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Post coronary heart diseases depression: role of illness perception and copping strategies

Nader Monirpour[1*]

Abstract

Objective: Due to unpleasant consequences of depression in patients suffering from cardiac diseases, such as increase in mortality rate during the first year, especially after undergoing a surgery; this study addresses structural relationships between cognitive and behavioral variables including illness perception and coping strategies in predicting depression after undergoing Coronary Artery Bypass Grafting (CABG) and Percutaneous Coronary Intervention (PCI). Besides, one of the cognitive models for assessing psychological adaptation with chronic medical diseases was outlined for the first time.

Method: The sample comprised 245 coronary patients confronted with the diagnosis for the first time, who had undergone PCI and CABG interventions. They were chosen and interviewed through convenience sampling following one month of initiating treatment process. For this purpose, Beck Depression Inventory for Primary Care (BDI-PC), Coping Inventory for Stressful Situations (CISS-21) and the short format of Disease Perception Questionnaire were administered. Data was analyzed using structural equations modeling (LISREL software).

Results: findings indicated that applying emotion-focused coping strategies determined 40% of depression variance in these patients, whereas problem-focused strategies determined 4.5% of it and avoidant coping strategy didn't have a significant role in depression. On the other hand, illness perception as a cognitive variable, could directly determine 26% of depression and 4.5% of it through emotion-focused strategies and 0.25% by means of problem-focused strategies. Also illness perception, could meaningfully determine 50% of emotion-focused coping variance, 7% of problem-focused variance and 8% of avoidance variance.

Conclusion: Overall results of this study supported Leventhal's theoretical model of self-regulation and verified the role of cognitive variables (illness perception) and behavioral ones (coping strategy) in emerging depression. Therefore it is recommended that much attention be drawn to the process of developing patient's illness perception through personal or group trainings and if necessary, offering effective cognitive and behavioral treatments by practitioners.

Keywords*:* post coronary heart diseases depression, illness perception, coping strategies, CABG, PCI.

Introduction

Psychological symptoms and disorders, which are widespread among coronary heart patients, are amongst most considerable factors increasing mortality rate. One of the psychological issues causing patients to be vulnerable to cardiac diseases while simultaneously can be a consequence of suffering from heart disease, is depression (Surtees, Wainwright, Luben, Wareham, Bingham & Khaw, 2008; Mykletun, Bjerkeset, Dewey, Prince, Overland & Stewart, 2007). Depression is pervasive in patients suffering from CHD, particularly after undergoing myocardial infarction. Prevalence of depression in patients suffering from cardiac diseases is 3 to 4 times more than general public (Sheps & Rozanski, 2005). Over 25% of patients with cardiac diseases, suffer from sever and progressive major depression following a

1- Assistant professor of Health psychology, Department of clinical psychology, Qom branch, Islamic Azad University, Qom, Iran.
* Corresponding author: Email: Monirpoor1357@gmail.com

heart attack. Almost 17 to 27% of these patients experience clinical symptoms of depression and more than 42% of them move towards major depression through the next year (Januzzi, Stern, Pasternak & De Sanctis, 2000; Perez, Nicolau, Romano & Laranjeira, 2005; Lane, Carroll, Ring, Beevers & Lip, 2002).

Depression has been recognized as a risk factor in emerging coronary heart disease since around 20 years ago and has been identified as a risk factor in causing mortality due to coronary heart diseases from almost 15 years ago (Carney & Freedland, 2007). Death rate during the first six months following a heart attack in patients suffering from coronary heart diseases along with depression, is 3 to 6 times more than patients without signs of depression (Bush, Zeigelstein,Tayback, Richter, Stevens, Zahalsky & Fauerbach, 2001; Surtees, Wainwright, Luben, Wareham, Bingham & Khaw, 2008). Various hypotheses have been presented regarding the mechanism by which depression affects critical state of disease and mortality caused by it. Amongst these hypotheses are behavioural changes in protecting oneself, decrease in treatment alliance and life quality (Williams, 1994), increase in risky behaviours such as smoking and alcoholism and losing motivation for cardiac rehabilitation (Barefoot & Schroll, 1996), decrease in heart rate variability (HRV) (Frasur-Smith, Lesperance & Talajic, 1995), alterations in immune system and increase in thrombogenicity (Braunwald, E., Zips, D., Libby, P., 2001).

Despite verifying destructive impacts depression imposes on heart issues and its deadly consequences in different studies, few researches have been implemented on identifying depression in these patients. Some of the studies on anticipators of depression in coronary heart patients have addressed following factors: psychological variables such as illness perception (illness identity, consequences, controllability/curability, duration and causes) (Bagherian, Gilani, Bahrami, Besharat and Saneei, 2007; Grace, Krepostman, Brooks, Heather, Scholey, Suskin, Jaglal, Abramson & Stewart, 2005), coping strategies (Monirpoor, Khoosefi, Poorkhosrovani and Poorkhosrovani, 2009; Elderen, Maes & Dusseldorp, 1999), type D personality (Martens, Smith, Winter, Denollet & Pedersen, 2008), social support (Frasure-Smith, Lesperance, Gravel, Masson, Juneau, Talajic & Bourassa, 2000), cardiologic variables like function of left ventricle, heart rate variability (Joost, van Melle, de Jonge, Ormel, Crijns, van Veldhuisen and et al., 2005), immunity variables such as IL-1, IL-6, C-reactive protein (Carmine, Manzoli, Mancini & Costa, 2008) and environmental variables like life events (Moosavi, Eslami, Sheikh Begloo & Birashk, 2004).

Up to the minute, most of the researches have addressed depression predictors in these patients but there are just a few examining specifically structural relationships of predictor variables. Lately, some theoretical models such as Leventhal and his colleagues› self-regulation model (1985) have identified adaptation to chronic diseases. In this model it is hypothesized that when people confront a threatening disease, they respond on the basis of their perception of the symptoms or over social messages they get (like physicians' or others' judgments); these representations include individual's insight into the nature of the disease, it's consequences and causes, it's curability and controllability and it's effect on individual's life. If they found their disease as threatening, severe, having long-term and critical consequences, incurable and uncontrollable, they will experience a great deal of anxiety. In parallel with cognitive insight, there exist a number of emotional factors caused by the disease. The emerging stress motivates the person to commence utilizing coping strategies. The purpose of applying coping skills is returning to the primary homeostasis and regaining health. The effectiveness of coping mechanisms will be assessed after performing them. Provided

that the strategies prove to be successful, the patient will be back on his psychological balance; and if not, he may encounter severe psychological and bodily outcomes. One of the main emotional states emerging due to this process is depression. Therefore the self-regulation model of adaptation with a medical disease such as coronary heart disease consists of three phases: 1) explaining and interpreting the disease and moulding patient's understanding of it, 2) coping with the disease and 3) assessing coping skills' effectiveness (Agden, 2004). This model addresses structural relationships between disease perception and its psychological symptoms such as depression, in which coping strategies play the mediator role. Hence this article outlines structural relationships between disease perception, coping strategies and depression after implementing CABG and PCI interventions, according to self-regulation model. The conceptual model adapted from Leventhal self-regulation model is shown in figure 1.

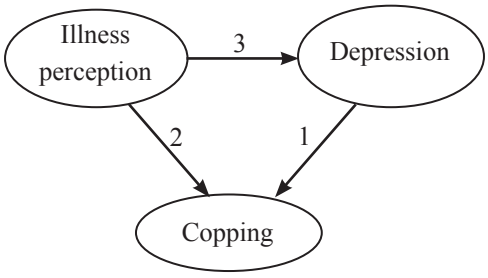

Figure 1: conceptual model to explain depression

In order to examine the above conceptual model, structural relationships between various variables will be scrutinized separately first, and later they will all be analyzed as a whole. Numbers written down on each path in figure 1, indicates sequences of relationships to be analyzed.

Method

Participants

This study was carried out on the basis of cross-sectional method. Participants were all coronary heart patients who had paid a visit to Tehran Heart Centre for the first time and whose disease had been diagnosed. Though the first 4 months of studying base-line, from overall 950 patients who had been interviewed, a number of 245 (143 under CABG and 102 under PCI) met the criteria for inclusion in the study. Therefore the sample consisted of 245 patients chosen through convenience sampling.

As far as ethics concern, participants were asked to study the research's aims and additional information. Then, they complete consent form if they accepted participation. Also, researcher prepared some facilitates like cognitive and behavioral educations and interventions on the based on the study findings to promote their illness perception and copping strategies against their diseases.

Measures

Beck Depression Inventory for Primary Care (BDI - PC). An inventory designed by Beck and his colleagues which is used in medical centres as a screening tool excluding bodily items from the main questionnaire (Parker & Gladstone, 2004; Wilhelm, Kotze, Waterhouse, Pavalovic & Parker, 2004). This 7-item scale fits in with the 4th edition of Diagnostic and Statistical Manual of Mental Disorders Text Revised (DSM-IV-TR) criteria for clinically diagnosed depression (American Psychiatric Association, 1994). Beck, Steer, Ball, Ciervo & Kabat (1997) confirmed its psychometric qualities. Also the psychometric measures were separately examined in an Iranian sample of 176 patients inflicted by MI; Cronbach's Alpha was estimated 0.88 representing its internal consistency. Furthermore its coefficient reliability was estimated 0.74 in a sample of 62 patients based on test-retest method in a period of 3 weeks. The scale's construct validity was calculated 0.84 through comparing with the Iranian version of Anxiety and Depression Inventory subscales in the hospital (Montazeri, Vahdannia, Ebrahimi and Jarvandi, 2003) in a sample of 176 MI patients.

Altogether results from psychometric qualities on Iranian samples indicated that this scale has a high quality and good diagnostic ability in differentiating depressed medical patients from those who are not depressed (Bagherian, et al., 2007).

Coping Inventory for Stressful Situations (CISS-21). This scale was made by Endler & Parker (1999) in the purpose of assessing people's coping skills in stressful situations like being inflicted by chronic diseases. The 21-item inventory assesses three categories of coping strategies: problem-focused, emotion-focused and avoidance-focused strategies. CISS is a valid and reliable scale for evaluating general coping strategies in samples of adult patients suffering from chronic diseases (Calsbeek, Rijken, Henegouwen & Dekker, 2002). Calsbeek, Rijken, Henegouwen & Dekker (2002) surveyed the scale's psychometric characteristics in a sample of 521 patients suffering from chronic digestive diseases (including inflammatory bowel disease, chronic liver disease, congenital digestive diseases and food sensitivity). Cronbach Alpha for all the scales in every group of patients was estimated 0.79 to 0.86. Analyzing verification factor using LISREL software, confirmed the inventory›s three-factorial structure. Nonetheless this inventory hasn›t been yet applied in Iran.

Illness perception Questionnaire (short form). This inventory is a summarized version of Disease Perception Questionnaire which covers all cognitive aspects proposed in Leventhal's self-regulation theory. Apart from its comprehensiveness and summation, this scale evaluates patient's perception of the severance of his disease. Scores to each scale (with the exception of the 9th one), ranges from 0 to 10. It provides an indicator of the patient's insight into the severance of his disease. Bagherian, et al (2007) examined its psychometric characteristics on Iranian samples separately. Cronbach Alpha in a sample of 176 Iranian MI patients was calculated 0.84. Its test-retest reliability was estimated 0.68 in a sample of 62 cardiac disease patients in a period of 3 weeks. Besides, the subscale's construct validity was calculated through comparing to Iranian revised version of Illness Perception Inventory (Arizi, et al., 2005) in a sample of 62 cardiac patients. The correlation coefficient between the two inventories was assessed 0.71.

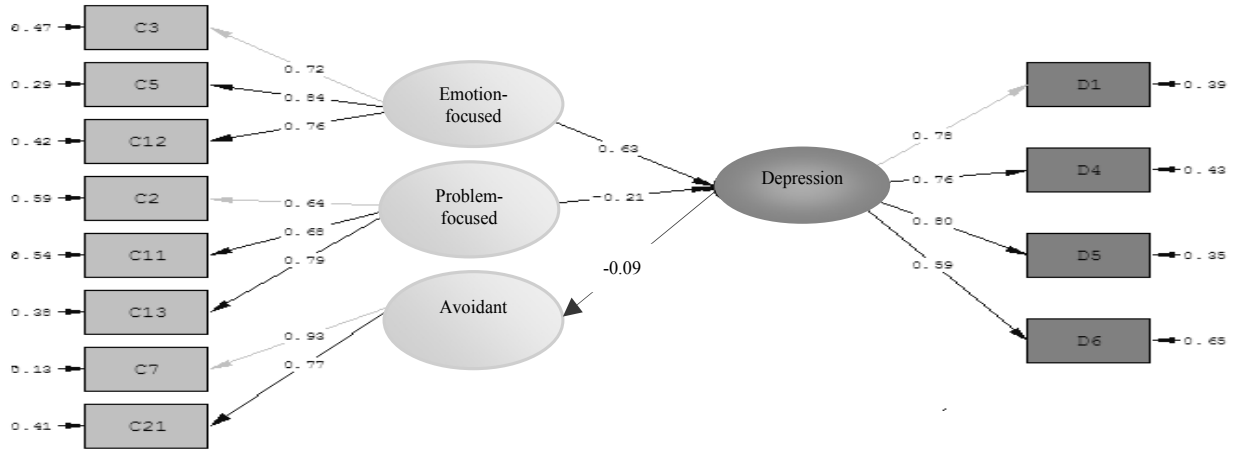

Figure 2: Sectional structural relationship between coping strategies and depression (the red line means related path is not significant)

Table 1: Model›s Indexes of Goodness of Fit

p-value	df	Chi-Square	RMSEA	PGFI	AGFI	GFI	Standard RMR	RMR
0.044	46	63.54	0.040	0.57	0.93	0.96	0.042	0.24

Data Analysis

Structural equation modeling was used to examine conceptual models hypothesized by researcher. In all models post-CHD depression entered as final ETA and Illness perception entered as KSI. Copping strategies entered as final ETA in 2nd model and as mediator ETA in 4th model. Several goodness of fit indexes were used in all models.

Results

As indicated in Figure 1, this model consists of 3 parts identified by numbers 1, 2 and 3. Hence first each component has been examined through 3 different hypotheses, and later the model was evaluated wholly.

1) Coping strategies predict depression after being inflicted by CHD in patients receiving CABG and PCI.

As it appears in Table 1, the above model has an acceptable goodness of fit, but the path from avoidance strategy to depression is not significant (T = -1.41). As the coefficient correlations are indicated on the paths, coping strategies determine overall 45.30% of depression variance; with emotion-focused strategy having a positive correlation with depression predicting 40% of it, problem-focused strategy with negative correlation 4.5%, and avoidant strategy having a negative correlation 0.8%. Altogether, results indicate that coping strategies, specifically emotion-focused and then problem-focused strategies have significant impact on depression after CHD in patients receiving CABG and PCI interventions at the baseline.

2) Illness perception, directly predicts coping strategies in patients receiving CABG and PCI.

The model holds an acceptable goodness of fit. All the directions connecting patient›s perception to coping strategies are significant in this model. illness perception has a positive correlation with emotion-focused variance and determines 50% of it; meaning the more negatives the perception, the more the patient applies emotion-focused strategies. Illness perception has negative correlation with problem-focused strategies and determines 7% of it; it also has negative correlation with avoidance variance predicting 8% of it. Hence when the negative perception intensifies, the patient exploits more of problem-focused and avoidance-focused strategies. Therefore illness perception in coronary

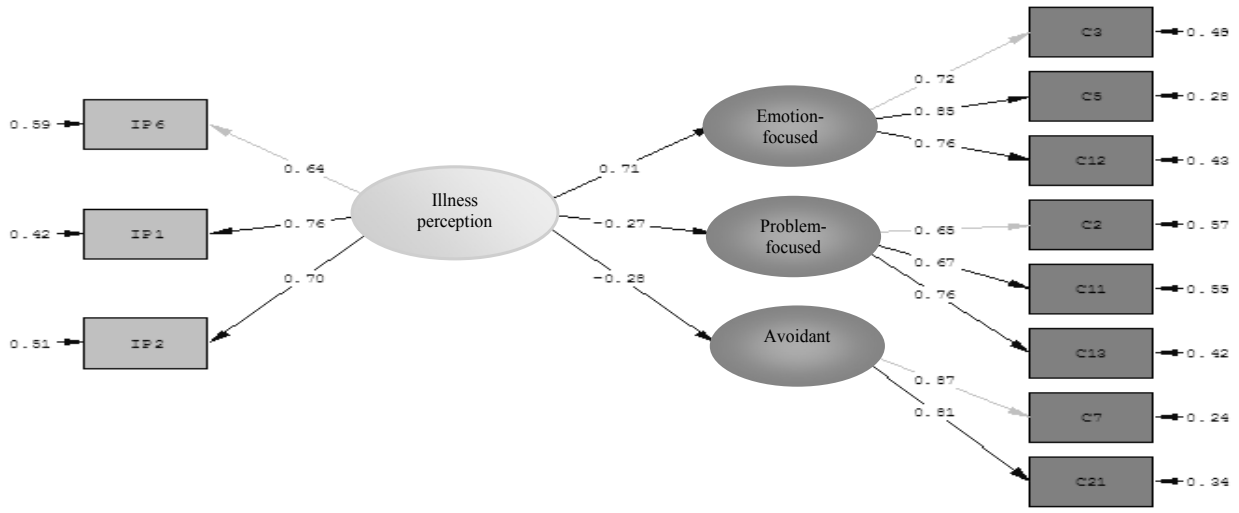

Figure 3: Sectional structural relationship between illness perception and coping strategies

Table 2: Model's Indexes of Goodness of Fit

p-value	df	Chi-Square	RMSEA	PGFI	AGFI	GFI	Standard RMR	RMR
0.004	38	82.59	0.069	0.54	0.90	0.94	0.067	0.50

Figure 4: Sectional structural relationship between illness perception and depression

Table 3: Model›s Indexes of Goodness of Fit

p-value	df	Chi-Square	RMSEA	PGFI	AGFI	GFI	Standard RMR	RMR
0.081	13	20.57	0.049	0.45	0.95	0.98	0.032	0.17

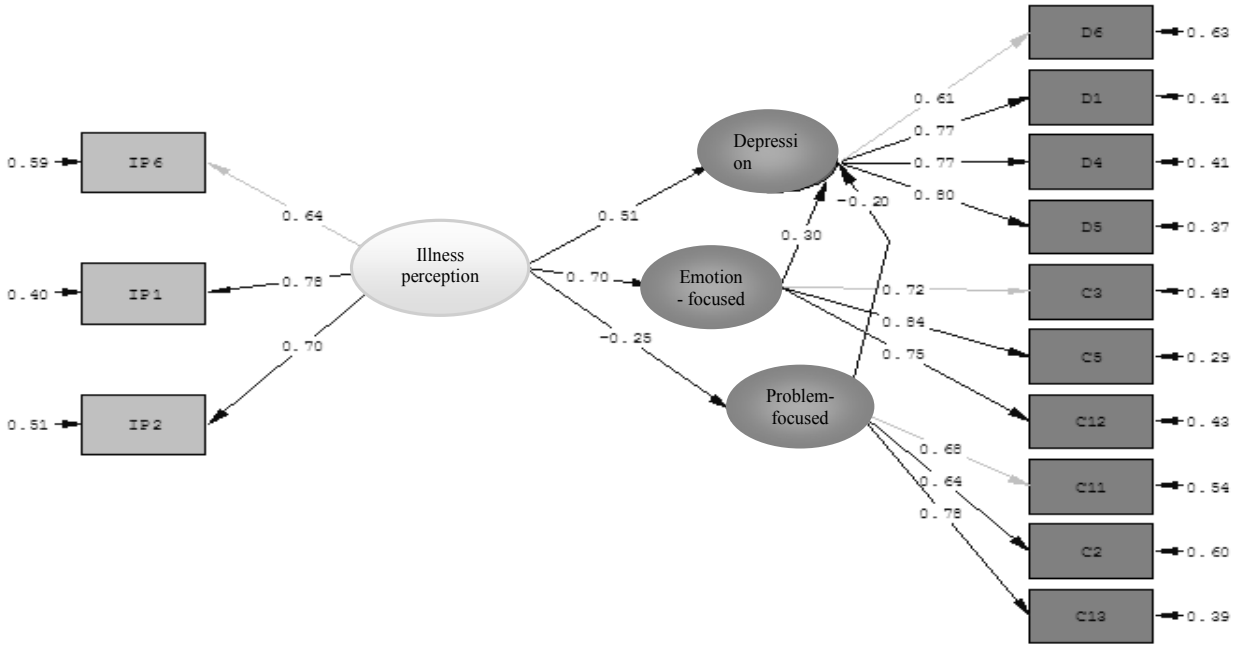

Figure 5: Examining the whole model

Table 4: Model's Indexes of Goodness of Fit

p-value	df	Chi-Square	RMSEA	PGFI	AGFI	GFI	Standard RMR	RMR
0.073	59	108.90	0.059	0.61	0.90	0.94	0.050	0.27

heart patients undergoing CABG and PCI at the baseline, predicts coping strategies specifically emotion-focused strategies significantly.

3) Illness perception can directly predict depression after CHD in patients undergoing CABG and PCI.

This model has an acceptable goodness of fit. Illness perception has an effective and meaningful role in identifying depression after CHD at the baseline which predicts 60% of it. Other than that the direction of correlation is positive; meaning the more negative the perception, the more intensifying the depression.

4) In examining the whole model, it was concluded that illness perception can directly and through coping strategies, predict depression and anxiety in coronary heart patients undergoing CABG and PCI interventions at the baseline.

This model proved to have a very acceptable goodness of fit. Illness perception can directly and through coping strategies, predicts depression in coronary heart patients undergoing CABG and PCI interventions. Illness perception is able to directly determine 26% of depression variance, predict 4.5% of it through emotion-focused strategies and 0.25% of it by problem-focused strategies. Total estimation of direct and indirect impact of illness perception, equals 30.75%. As a matter of fact, more negative disease perception is resulted by utilizing much of emotion-focused strategy and less usage of problem-focused strategies, which leads to intensifying depression.

Overall, the results suggest that in the baseline, illness perception can strongly and directly predict depression; and it›s partial impact on depression after CHD in patients undergoing CABG and PCI, is imposed through coping strategies specifically emotion-focused strategies.

Discussion and conclusion

Considering the variety of influential variables on the etiology of depression after being inflicted by medical diseases like coronary heart diseases, and taking into account the interference of depression symptoms with bodily manifestations caused by the disease; studying etiology of depression in chronic medical patients has entered a new era of research. Albeit some researchers have been lately attempting to contain psychological disorders caused by chronic medical diseases in conventional cognitive-behavioural models, researches in this region are looming ahead. Regarding the significance of the impact depression imposes on obnoxious consequences of heart diseases, especially after undergoing a surgery or percutaneous, this study have been examining one of the cognitive models entitled Leventhal self-regulation model for the first time in Iran.

Results implied that in the period right after undergoing CABG and PCI, exploiting coping strategies would significantly predict depression. Although avoidant coping strategies had a negative correlation with depression, wasn't able to considerably predict it in that period of time. In fact direction of the paths implied that applying more of the emotion-focused strategies, accompanied intensified depression; while exercising much of problem-focused and avoidant-focused strategies, resulted in reduction of depression.

Outcomes of this study concerning the relations between approach coping (emotion-focused and problem-focused) was consistent with Sheer and his colleagues' research (1989) on approach behaviours before and after CABG. They concluded that when coping behaviour is concerned with emotional issues (emotion-focused), it has a negative correlation with well-being; while if the coping behaviour regards planning and achieving aims (problem-focused), it has a positive correlation with well-being. In another research conducted by Holahan, C.J., Moos, R.H., Holahan, C.K., & Brennan, P.L. (1995), it was concluded that approach or active coping, foretells fewer depression symptoms in heart disease patients.

In spite of the fact that avoidant coping strategies couldn't significantly predict depression, however they had a negative correlation. In fact applying avoidant strategies accurately after being afflicted by coronary heart disease and undergoing a surgery, decreases severity of depression. These results are consistent with a number of meta-analytic researches. For instance, Mullen, B., & Suls, J. (1982) and Suls, J., & Fletcher, B. (1985) concluded based on various meta-analytic studies, that avoidant strategies in short-term along with approach coping strategiy in long-term can lead to effective adaptation with stressful events. In accordance with Myocardial infarction, some studies have shown that avoidance or denial in short-term can bring about adaptation (Levine, J., Warrenburg, S., Kerns, R., Schwartz, G., Delaney, R., Fontana, A., Gradman, A., Smith, S., Allen, S., & Cascione, R., 1987; Levenson, J. L., Mishra, A., Hamer, R.M., & Hastillo, A., 1989); whereas avoidance can result in poorer adaptation in long-run. Although Sherbourne C.D., Hays, R.D., Ordway L., Di Matteo, M.R., & Kravits, R.L. (1992) realized that avoidance behaviour in long-term imposes damaging impact on treatment alliance and acceptance of medical recommendations, one prospective study (Feifel H., Strack, S., & Nagy, V.T., 1987) has indicated that in patients suffering from CHD, avoidance behaviours in short-term has harmful psychosocial consequences as well.

Perhaps one of the reasons for insignificancy of avoidance impact in predicting depression is associated with patient's unavoidable circumstances accurately after undergoing a surgery or percutaneous coronary intervention. In these circumstances, patients take their symptoms seriously and the pressure these signs and consequences imposes on them, prevent them from avoiding the disease. However there exist some other possible explanations. For instance it sounds like the items in CISS-21 assessing avoidance coping construct, are not capable of evaluating some prevalent avoidance behaviours in Iranian patients suffering from cardiac diseases undergoing surgery. There exists the same problem with other strategies; as an example, religious coping strategies are among most widespread coping mechanisms in Iranian religious culture. Besides, listening to music, playing with cell-phone and similar behaviours are pervasive avoidance behaviours amongst these patients. On the other hand the avoidance behaviours which are assessed in this inventory can be regarded as emotion- or problem-focused as well. As an instance meeting a friend can be considered as a way of receiving some sympathy (emotion-focused) or gaining required information or tools for solving a problem (problem-focused). Anyhow results of the present study shows that applying emotion- or problem-focused strategies following undergoing a surgery, can directly impact depression; with emotion-focused coping strategies having greater effect.

Outcomes regarding the relation between patient's illness perception and depression indicated that these two variables have a positive and meaningful relationship. When illness perception is exclusively applied as the predictor variable of the model, is able to predict 60% of depression. This conclusion verifies the significance and effectiveness of cognitive variables concerning disease in the resulting consequences. These findings support Grace, Krepostman, Brooks, Heather, Scholey, Suskin, Jaglal, Abramson & Stewart (2005) research. These researchers examined the relationship between illness perception, depression symptoms and gender differences in 661 patients suffering from acute heart syndrome and found that there is a meaningful relation between disease perception and depression. In addition, Koutantji, S., Pearce & Harrold, E. (2000) examined the relation between disease perception and depression and concluded that regarding the disease as severe has a relationship with depression. Husain, Dearman, Chauhdry, Rizvi & Waheed (2008)

likewise studied the relationship between illness perception and depression; they indicated that when the patients hold their disease as having ample symptoms as well as severe consequences and uncontrollability, they show to have intensified depression. Overall all these findings suggested that having a pessimistic perception of the disease, can perceptibly predict depression symptoms in these patients.

This study proved that besides residing a direct relationship between perception of the patient and depression, these variables hold an indirect relation with coping strategies engaging as mediator variable. Illness perception can directly determine 49% of emotion-focused coping variance, and 4.5% of depression variance through emotion-focused strategies. The direction of this relationship showed that the more pessimistic the insight, the more the patient applies emotion-focused strategies, and as a result the more intensifying the depression. Also, perception predicted 6.5% of problem-focused coping variance directly and determined 0.25% of depression variance through it. Although illness perception could directly and meaningfully predict 5% of avoidance coping variance, avoidant coping strategies didn›t have a significant role in mediating the relationship between illness perception and depression.

The mentioned results support Leventhal›s self-regulation model in predicting psychological adaptation. Therefore the more pessimistic the patient›s perception, the more intensified the depression. In addition, having a pessimistic illness perception would intensify the patient›s anxiety and confront him with more challenges and threats and consequently make his adaptation much harder. This condition leads to stimulation of coping strategies and therefore escalating the depression. Provided that the individual›s coping skills is sufficient and he applies solution-focused strategies, his unpleasant emotional states like depression would decrease. Nevertheless if his coping resources are inadequate, his perception of the disease can result in applying ineffective emotion-focused strategies like self-blame and consequently lead to depression.

Taken altogether, results of this study are consistent with Leventhal's self-regulation model on psychological adaptation to chronic medical disease. It should be noted that in spite of the fact that coping strategies have an impact in mediating patient's illness perception on depression, illness perception indicated to have a much greater impact exclusively. Therefore despite all the limitations of this study, precious findings have been achieved. One of the restrictions was infeasibility of controlling previous cognitive vulnerabilities, since vulnerable cognitive styles can lead to distorted perception of the disease. Besides, a number of influential variables on patient's illness perception were not controlled; these included personality characteristics, extent of social support, severity of symptoms experienced and the onset of the disease. Nevertheless former depression was controlled to a great extent through clinical interview with patients.

In spite of the mentioned limitations, valuable conclusions were drawn. Regarding the results, it appears that illness perception, as a cognitive variable, has an effective impact on psychological consequences like depression. Since patient's experiences and his interpretation of them is one of the resources in moulding his understanding of the disease, it is recommended that physicians clarify the clinical symptoms as much as possible and provide realistic medical interpretations to the patient. In order to prevent inaccurate cognitive understandings, it is necessary that physicians and nurses offer information about the diagnosis, treatment, disease duration and its consequences. As has been emphasized in Leventhal's self-regulation model, patient's friends and acquaintances as well form a dimension of his perception of the disease. Particularly during hospitalization

patients occasionally receive a wide variety of contradictory information from other patients. As an instance, one the prevalent consequences of treatment interventions among heart disease patients is decline in sexual functionality. Many patients are very apprehensive about it and some declare it as a longstanding illness; or even some of them commence drug using in the hope of reopening the vessels, on the basis of their peers' recommendations.

Despite the significant role of cognitive variables in emergence of depression and other psychological issues, it hasn't been adequate attention drawn to it. Hence it seems that receiving psychological counselling and even in some patients, going through psychotherapy is essential. Considering the inadequacy of time for moulding the patient's perception, and the possibility that a critical period may emerge through this process, it is recommended to apply cognitive approach for patients suffering from heart diseases. On the other hand, holding group sessions for patients can help decrease utilization of ineffective emotion-focused strategies while simultaneously enhance the patients' emotions. Besides, providing emotional support can lead to more efficient adaptation with the disease. To be capable of controlling their symptoms, some patients require receiving direct cognitive and behavioural education, and these results in the promotion of practical skills for coping with the disease.

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