

## *Effect of illness perception improvement on risk factors of coronary artery disease*

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### **Abstract**

**Background:** Illness perception can affect health-related behaviors and disease outcomes.

**Objectives:** To determine the effect of an educational intervention of improving illness perception on some modifiable risk factors of coronary artery disease.

**Methods:** In this clinical trial, 100 patients undergoing coronary angiography that met the inclusion criteria were divided randomly into two intervention and control groups. In the intervention group, three educational sessions were conducted individually, while usual care was conducted for the control group. Measurements on fasting blood glucose, cholesterol, triglyceride, blood pressure, body mass index, and smoking status were gathered at baseline, immediately and six months after the intervention in both groups. Data were analyzed using the SPSS.

**Results:** The mean of systolic blood pressure ( $p < 0.005$ ), fasting triglycerides ( $p < 0.005$ ), and fasting blood glucose ( $p < 0.005$ ) were significantly different before and after the intervention between the two groups.

**Conclusion:** Improvement illness perception through educational intervention can affect risk factors of coronary artery disease.

**Key words:** *Illness perception, Risk factors, Coronary artery disease*

### **Introduction**

Cardiovascular diseases are the most common causes of death in the world [1], and Coronary Artery Disease (CAD) is the cause of most cardiovascular mortalities. According to the WHO, 17.5 million people died worldwide from cardiovascular disease in 2012. It is estimated that 7.4 million of these mortalities were caused by coronary heart disease [2]. Furthermore, cardiovascular diseases and specifically CADs, are considered to be the first-ranked causes of mortalities in Iran [3].

During the last 50 years, epidemiologic studies have shown a high correlation between cardiac risk factors and CAD progression [4]. Failure in modifying the risk factors of coronary cardiac diseases, such as physical inactivity, high blood pressure, hyperlipidemia, smoking, hyperglycemia, and obesity, leads to progression of coronary heart disease and results in increased mortality rates [5].

Studies have shown that acute interventions, such as medication prescription, Coronary Artery Bypass Graft (CABG), and Percutaneous

Transluminal Coronary Angioplasty (PTCA) are unable to correct the underlying causes of coronary diseases, unless patients apply significant lifestyle changes [6]. Accordingly, adoption of healthy behaviors is necessary for patients with CAD to support health maintenance and prevent cardiac events [7] and patients' beliefs and attitudes are effective in altering their behaviors [8].

After diagnosis, patients develop organized patterns of beliefs, which are related to their health condition. These beliefs are called illness perceptions that determine individuals' future behaviors in relation to disease management. Illness perception is expressed as part of the Common Sense Model of Self-Regulation (CSM), and is a process that people undergo in response to health-threatening situations [9]. This model, which was presented by Leventhal et al (1983), holds that health-related behavioral patterns are the result of complex multi-dimensional representations of a disease, including cognitive and emotional representations. Cognitive representation of a disease has five dimensions:

- 1) Identity: Labels and symptoms with which a person describes his illness;
- 2) Consequences: The expected effects and consequences;
- 3) Cause: Causal features that a patient relates to his illness;
- 4) Timeline: The waiting period, based on the patient's opinion;
- 5) Control and cure: The patient's beliefs about the extent of the treatability and controllability of a disease; and
- 6) Emotional representation: Includes negative reactions to disease, such as fear, anger, and distress [10].

Thus, patients' beliefs about the disease are often different from those of the therapists. In fact, medical staff are not aware of patients' beliefs about their illnesses, and rarely focus on patients' beliefs. Moreover, patients' perceptions vary widely, even for people with the same medical conditions or injuries, who may have different understandings about their disease [9].

Studies have shown that interventions on improving disease perceptions in patients with

diabetes and chronic kidney failure had fruitful outcomes [11,12]. Among patients with cardiac diseases, illness perception interventions have also resulted in some improvements in disease consequences, such as faster returns to work [13,14], better preparation for hospital discharge, less pain from angina [13], and improvement in registration in rehabilitation programs [15]. This study was conducted to determine the effect of an educational intervention of improving illness perception on some modifiable risk factors of coronary artery disease.

### Methods

The present study was a randomized clinical trial, which has been conducted among two groups of intervention and control. The study population consisted of patients undergoing angiography, who had been hospitalized in internal wards of cardiology and angiography in Mousavi hospital in Zanjan.

The number of participants was determined using the differences between means and related variances in similar studies [16,17]. Given a lost rate of about 10%, 100 participants were randomly divided into two intervention and control groups (each=50).

The inclusion criteria were having at least 18 years old, lack of mental illnesses, not using psychiatric drugs, lack of cognitive disorders, no history of acute coronary syndrome, and possibility of making a phone call to the patient.

The exclusion criteria were disapproval of CAD by angiography, deterioration of the patient's medical condition before completion of the intervention, discharge of the patient before the intervention ended, and patient's unwillingness to continue the study.

Data were collected using a two-part questionnaire: 1) Patients' characteristics including age, sex, educational level, marital status, address, history of hyperglycemia, hyperlipidemia, hypertension, drug use, and family history of cardiovascular disease; 2) Recording patients' systolic and diastolic blood pressure, fasting blood sugar, total cholesterol, triglyceride, weight, height, and smoking status.

In the morning and after 12 hours fasting, total

cholesterol, triglyceride, and blood sugar levels were measured using a Dirui CS-400 analyzer and bionic kits in the laboratory of Mousavi hospital. Patients' Body Mass Indices (BMIs) were calculated by dividing weight (in kilogram) to height squared (in square meters); height was measured in centimeters, with the patients in a standing position without shoes or hats. Patients' weights were measured while wearing minimal clothing and without shoes using a Beurer PS 160 digital weight scale with an accuracy of 100 grams. After a 5-minute rest, each patient's blood pressure was measured on the right arm using a Dr. J manometer. A reference manometer (mercury manometer) was used for calibration. Smoking status was assessed via self-report questionnaire.

After introducing and explaining objectives of the study to the angiography candidates, we asked them to complete informed consent forms. Then, participants completed the questionnaires. Patients with coronary disease remained in the study; while those without coronary disease were excluded. The intervention group received three 30–40 minute sessions to improve illness perception. Intervention was designed based on the patients' needs and was focused on five disease recognition perception dimensions. Two first sessions were held individually and face to face. The third session was held using phone call. In the first session which was held before the angiography, a brief explanation was given about CAD pathophysiology, common disease symptoms, and the distinction between cardiac and non-cardiac symptoms.

In the second session which was held 4–6 hours following the angiography, a review of the previous session was given. Then, the patients' beliefs about the risk factors with a focus on improving illness perception were discussed. Moreover, patients' beliefs about the controllability of CAD were discussed in this session and a short 12-minute film was presented on the importance of health-related behaviors in controlling the disease's risk factors.

On the next day, before discharge, the third session was held. The focus of this session was on the effect of the patients' beliefs on disease timelines and outcomes. In addition, the patients'

beliefs about the dimensions of CAD were corrected. Recovery symptoms were explained and were differentiated from those of CAD progression and acute coronary syndrome was explained. Moreover, patients' anxiety regarding prescribed drugs was examined. Pharmaceutical training was provided, with a focus on the importance of regular drug consumption, instructions for taking the drugs, dosages, and side effects. At the end of the third session, patients were given a training booklet and viewed full versions of video tutorials about the pathophysiology, risk factors, control, and treatment of CAD – some parts of the film were separately copied and shown to patients on second session-handed to patients.

Three months after the in-hospital interventions, a 20–30 minute phone call was conducted to follow-up with the patients. In this follow-up session, a form was used to assess health-related behaviors in the last three months. Proper behaviors were praised and their benefits were emphasized. At the end of the calls, the patients' questions were answered.

The control group received their usual care. At the end of study, booklet and video tutorials were given to the control group.

In order to re-evaluate risk factor statuses, patients in the two groups were asked to return to the Mousavi hospital six month after discharge. A revisit date was given to them. Each participant was contacted a few days before the revisit date.

Six months after the intervention, we gathered data about the patients' risk factor statuses by measuring height, weight, systolic blood pressure, diastolic blood pressure, smoking, triglyceride, cholesterol, and fasting blood pressure levels in the Mousavi hospital in Zanjan.

Data were analyzed using the independent t-test, Chi-squared test, and Fisher exact test. Statistical significance was set as  $p < 0.05$ .

This study was registered with the clinical trial center of Iran and obtained ethical code from the research ethics committee of Zanjan University of Medical Sciences.

## Results

Ten participants were excluded in the follow-up period (5 in the control group and 3 in the

experimental group due to their unwillingness to continue the study, and 2 in the intervention group failed to answer the phone call).

From a total of 90 participants, most were male (53.3), were in the age range of 60–70, and were illiterate (43%). The most widely used drugs by

the patients were anticoagulant antiplatelet drugs (93%). The results showed that there were no significant differences in the individual characteristics of the two groups at baseline (Table 1).

**Table 1: Patients' demographic information in control and experimental groups**

Variable	Group		P value*	
	Experimental N (%)	Control N (%)		
Marital Statuses	Married	38 (84.4)	39(86.7)	0.764
	Dead husband/wife	7(15.6)	6(13.3)	
Place of Living	City	32(71.1)	30(66.7)	0.649
	Village	13(28.9)	15(33.3)	
High cholesterol history	Yes	18(40.0)	23(51.1)	0.290
	No	27(60.0)	22(48.9)	
High Blood Sugar History	Yes	13(28.9)	11(24.4)	0.634
	No	32(71.1)	34(75.6)	
High Blood Pressure History	Yes	32(71.1)	29(64.4)	0.499
	No	13(28.9)	16(35.6)	
Family History of Cardiac Disease	Yes	11(24.4)	13(28.9)	0.634
	No	34(75.6)	32(71.1)	

**\*Chi squared Test**

The smoking status remained unchanged before and six months after the intervention between the two groups (Table 2).

**Table 2: Comparison of frequency distribution of smoking before and after intervention in control and experimental groups**

Variable	Before intervention		P value*	After intervention		P value*
	Experimental N (%)	Control N (%)		Experimental N (%)	Control N (%)	
No smoking	33(73.3)	33(73.3)	1.000	36(80.0)	33(73.3)	0.695
Less than 10 cigarettes per day	4(8.9)	5(11.14)		5(11.1)	8(17.84)	
10-20 cigarettes per day	6(13.3)	5(11.1)		4(8.9)	3(6.7)	
More than 20 cigarettes per day	2(4.4)	2(4.4)		0(0.0)	1(2.2)	

**\*Fisher exact test**

At baseline, there were no significant differences between the control and intervention groups in the mean BMI, systolic blood pressure, diastolic

blood pressure, triglyceride, total cholesterol, and fasting blood sugar (Table 3).

**Table 3: Comparison of mean risk factors before intervention in control and experimental groups**

Variable	Group		P value*
	Experimental Mean±SD	Control Mean±SD	
Body Mass Index	25.74±4.66	26.56±4.13	0.380
Systolic blood pressure	128.22±18.19	124.56±24.56	0.423
Diastolic blood pressure	84.11±13.83	87.33±11.99	0.241
Triglyceride	182.71±75.64	176.78±73.52	0.707
Total cholesterol	186.78±47.79	188.42±46.77	0.869
Fasting blood sugar	128.00±46.36	125.69±42.61	0.806

**\*Independent T-test**

Comparison of the risk factors six months after the intervention showed significant differences between the two groups in systolic blood pressure,

triglyceride, and fasting blood sugar. There were no significant differences in other indicators between the two groups (Table 4).

**Table 4: Mean differences comparison of risk factors before and after intervention of each group in control and experimental groups**

Variable	Group		P value*
	Experimental Mean±SD	Control Mean±SD	
Body Mass Index	0.21±0.74	0.19±0.68	0.886
Systolic blood pressure	-8.89±13.89	2.67±20.60	0.002
Diastolic blood pressure	-2.56±12.91	-1.89±9.31	0.779
Fasting blood Triglyceride	-20.07±28.97	2.40±28.99	0.001
Fasting blood cholesterol	-0.89±22.79	2.78±21.71	0.437
Fasting blood sugar	-9.09±9.94	2.75±16.29	0.001

**\*Independent T-test****Discussion**

The results of the study showed that the educational intervention based on improving illness perception decreased systolic blood pressure, triglyceride, and fasting blood sugar levels in patients with CAD.

Petricek et al (2009) indicated in their study conducted in Croatia that illness perception is an important predictor in controlling vascular risk factors in patients with type II diabetes [18], and illness perception is related to controlling the rate of cardiovascular risk factors. Their findings are consistent with those of the present study. On the other hand, Byrne et al (2005) indicated that illness perception is a weak predictor of secondary prevention behaviors (smoking, physical exercise, alcohol consumption, diet,

medication adherence) in patients with coronary heart disease [19].

The present study indicated that the educational intervention based on illness perception improvement was effective in reducing fasting blood sugar. This is consistent with the findings of Valipour and Rezaei, who reported the effect of illness perception on control of blood sugar [20]. The findings of Baljani et al (2012) are consistent with those of the present study in regard to the effect of interventions on the control of systolic blood pressure. In the present study, however, self-efficiency interventions were effective in reducing the average BMI, LDL, HDL, and diastolic blood pressure in patients with cardiovascular disease [16]. Baljani's findings are contrary to those of the present study, however

this is likely because of differences in the type of intervention and the longer follow-up period (a year after intervention).

The results of the present study indicated that there were no significant differences between the groups in the number of cigarettes smoked per day after intervention. However, the number of daily cigarettes smoked six months after the intervention was reduced in both control and intervention groups.

In the Baljani et al study, self-efficiency interventions were significantly effective in reducing the number of smokers [16]. Cossette et al (2012) indicated that nursing interventions with a focus on illness perception had no effect on controlling smoking risk factors [15]. Yan et al (2013) findings in China showed that interventions based on illness perception in patients with myocardial infarction were not effective in controlling their smoking. In Yan's study, smoking was reduced in both intervention and control groups, which is consistent with the results of the present study. Yan et al believed that the reason for the smoking reduction in both groups was that the patients were unable to smoke during their hospital admission (for nearly 10 days), and this likely affected their smoking habits. Moreover, due to the shortness of the follow-up period (12 weeks after discharge), the patients probably remembered the fear and pain of the myocardial infarction, which might have led them to quit smoking during this period [21].

In the present study, the number of smoked cigarettes reduced in both control and intervention groups, six months after the intervention. Only a few participants were smokers, and the small number in both groups may have affected the findings of the study. In the three previous studies and in the present study, smoking status was assessed via patients' self-reporting. In the present study, self-reporting by the patients— especially the female participants— may not be accurate due to desirability bias.

In the present study, intervention was not effective in controlling the BMI. Cossette et al found that a nursing intervention with a focus on illness perception had no effect on BMI, although the researchers believed these findings were due

to the short follow-up period (six weeks). In comparison, in Baljani's study, the follow-up session was conducted a year after the intervention and showed the effectiveness of the intervention in reducing the average BMI.

In Broadbent et al study (2009), an intervention based on illness perception caused members of the intervention group to exercise more [14]; however the assessed risk factor in the Broadbent et al study was different from those in the present study. Nevertheless, this indicates that the intervention based on illness perception was effective in improving the physical inactivity.

The findings of Yan et al (2013) also indicated that an intervention based on illness perception improved the nutritional status and physical activity of patients with myocardial infarction [21]. Thus, illness perception intervention improved health-related behaviors. The findings of this study reflect the effectiveness of an educational intervention based on illness perception improvement to control some reducible risk factors in patients with CAD who are at risk of acute coronary syndrome. Since nurses are more in contact with patients than other healthcare providers, they can play a key role in encouraging patients to improve their health-related behaviors. If nurses understand patients with CAD, they can create a positive atmosphere for them to express their individual beliefs about their diseases, and this will lead to an effective relationship based on trust between the patient and nurse. In turn, this will encourage patients to have an active role in managing their disease processes.

A limitation of the study was different psychological characteristics and motivations of the participants that had possibly might influence their perceptions.

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