age, and family as the main reasons for the diseases were placed into the biological group. Choosing one of the components related to environmental (dust, smoke and toxic substances, and passive smoking), physiological (hypertension, diabetes, hyperlipidemia, and overweight), behavioral (lack of exercise, nutrition, physical work, cigarette, and substance abuse), and psychological (stress, mourning and depression, anger, and spousal abuse) attitudes as the main reason for the disease was the criterion for dividing patients into groups. Consequently, each patient was added to only one group according to their major attitude toward the reason for the disease. Those who did not correctly perceive the main cause of their disease and could not attribute their disease to any risk factor were placed in the sixth group. Patients who were in any of the first five groups were entered into the group of patients with perceived risk factor and patients in the sixth group who were unaware of their condition cause were considered as the group without a perceived risk factor. For illiterate patients, the self-reported questionnaires were read by the clinical psychologist of the CR ward, and then the patients' answers were registered. All data were collected by the CR clinical psychologist and were used after confirmation of the CR cardiologist and head nurse.

### 3.2. Inclusion Criteria

The inclusion criteria included the following: (1) age between 30 and 80 years, (2) currently having no addiction to illegal drugs, and (3) having no psychotic disorder.

### 3.3. Participants

A total of 790 patients participated in the CR program and were registered in a six-year period between January 2005 and 2011. After the exclusion of 26 patients because they failed to meet the inclusion criteria, the data of other patients were entered into the analysis. However, the statistical software excluded 19 patients because their information in some items was missing. Ultimately, the sample size obtained was 745 persons.

### 3.4. Ethical Considerations

This study was conducted after obtaining the approval of the Ethics committee of Kermanshah University of Medical Sciences.

### 3.5. Instruments

#### 3.5.1. Structured Clinical Interview for Axis I Disorders

This instrument evaluates the axis I psychological disorders. It has six parts for assessing the diagnostic criteria of the 38 disorders in axis I including mood disorders, anxiety, and psychosis (18).

#### 3.5.2. Beck Anxiety Inventory

Beck (1988) designed a 21-item questionnaire to assess anxiety. Each item receives a score of 0-3, and thus the total score varies from 0 to 63. A score of 0-7 indicates no anxiety; a score of 8-15 indicates mild anxiety; a score of 16-25 indicates moderate anxiety; and a score of 26-63 indicates severe anxiety. The Cronbach's alpha of the scale is 0.92, the consistency when retested within one week is 0.75, and the consistency of the items varies from 0.30 to 0.76 (19).

#### 3.5.3. Beck Depression Inventory

Beck (1961) designed a 21-item questionnaire to assess depression. Each item receives a score of 0-3; therefore, the total score varies from 0 to 63. A score of 0-4 indicates possible denial; 5-9 indicates very mild depression; 10-18 indicates mild to moderate depression; 19-29 indicates moderate to severe depression; and a score of over 30 indicates severe depression. Beck et al. (1988) reported the consistency when patients were retested within one week as 0.93 (20).

### 3.6. Statistical Analysis

The percentages relevant to the distinct variables were reported using descriptive statistics. For continuous variables, their mean and standard deviation were reported. The multivariate analysis of variance (MANOVA) was used for comparing the dependent variable's condition among the groups. Applying the variance analysis using the SPSS version 21.0 for Windows (SPSS Inc., Chicago, IL, USA), the effect of gender and age was controlled as fix factors. A P value level of less than 0.05 was considered statistically significant.

## 4. Results

Among the 745 participants, 498 (66.9%) were male. The mean age of the participants was 57.6 ( $\pm$  8.8) and 61.2 ( $\pm$  9.3) years in the groups with and without perceived risk factor (n=602 vs. 143), respectively. A total of 421 female (vs.

66) and 181 male (vs. 77) patients attributed their disease to a risk factor. Tables 1 and 2 present the demographics and comorbidities of the participants, respectively.

Table 2 indicates a significant difference between the groups only in terms of smoking. In comparing the mixed score of dependent variables with the control of age and gender, the MANOVA results showed that the obtained F value was significant for the group source [F (2,600) = 4.246; P = 0.015]. However, the interactions among group  $\times$  gender (P = 0.91), group  $\times$  age (P = 0.73), and group  $\times$  gender  $\times$  age (P = 0.99) were not statistically significant. Therefore, a significant difference was found in at least one of the dependent variables between the two groups. The results of the analysis of variance for anxiety and depression are presented in Table 3.

According to this table, the mean scores of anxiety [F (1,601) = 7.516; P = 0.006] and depression [F (1,601) = 5.875; P = 0.016] were statistically higher in patients with a perceived risk factor than in those without. Similarly, males with a perceived risk factor experienced higher anxiety (P = 0.01) and depression (P = 0.02) than males without such perceived risk factor. However, such a difference was not observed in females for anxiety (P = 0.43) and depression (P = 0.18).

## 5. Discussion

This study was conducted to compare anxiety and depression between cardiovascular patients with and those without a perceived risk factor toward CVD. The results demonstrated that anxiety and depression scores were significantly higher in patients with a perceived risk factor than in those without. Although patients with a perceived risk factor can attribute clearly their condition to a risk factor, their attitude about the cause of their disease may be incorrect and may only be a dysfunctional belief. As there may not be a relationship between a real risk factor and a perceived risk factor (21), many perceived risk factors can be regarded as dysfunctional attitude. According to a report, patients with dysfunctional beliefs are more anxious and have poorer physical performance than other patients (14). This anxiety and limited physical performance can have depressive symptoms. Therefore, anxiety and depression among patients with a perceived risk factor for CVDs can increase through incorrect perception and dysfunctional beliefs.

Another explanation for this finding is the possible educational level of the two groups. One-third of patients with a perceived risk factors versus two-thirds of the other group subjects were illiterate. This rate of illiteracy can be related to poorer recognition of the disease and related risk factors (11) and can lead to the state in which patients

**Table 1.** Demographics of Patients

Variable	Aware (n = 602), No. (%)	Unaware (n = 143), No. (%)	Total (n = 745), No. (%)
<b>Sex</b>			
Male	421 (69.9)	77 (53.8)	498 (66.9)
Female	181 (30.1)	66 (46.2)	247 (33.1)
<b>Marital status</b>			
Married	526 (87.4)	123 (86.0)	649 (87.1)
Widowed/Divorced	76 (12.6)	20 (14.0)	96 (12.9)
<b>Educational level</b>			
Illiterate	217 (36.1)	93 (65.0)	310 (41.6)
Junior school	194 (32.2)	39 (27.3)	233 (31.3)
High school diploma	108 (17.9)	7 (4.9)	115 (15.4)
University degree	83 (13.8)	4 (2.8)	87 (11.7)
<b>Occupation</b>			
Clerk	68 (11.3)	4 (2.8)	72 (9.7)
Market	214 (35.5)	52 (36.4)	266 (35.7)
Retired	151 (25.1)	23 (16.1)	174 (23.3)
Housewife	169 (28.1)	64 (44.7)	233 (31.3)

**Table 2.** Comorbidities of Participants

Comorbidity	Aware, No. (%)	Unaware, No. (%)	X <sup>2</sup>	P value
<b>Mental conditions</b>				
Mood disorders	79 (13.1)	14 (9.8)	0.391	0.53
Anxiety disorders	146 (24.3)	36 (25.2)	0.020	0.89
Mood/Anxiety	62 (10.3)	15 (10.5)	0.048	0.83
<b>Physical conditions</b>				
Diabetes	93 (15.4)	18 (12.6)	2.332	0.29
Hypertension	97 (16.1)	18 (12.6)	2.410	0.28
Hyperlipidemia	133 (22.1)	27 (18.9)	2.877	0.19
Addiction	105 (17.4)	17 (11.9)	2.603	0.11
Smoking	251 (41.7)	45 (31.5)	5.046	0.03*
Drinking	23 (3.8)	7 (4.9)	1.445	0.26

**Table 3.** Comparison between Anxiety and Depression among the Groups

Variable	Aware	Unaware	Total	F (1,601)	P Value
<b>Total</b>					
Anxiety	30.63 ± 11.88	29.39 ± 11.20	30.39 ± 11.75	7.516	0.006**
Depression	17.38 ± 3.36	16.86 ± 3.00	17.28 ± 3.30	5.875	0.016*
<b>Male</b>					
Anxiety	28.34 ± 11.28	24.84 ± 10.06	27.80 ± 11.16	6.441	0.011*
Depression	16.89 ± 3.34	15.95 ± 2.91	16.75 ± 3.29	5.414	0.020*
<b>Female</b>					
Anxiety	35.97 ± 11.53	34.70 ± 10.13	35.63 ± 11.17	0.630	0.43
Depression	18.52 ± 3.15	17.92 ± 2.76	18.36 ± 3.06	1.837	0.18

have no correct perception of their condition. However, those who are aware about CVDs risk factors and attribute their condition to a risk factor may feel more risk and may be more mentally involved with their disease because of

their higher educational level and understanding of more details about the disease.

Consistent with the general results of this study, another finding indicated that males with a perceived risk

factor experienced more anxiety and depression than males without a perceived risk factor. As previously mentioned, this finding can be the result of dysfunctional attitudes of this gender group or their educational level. However, no difference was found between females of the two groups. The main reason for this observation may be the lower sample size of women compared with that of the men, as the number of women was less than half of the male participants. An observation on anxiety and depression in females of the two groups showed that their scores are consistent with the overall finding of the study and that the anxiety and depression scores of women with a perceived risk factor are higher than those of the other females. Therefore, the factor that can affect the significance of this comparison is the lower sample size of women in this study.

Studies have shown that women are less aware than males about CVD risk factors and that only half of them are aware about the risk factor of their condition (1, 16). Therefore, it is less likely that inconsistency exists between the real and the perceived risk factor in females that results in a dysfunctional attitude and cognition about the disease risk factors. Finally, as a result of dysfunctional attitudes, the likelihood of anxiety and depression is lower in women than in men.

One of the limitations of this study is the discrepancy in the educational level of the two groups; one-third of patients with a perceived risk factor versus two-thirds of the other group subjects were illiterate. Moreover, smoking was more common in those with higher anxiety and depression and had a perceived risk factor. Smoking may affect the psychological status of patients. Therefore, educational level and smoking of patients should be considered and controlled in future studies.

## Footnote

**Authors' Contribution:** All authors contributed extensively to this paper.

## References

- Saeidi M, Komasi S, Soroush A, Zakiei A, Shakeri J. Gender differences in patients' beliefs about biological, environmental, behavioral, and psychological risk factors in a cardiac rehabilitation program. *J Cardio Thorac Med*. 2014;2(4):215-20.
- Saeidi M, Soroush A, Komasi S, Moemeni K, Heydarpour B. Attitudes toward cardiovascular disease risk factors among patients referred to a cardiac rehabilitation center: importance of psychological attitudes. *Shiraz E-Med J*. 2015;16(7):e22281. doi: [10.17795/semj22281](https://doi.org/10.17795/semj22281).
- Saeidi M, Komasi S, Heydarpour B, Momeni K, Zakiei A. Those who perceive their disease as a physiological or psychological risk factor experience more anxiety at the beginning of cardiac rehabilitation program. *Res Cardiovascular Med*. 2016;5(4):e29291. doi: [10.5812/cardiovascmed.29291](https://doi.org/10.5812/cardiovascmed.29291).
- Roest AM, Martens EJ, de Jonge P, Denollet J. Anxiety and risk of incident coronary heart disease: a meta-analysis. *J Am Coll Cardiol*. 2010;56(1):38-46. doi: [10.1016/j.jacc.2010.03.034](https://doi.org/10.1016/j.jacc.2010.03.034). [PubMed: 20620715].
- Huffman JC, Celano CM, Beach SR, Motiwala SR, Januzzi JL. Depression and cardiac disease: epidemiology, mechanisms, and diagnosis. *Cardiovasc Psychiatry Neurol*. 2013;2013:695925. doi: [10.1155/2013/695925](https://doi.org/10.1155/2013/695925). [PubMed: 23653854].
- Hare DL, Toukhsati SR, Johansson P, Jaarsma T. Depression and cardiovascular disease: a clinical review. *Eur Heart J*. 2014;35(21):1365-72. doi: [10.1093/eurheartj/ehu462](https://doi.org/10.1093/eurheartj/ehu462). [PubMed: 24282187].
- Bath J, Bohin G, Jones C, Scarle E. Cardiac rehabilitation: A work book for use with group programmes. Chichester: Wiley-Blackwell; 2009.
- Sher L. Psychological factors and cardiovascular disorders: The role of stress and psychological influences. New York: Nova biomedical books; 2009.
- Saeidi M. The efficacy methods of relaxation and reconstruction of cognitive on anxiety and depression in cardiac rehabilitation patients. 2004.
- Lau-Walker M. Importance of illness beliefs and self-efficacy for patients with coronary heart disease. *J Adv Nurs*. 2007;60(2):187-98. doi: [10.1111/j.1365-2648.2007.04398.x](https://doi.org/10.1111/j.1365-2648.2007.04398.x). [PubMed: 17877566].
- Hirani SP, Newman SP. Patients' beliefs about their cardiovascular disease. *Heart*. 2005;91(9):1235-9. doi: [10.1136/hrt.2003.025262](https://doi.org/10.1136/hrt.2003.025262). [PubMed: 16103576].
- Perkins-Porras L, Whitehead DL, Steptoe A. Patients' beliefs about the causes of heart disease: relationships with risk factors, sex and socioeconomic status. *Eur J Cardiovasc Prev Rehabil*. 2006;13(5):724-30. doi: [10.1097/01.hjr.0000216551.81882.11](https://doi.org/10.1097/01.hjr.0000216551.81882.11). [PubMed: 17001211].
- van der Wal MH, Jaarsma T, Moser DK, Veeger NJ, van Gilst WH, van Veldhuisen DJ. Compliance in heart failure patients: the importance of knowledge and beliefs. *Eur Heart J*. 2006;27(4):434-40. doi: [10.1093/eurheartj/ehi603](https://doi.org/10.1093/eurheartj/ehi603). [PubMed: 16230302].
- Furze G, Lewin RJ, Murberg T, Bull P, Thompson DR. Does it matter what patients think? The relationship between changes in patients' beliefs about angina and their psychological and functional status. *J Psychosom Res*. 2005;59(5):323-9. doi: [10.1016/j.jpsychores.2005.06.071](https://doi.org/10.1016/j.jpsychores.2005.06.071). [PubMed: 16253623].
- Perkins-Porras L, Joeke K, Bhalla N, Sutherland C, Pollard M. Reporting of Posttraumatic Stress Disorder and Cardiac Misconceptions Following Cardiac Rehabilitation. *J Cardiopulm Rehabil Prev*. 2015;35(4):238-45. [PubMed: 25689163].
- Jensen LA, Moser DK. Gender differences in knowledge, attitudes, and beliefs about heart disease. *Nurs Clin North Am*. 2008;43(1):77-104. doi: [10.1016/j.cnur.2007.10.005](https://doi.org/10.1016/j.cnur.2007.10.005). [PubMed: 18249226].
- Komasi S, Saeidi M. Aging is an important cause for a lack of understanding of the main risk factor in cardiac rehabilitation patients. *Thrita*. 2015;4(4):e32751. doi: [10.5812/thrita.32751](https://doi.org/10.5812/thrita.32751).
- Lobbestael J, Leurgans M, Arntz A. Inter-rater reliability of the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID I) and Axis II Disorders (SCID II). *Clin Psychol Psychother*. 2011;18(1):75-9. doi: [10.1002/cpp.693](https://doi.org/10.1002/cpp.693). [PubMed: 20309842].
- Beck AT, Epstein N, Brown G, Steer RA. An inventory for measuring clinical anxiety: psychometric properties. *J Consult Clin Psychol*. 1988;56(6):893-7. [PubMed: 3204199].
- Beck AT, Steer RA, Garbin MGJ. Psychometric properties of the beck depression inventory twenty-five years of evaluation. *Clin Psych Rev*. 1988;8:77-100.
- Murphy B, Worcester M, Higgins R, Le Grande M, Larritt P, Goble A. Causal attributions for coronary heart disease among female cardiac patients. *J Cardiopulm Rehabil*. 2005;25(3):135-43. [PubMed: 15931015].