

## Perceived personal control and post-myocardial infarction depression

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### Abstract

**BACKGROUND:** Depression is very prevalent amongst myocardial infarction (MI) patients. It has been reported to be associated with adverse clinical events in these patients. The purpose of this study was to consider the relationship between personal control at baseline and the onset of post-MI depression.

**METHODS:** A total number of 176 MI patients aged 32-84 years old who were admitted to coronary care units (CCUs) in Isfahan, Iran were selected. Baseline data was collected by a demographic and medical questionnaire, personal control scale, Beck Depression Inventory and echocardiography. Beck Depression Inventory for Primary Care was completed by the subjects 3 months after discharge. Covariance model was used to analyze the data.

**RESULTS:** The findings indicated that 45% of the participants suffered from post-MI depression. Analysis of covariance showed a significant difference between patients with and without post-MI depression in personal control scores ( $F = 6.16$ ;  $P < 0.05$ ).

**CONCLUSION:** Generally, our findings suggested relationship between patients' beliefs about having control over the disease and the onset of post-MI depression. This finding can be considered in rehabilitation courses to prevent post-MI depression.

**Keywords:** Myocardial Infarction, Depression, Personal.

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### Introduction

Patients with severe physical illness are usually in permanent challenge for adaptability in order to maintain their life and welfare. Sense of personal control has been considered as human a characteristic<sup>1</sup> and is one of the main factors in coping processes which have an important role in adaptability with illness.<sup>2</sup> Perceived personal control is how much a person thinks he can affect events or situations.<sup>3,4</sup>

According to Folkman and Moskowitz, coping is a complicated and multidimensional process that also depends upon environmental requirements and sources.<sup>5</sup> It is generally believed that having the required abilities and resources for using problem-oriented coping styles would reduce the psychological and physiologic effects of daily stressors and problems. One of the required resources is the sense of personal control.<sup>6</sup> Evidence has shown that while external locus of control is more associated with psychosocial consequences such as depression and anxiety<sup>4,7</sup> the sense of having control over a disease is linked with positive psychological outcomes.<sup>4,8</sup>

Previous studies have shown high levels of personal control to be related with lower levels of depression among patients with rheumatoid arthritis,<sup>9</sup> kidney diseases,<sup>10</sup> diabetes,<sup>11</sup> and cancer.<sup>12</sup> In a prospective study, Barez et al.<sup>13</sup> suggested that perceived control in patients with cancer can predict psychological adjustment and adaptability. Personal control has also been found to affect psychological functioning in cardiac patients. Helgeson evaluated 80 admitted patients with myocardial infarction (MI) and reported correlations between perceived control and depression, anxiety, and hostility.<sup>14</sup> In a similar longitudinal study on 278 MI patients treated through percutaneous transluminal coronary angioplasty (PTCA), Helgeson showed a close relationship between perceived control and depression and anxiety.<sup>15</sup> Although both the abovementioned studies have indicated an important relationship between structures of perceived control and depression and anxiety, none of them clarified these relationships specifically. Furthermore, Bohachick et al. studied patients with heart replacement surgery and found a correlation between sense of control at baseline and

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depression six months later.<sup>16</sup> Nevertheless, these studies were not basically related to post-MI patients. As far as searching related literature revealed, Moser and Dracup<sup>17</sup> have been the only researchers to prospectively evaluate post-MI patients. They assessed the perception of control among 176 patients following MI at baseline and in a six-month follow-up. They observed that subjects with higher levels of control were less depressed. The results of another study on 222 patients with heart failure showed levels of depression to be inversely related with perceived personal control.<sup>18</sup>

In general, although previous studies have implied a correlation between personal control and depression in chronic patients, they have mostly been cross-sectional. On the other hand, few studies (Helgeson<sup>14,15</sup> and Moser and Dracup<sup>17</sup>) have specifically evaluated the correlation between personal control and depression following MI while others investigated the relation among other patients. Therefore, this prospective study evaluated personal control at baseline and then at 3-month intervals after the MI to determine the correlation between primary personal control and the incidence of subsequent depression.

### Materials and Methods

This was a prospective study to review the association between perceived personal control and the incidence of depressive symptoms following MI.

#### **Study subjects:**

The study subjects included 176 MI patients aged 32-84 years (mean age: 56 years) who had been admitted to one of the hospitals of Isfahan Iran) equipped with a coronary care unit (CCU). Patients were all diagnosed with MI during April to September 2006. The subjects were mainly male (84%), married (88.6%), and from low to moderate socioeconomic classes of the society (87%). Anterior and non-anterior MI were detected in 48.3% and 51.7% of the patients, respectively. Moreover, 123 individuals had no history of previous MI.

The studied patients were selected through available (consecutive) random sampling according to inclusion and exclusion criteria. The inclusion criteria were having 2 out of 3 criteria for MI diagnosis and agreement of the patient for participation in the study. Diagnostic criteria for MI included angina pectoris characterized as low blood supply to heart muscle which lasted at least for 20 minutes (typical ischemia), presence of pathologic changes indicating ischemia/infarction in echocardiographic (ECG) waves, and increased cardiac enzyme. Patients were excluded if the MI was secondary to bypass surgery or

angioplasty, or if serous comorbidities reducing life expectancy, major psychological disorders, or cognitive disorders or weakness in cognitive functioning were present. In addition, patients under treatment for depression or with highly poor general medical condition and those unable to speak fluent Persian to complete interviews and questionnaires were also excluded. The incidence of an MI during hospitalization due to other medical reasons and impossibility of patient follow-up after the discharge were other criteria for not including an individual.

#### **Tools:**

1) *Demographic Characteristics and Medical Questionnaire*. Demographic characteristics and medical data of the patients were obtained through a questionnaire designed for data collection. Medical information of the patients was also extracted from their files.

2) *Beck Depression Inventory-Primary Care (BDI-PC)*: This inventory was designed by Beck et al. through removing somatic items from the original inventory in order to be used as a screening tool in medical centers and also to minimize the probability of false estimates from depression among somatic patients. Previous studies have indicated the superiority of this test over the hospital anxiety and depression scale.<sup>19,20</sup> This inventory consists of 7 items each of which indicates a sign of depression. The items of this scale are in accordance with the criteria of the Diagnostic and Statistical Manual of Mental Disorders 4<sup>th</sup> Edition (DSM-IV) for diagnosis of clinical depression.<sup>21</sup> Severity of each sign in each item is expressed using 4 phrases which are scored from zero (lack of the sign) to three (maximum level of severity). The maximum obtainable score in the scale is 21. Many previous studies have evaluated the psychometric qualities of BDI-PC and confirmed its high screening validity and reliability among somatic patients.<sup>22,23</sup> The psychometric qualities of BDI-PC have also been separately investigated on Iranian samples. The scale's Cronbach's alpha, as a measure of internal consistency, has been obtained as 0.88 in 176 samples. Furthermore, the results of test-retest of this scale with a 3-week interval on 62 cardiac patients revealed a retest validity coefficient of 0.74. Moreover, construct validity of the scale was tested among 140 individuals and obtained as 0.87 compared to depression subscales in Persian version of hospital anxiety and depression scale.<sup>24</sup> In addition, using organized clinical interview based on DSM-IV criteria in the mentioned subjects, the cut-off point was obtained as 5 with a sensitivity of 0.84, specificity of 0.97, and maximum clinical efficiency of 0.91 for clinical depression screening such as major depression and minor depression.<sup>25</sup>

3) *Revised Illness Perception Questionnaire (IPQ-R)*: IPQ-R has been designed based on Leventhal's self-regulation theory in order to assess cognitive aspects of an illness. In this study, the personal control scale of IPQ-R was used to assess the variable of personal control on disease. The items of this questionnaire are graded based on a 5-point Likert scale from completely agree to completely disagree. In order to prepare the Persian version, the questionnaire was first translated from English into Persian with the assistance of an expert with MSc in English language. Thereafter, the prepared Persian version was translated back into English by one of the professors at the Department of English (Isfahan University). After approving the translation, psychometric qualities of the scale were separately investigated on a group of Iranian subjects. Cronbach's alpha of the Persian version of IPQ-R was calculated as 0.88 among 176 Iranian patients with MI. Furthermore, the retest validity of this scale over a 3-week period was obtained as 0.74 on 62 cardiac patients. In addition, construct validity of this scale was assessed by comparison with Pearlin's Personal Mastery Scale.<sup>26</sup> The correlation coefficient of these two scales was obtained as 0.64 and considered as construct validity index of the personal control scale. Therefore, the results showed that this scale possessed a proper validity for evaluating personal control in Iranian cardiac patients.

On the other hand, content validity of this scale was investigated through comments of 15 psychologists and psychiatrists using a 6-point Likert scale for the items and a 10-point Likert scale for the whole scale. Generally, the extracted results in this assessment indicated high and satisfactory validity of the scale.

4) *Second Edition of Beck Depression Inventory (BDI-II)*: BDI is one of the well-known tests for assessing depression. It includes 21 four-choice items which are scored from zero to three. The total score of each individual calculated by summing the scores of all items and ranges between 0 and 63.<sup>27</sup>

Validity and reliability of BDI have been frequently investigated and reported to be in a high level. Osman et al. have recently confirmed the reliability of the items in BDI-II with a Cronbach's alpha of 0.92. They also reported high correlation coefficients with other depression inventories.<sup>28</sup>

5) *Echocardiography (ECG)*: Left ventricular ejection fraction (LVEF) is an appropriate clinical index for left ventricular ejection function. It is determined by CG and its results are as percentage. This index is

shown by the following formula:<sup>29</sup>

$$LVEF = \frac{\text{End-diastolic volume} - \text{End-systolic volume}}{\text{End-diastolic volume}} \times 100$$

In this study, LVEF was assessed immediately after MI. In most of conducted studies in this regard, this index has been used as a categorical variable (such as two levels of low and normal).<sup>30,31</sup>

#### **Study Procedure and Data Analysis:**

This was a prospective study to determine the relationship between personal control and post-MI depression. First, the required data was collected from patients who enrolled in the study during their admission. Then, three months after MI, the patients were evaluated using BDI-PC. In implementing this inventory, the patients were asked to read the choices of each item carefully and choose one of them by considering their moods during the past two weeks. At the follow-up stage, using the scores of patients in BDI-PC and based on a cut-off point of 5, depressed and non-depressed patients were distinguished. Thereafter, the collected data during admission and follow-up stages was analyzed in the depressed and non-depressed groups. Univariate test and analysis of covariance were used to compare values between and inside groups, respectively.

## **Results**

Out of 176 admitted patients with MI, 79 patients (44.9%) were depressed three months after discharge. Using univariate analysis, Table 1 compares depressed and non-depressed patients three months after discharge in terms of demographic and medical variables during admission (baseline). Based on Table 1, the depressed and non-depressed groups had significant differences in the intensity of depressive symptoms at baseline (18.31 vs. 8.49;  $P < 0.01$ ) and left ventricular function (25% vs. 15.3% with LVEF lower than 40%;  $P < 0.01$ ). However, the two groups were similar in other baseline characteristics. Due to the observed differences between the two groups, depressive symptoms during admission and left ventricular function were entered into covariance analysis as covariance variables in adjustment of personal control scores.

Table 2 indicates the results of data analysis through covariance analysis method. The results of covariance analysis of personal control scores showed a significant difference between the two groups by entering the intensity of depressive symptoms during admission and left ventricular function as the covariate variables ( $P < 0.05$ ;  $F = 6.16$ ) (Table 2).

**Table 1.** The relationship between each variable at baseline and the incidence of depression 3 months after discharge

Demographic and Medical Variables		Depressed Patients (n = 79)	Non-depressed Patients (n = 97)	Odds Ratio	Confidence Interval 95%	P
Mean age (years)		54.37	57.16	0.97	0.420-1.002	0.068
Sex	Male	35.2%	48.9%	2.14	0.93-4.89	0.07
	Female	9.7%	6.3%			
Marital status	Married	38.1%	50.6%	1.99	0.77-5.14	0.14
	Single	6.8%	4.5%			
LVEF > 40%		25%	15.3%	3.26	1.74-6.11	0.001
Family history of cardiac diseases		22.16%	30.68%	0.77	0.42-1.40	0.40
Hypertension		13%	17.61%	0.87	0.45-1.66	0.68
Smoking		25%	25.56%	1.45	0.79-2.63	0.22
Diabetes		14%	14%	1.33	0.69-2.57	0.39
Hyperlipidemia		18.2%	25%	0.82%	0.44-1.49	0.51
Mean depression score during admission		18.31	8.49	1.17	1.11-1.23	0.001
Logarithm of maximum CPK enzyme		0.05	0.054	1.057	0.58-1.90	0.67

LVEF: Left ventricular ejection fraction; CPK: Creatine phosphokinase

**Table 2.** The results of analysis of covariance for data of personal control following myocardial infarction in the two groups of depressed and non-depressed patients [Severity of depression during admission and left ventricular function (as severity of myocardial infarction (MI) were considered as covariate variables in the analysis of covariance.]

	SS	df	MS	F	P	Statistical power
Depression during admission	361.32	1	361.032	20.638	0.0001	0.99
Left ventricular function	16.892	1	16.892	0.966	0.327	0.165
Personal control	104.763	1	107.763	6.16	0.014	0.7

### Discussion

This study aimed to evaluate the relationship between personal control and the incidence of depression following MI using a prospective approach. We thus assessed perceived personal control over the disease among patients with MI during admission. The incidence of depressive symptoms was also investigated 3 months after their discharge. The findings of this study showed that the incidence of post-MI depression can be as high as 45%. The results of this study confirmed the relationship between the perceived personal control and incidence of depression following MI. In other words, this study showed that a higher sense of control can prevent depression in post-MI patients. Therefore, perceived personal control over the disease can have

an important role on preventing the incidence of depression in patients following MI. The results of this study were in accordance with the results of Affleck et al. on patients with rheumatoid arthritis,<sup>9</sup> Christensen et al. on patients with kidney disease,<sup>10</sup> Macrodimitris and Endler on diabetics,<sup>11</sup> Newsom et al. on cancerous patients,<sup>12</sup> and Barez et al. on breast cancer patients.<sup>13</sup> However, except the study of Barez et al.,<sup>12</sup> all studies were in cross-sectional form. In addition, none of the mentioned studies evaluated patients with MI. Besides, among the previous studies on cardiac patients, only the study of Moser and Dracup<sup>17</sup> was a prospective study and the rest of them were cross-sectional. The correlation between the two phenomena has been reviewed simultaneously in cross-sectional studies. Therefore, definite conclusion cannot be made due to ambiguity.

This is the main reason the present study was conducted prospectively. Despite this, the results of the present study were in accordance with the results of Helgeson on admitted patients with MI<sup>14</sup> and on MI patients treated with PTCA.<sup>15</sup> Although the two abovementioned cross-sectional studies have shown an important correlation between the structures of perceived control and depression and anxiety, none of them clarified this relationship specifically. Although the findings of the present study were in accordance with the prospective results of Bohachick et al. on patients with heart replacement, the mentioned study was not specifically on post-MI patients.<sup>16</sup> As far as searching related literature revealed, the only prospective study on post-MI patients was the study of Moser and Dracup<sup>17</sup> whose results have been confirmed by the present study.

These researchers could indicate that study subjects with high control had a significantly lower level of depression.<sup>17</sup> The incidence of MI, as a serious illness, is a major source of stress in MI patients. It can in fact lead to the occurrence of serious psychological disorders. Incidence of depressive symptoms following MI is a very common psychological problem and has negative influences on prognosis of cardiac disease in the patients.<sup>32</sup> The risk of mortality during the first 6 months after MI in patients with depressive symptoms has been reported to be 6 times higher than patients without depressive symptoms. Such high risk for mortality has been seen even until 18 months after the MI.<sup>33</sup> Approximately 20%<sup>32</sup> to 38%<sup>34</sup> of MI patients have depressive symptoms after they are discharged. Based on our results, one of the important variables affecting the incidence of this type of depression is personal control over the disease. The role of personal control on the incidence of depression following MI can be sought as a major stressor in coping process with MI.

According to Folkman and Moskowitz, coping is a complicated and multidimensional process that can have negative and positive natures. It is related with strategies that include primary and secondary assessments.<sup>35</sup> While coping seems to be generally associated with emotional adjustment during the process of stress, the basic relationship between different types of coping is not easily recognizable and assessable. For example, certain types of avoidance coping strategies have a clear relationship with adverse psychological events. On the contrary, it has been seen that instrumental problem-oriented coping styles and seeking social support have both positive and negative effects and do not affect health outcomes.<sup>35,36</sup> In brief, it has been suggested that having the abilities and resources required for

problem-oriented coping can reduce psychological impacts, physiological problems, and daily stressors. One of the required resources is the perception of personal control.<sup>36</sup> It is believed that personal control in coping process represents 2 concepts. In the first, personal control is interpreted as the generalized belief an individual holds about the extent of control he has over the events and outcomes of life. The second concept however, involves the assessment of a situation to determine the possibility of controlling a special stressful situation. Control as a generalized belief is a form of primary assessment, while control in a situational assessment is considered as a secondary assessment.<sup>36</sup> Partridge and Johnston claimed that confronting permanent stressful factors such as MI, as a chronic disease, increases adverse problems for an individual.<sup>37</sup> In such situations, individual resources and coping strategies would help reduce the negative effects of stress. It is worth mentioning that resources include not only what an individual does, but also what they possess to establish and develop coping strategies. Problem-oriented coping strategy can be applied for eliminating or correcting the stressful situation which is experienced or for modifying the situation by providing a sense of personal control. Partridge and Johnston also announced that perception of personal control is one of the components of control-oriented coping strategies. As a moderator variable, personal control plays an important role in confronting with stressful events such as chronic diseases and thus in determining subsequent health outcomes. In the further claimed that one of the mechanisms through which coping with stress affects subsequent outcomes is the mediator qualities of personal control.<sup>37</sup> Therefore, the phenomenon of personal control is among the components which should be taken into account for prevention and intervention in chronic diseases.

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### Conflict of Interests

Authors have no conflict of interests.

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