

## Comparing the Effectiveness of Family Care Based on the Model of Health Belief, and Health-Promoting Styles Training on the Illness Perception and Somatic Symptoms of Patients with Asthma

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### Quantitative Study

#### Abstract

**Background:** The purpose of this research was to compare the effectiveness of family care based on the health belief model, and health-promoting styles training on the illness perception and somatic symptoms of patients with asthma.

**Methods:** This semi-experimental research was conducted with a pretest-posttest design, follow-up, and a control group. The statistical population of this research included patients with mild asthma who were referred to Shahid Fayaz Bakhsh Hospital in Tehran, Iran, in the spring of 2019. Using purposive sampling, 45 of them were selected and randomly assigned to 2 intervention groups and 1 control group. The research tools included a demographic questionnaire, and the Illness Perception Questionnaire (IPQ) and St. George Respiratory Questionnaire (SGRQ). After the implementation of the health belief and health-promoting style interventions, repeated measures analysis of variance was used to analyze the data.

**Results:** The results of the Bonferroni post hoc test indicate a significant difference between the averages of the experimental and control groups, as well as in the pretest stage with the posttest, and pretest with follow-up in terms of the severity of the somatic symptoms. Moreover, they indicate the positive effect of the health promotion intervention and the health belief intervention in the experimental group and the continuation of these effects in the follow-up phase.

**Conclusion:** It can be concluded that there was a significant difference between the averages of the experimental and control groups, as well as in the pretest stage with the posttest, and pretest with follow-up in terms of the illness perception variable, which indicate the positive effect of the health promotion intervention and the health belief intervention in the experimental group and the continuation of these effects in the follow-up phase.

**Keywords:** Illness perception; Health belief; Asthma; Health-promoting styles; Somatic symptoms

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## **Introduction**

Psycho-physical disorders are disorders that appear physically, but their cause is emotional issues that affect the functioning of the automatic nervous system, endocrine glands and physiological flows of the body (Nunes, Pereira, & Morais-Almeida, 2017). These disorders are closely related to the sympathetic and parasympathetic systems and are associated with observable physical lesions. Of these diseases, we can mention asthma (Goetzmann et al., 2019). Asthma is a periodic and chronic inflammatory disease of the airways, which is caused by increased sensitivity to environmental allergens. Asthma symptoms include shortness of breath, increased airway reactivity, wheezing, and coughing, which can vary from mild to severe and intermittent to chronic (Bagnascu et al., 2021). The attitude towards this chronic disease, based on the biopsychosocial model, requires the integration of its social and psychological dimensions (Amiri Saif Eldini, Kohbanani, & Saber, 2017). Asthma is a common disorder that has affected the lives of about 300 million people and its prevalence is increasing worldwide. The prevalence of asthma in the world is on average 4-7% and the average prevalence of asthma symptoms in the United States is 13.14%. For this reason, it has been considered a public health problem in the last 35 years and is currently recognized as an important cause of preventable disability and death, which is medically costly (Rajabi et al., 2013; Nunes et al., 2017). Moreover, studies have reported the prevalence of asthma and chronic bronchitis in Iran to be 4.8 to 5.6% (Varmaghani et al., 2016).

Recently, the role of illness perception in the quality of life (QOL) of people with chronic diseases has received much attention. Illness perception refers to a person's cognitive and emotional beliefs regarding disease and its treatment, and how the individual reacts emotionally to the symptoms of disease (Petrie, Jago, & Devcich, 2007). Thus, the personal view of people, when their health is threatened by disease, affects how they deal with disease and self-care, as well as their psychological and physiological outcomes (Kim, Kim, & Ryu, 2019).

In this regard, Mohammad Polarti et al. (2019) concluded that family-centered care based on the health belief model leads to the improvement of asthma recovery indicators in children, and as a result, additional costs are prevented from being imposed on the patient. Naimi, Freedman, Ginsburg, Bogen, Rand, and Apter (2009) suggested that based on the health belief model of perceived susceptibility to asthma and its severity in adolescents, the benefits of taking the recommended measures to prevent and improve the health status related to the disease, the obstacles in performing the behavior, the guide, the practice and probability of success of health-related behavior increase treatment adherence in these patients. Beshrpour et al. (2017) found that health beliefs and beliefs related to the status and consequences of the disease, and how the disease is perceived in patients with chronic disease play a role in their tendency to perform health-promoting behaviors. Furthermore, Babaei et al. (2019) concluded that the intervention based on the model of individual behavior change based on the model of health belief leads to the improvement of health-promoting lifestyle dimensions in patients.

Today, behavior change patterns are employed to make health education programs more effective (Rahbar et al., 2017). Knowledge and illness perception has a predictive value in promoting health behaviors and the health of patients with asthma (Khosroshahi et al., 2019). In this regard, training to improve people's knowledge and perception of their illness can be useful and add to the importance and necessity of the present research. The present study was conducted with the aim to answer the following question: Is there a difference between the effectiveness of

teaching health-promoting styles and the health belief model on illness perception and somatic symptoms of asthma patients?

## Methods

The current research was a semi-experimental research with pretest-posttest design, follow-up, and a control group. The statistical population of this research included those with mild asthma who were referred to Shahid Fayaz Bakhsh Hospital in Tehran, Iran, in the spring of 2019. Considering a confidence interval (CI) of 95%, alpha error of 0.05, test power of 0.7%, and effect size of 0.4, the sample size studied in this research was determined to be 15 people. Therefore, 15 people were selected from the above population using the available sampling method based on their diagnosis of asthma, and they were randomly divided into 2 experimental groups and 1 control group. The inclusion criteria were not receiving psychological intervention at the same time, informed consent, and willingness to participate in this research. The exclusion criterion was absence from more than 2 treatment sessions.

To comply with ethical principles, all the participants were assured that all the information obtained from this study would only be used to present the results in the thesis and that all their information would remain confidential until the end. The participants were reminded that they could withdraw from the study at any time. To comply with ethical principles, the control group also benefited from the intervention after the end of the study.

## Instruments

*Illness Perception Questionnaire:* The Illness Perception Questionnaire (IPQ) developed by Brad Bennett et al. (2006) includes 9 subscales, which except for the causality question, are scored on a scale of 0-10. Each subscale measures one component of illness perception. It measures 5 subscales of cognitive reaction to the disease, including the perception of outcomes, time, personal control, treatment control, and identity, measuring emotional reactions, including concern about the disease and emotions. A subscale measures the ability to understand the disease. According to a report by Brad Bennett et al. (2006), Cronbach's alpha coefficient was found to be 0.80 for this instrument. Bazazian and Besharat (2010) reported the test-retest coefficient of this instrument to be 0.50-0.75 in 4 weeks, and the correlation of this instrument with the scale of psychological well-being to be within the range of 0.10-0.67.

*St. George Respiratory Questionnaire:* The St. George Respiratory Questionnaire (SGRQ) made by George et al. (1991) consists of 50 items that evaluate the 3 subscales of symptoms, activities, and effectiveness. The items are scored on a Likert scale ranging from 0 to 100. George et al. (1991) reported the correlation of this instrument with the self-report instrument of health grading to be within the range of 0.15-0.40. Fallah Tafti, Cheraghundi, Makri, and Talischi (2014) reported the Cronbach's alpha coefficient of this instrument to be 0.91, and the correlation of this instrument with the total number of drugs, frequency of clinical visits, and hospitalizations, as an indicator of the validity of the instrument.

## Health belief model

The educational program based on the dimensions of the health belief model by Abraham and Sheeran (2007) was implemented in 6 90-minute sessions, which are reviewed in detail below:

*First session:* Based on the information that people received about their disease and symptoms, they understood the sensitivity of the disease and the importance of health and preventive behavior.

*The second session:* The person's perception of the severity of the symptoms of asthma and the resulting consequences causes the person to adopt the behavior of preventing personal, family, social, and economic complications and consequences.

*The third session:* The perceived barriers dimension includes factors that prevent the patient from performing the behavior of preventing asthma symptoms.

*The fourth session:* The dimension of perceived benefits includes the benefits and profits that a person obtains due to preventive behaviors, in other words, the analysis of the benefits of performing preventive behaviors.

*The fifth session:* The guide for action includes the stimuli that affect the person and cause him to adopt preventive behavior to prevent the many complications caused by the disease.

*The sixth session:* Self-efficacy is promoted and confidence is created for the patient regarding his/her abilities in prevention.

### **Health-promoting style model**

The educational program based on the dimensions of the health-promoting style model (Walker, Sechrist, & Pender, 1987) was implemented in 6 sessions of 90 minutes, which are reviewed in detail below:

*First session:* Stress management: Coping is a mechanism that has different patterns to control the effect of stress and deal with sources of psychological pressure. Coping is divided into the 3 types of emotion-oriented, problem-oriented, and avoidance.

*Second session:* The importance of creating and maintaining a sense of health responsibility: People's choices and lifestyle patterns affect their health and longevity. Health protective components reduce the possibility of exposure to illness or injury.

*Third session:* Nutrition: familiarity with food: For example, some types of oils and foods contain omega-3 and omega-6 fats. These fats are very essential for health and must be present in the diet during the day. However, some foods contain undesirable fats, and therefore, should not be used very much. Today, many foods in the market, especially processed foods (prepared or semi-prepared), contain large amounts of fat.

*Fourth session:* Physical activity: Definition and types of physical activities: For example, these activities can improve cardiovascular performance and fitness, and the higher the amount of energy used in a week is (of course, regularly and for at least 6 consecutive weeks), the more beneficial effects it will have on the cardiovascular system.

*Fifth session:* Spiritual growth: Faith in God makes a person's attitude towards the whole existence purposeful and meaningful, and lack of faith in God makes a person lack coherence and peace. In addition, it can be said that religious practices, from an intra-personal point of view, enable a person to control his/her stress and disability physiologically, cognitively, and emotionally.

*Sixth session:* Interpersonal relationships: Interpersonal relationships provide support resources for a person. Interpersonal (social) support is defined as the resources and mutual relationships that are provided to a person by others to help him/her to cope effectively with his/her problems.

### **Procedure**

To conduct the research, first, the necessary permission was obtained from Islamic Azad University, Kish International Branch of Shahid Fayaz Bakhsh Hospital, Iran, then, the invitation to participate in this research along with the contact number of the researcher was distributed in the hospital. After contacting the patients and obtaining their oral informed consent of cooperation, the demographic questionnaire was sent to them "online". In this way, the inclusion and exclusion criteria were checked based on people's responses to the demographic questionnaire, and finally,

30 people were selected. After randomly assigning the participants to the study groups, in the next step, the tools were implemented as a pretest on the participants of the intervention and control groups before the start of the intervention. Then, the people in the intervention groups received training on the health-promoting style and health belief model during online Skype sessions, and the control group did not receive any type of educational intervention. At the end of the intervention, all the participants of the 3 groups completed the questionnaires for the posttest and after 1 month for the follow-up. The entire course lasted 2 months.

In this research, descriptive and inferential statistics were used for the statistical analysis of data. Descriptive statistics, frequency tables, cumulative frequency percentages, and graphs were used to describe demographic characteristics. Inferential statistics were performed after checking the assumptions of analysis of variance (ANOVA) with repeated measurements, including the normality of the data distribution, which was checked using the Shapiro-Wilk test, and the homogeneity of variances, which was checked using Levene's test.

## Results

The demographic characteristics of samples are presented in table 1. There were no significant differences between the 3 groups in terms of gender and age.

Table 2 shows that the mean score of somatic symptoms and illness perception in experimental and control groups varied in the posttest and follow-up. Table 2 also shows that the distribution of subjects' scores in the pretest, posttest, and follow-up stages for the variable of somatic symptoms and illness perception was normal.

Table 3 shows that the effect of time and the interaction effect of time\*groups were significant for the variables of illness perception and somatic symptoms. Therefore, the health promotion intervention was effective in the illness perception and somatic symptoms of asthma patients.

Table 4 shows the results of the Bonferroni post hoc test, indicating a significant difference between the mean of the experimental and control groups, as well as in the pretest, posttest, and pretest with follow-up for the variables of illness perception and somatic symptoms, thus indicating the positive effect of the health promotion intervention in the experimental group.

**Table 1.** Demographic characteristics of participants

Variables	Group	Range	n (%)
Gender	Health belief model	Female	7 (46.7)
		Male	8 (53.3)
	Health-promoting styles	Female	7 (46.7)
		Male	8 (53.3)
	Control	Female	7 (46.7)
		Male	8 (53.3)
Age	Health belief model	30-35 years	4 (26.7)
		36-40 years	4 (26.7)
		41-45 years	5 (33.3)
		46-50 years	2 (13.3)
	Health-promoting styles	30-35 years	4 (26.7)
		36-40 years	4 (26.7)
		41-45 years	5 (33.3)
		46-50 years	2 (13.3)
	Control	30-35 years	4 (26.7)
		36-40 years	4 (26.7)
		41-45 years	5 (33.3)
		46-50 years	2 (13.3)

**Table 2.** The mean (SD) and Shapiro-Wilk test related to the variable of somatic symptoms and illness perception in experimental and control groups

Variable	Stage	Group	Mean ± SD	Shapiro-Wilk test		
				Statistics	df	P
Somatic symptoms	Pretest	Experimental	14.57 ± 1.87	0.968	28	0.520
		Control	13.92 ± 2.76	0.887	28	0.056
	Posttest	Experimental	10.75 ± 1.91	0.940	28	0.112
		Control	13.32 ± 2.55	0.917	28	0.059
	Follow-up	Experimental	9.67 ± 1.90	0.968	28	0.530
		Control	13.35 ± 2.61	0.936	28	0.088
Illness perception	Pretest	Experimental	35.39 ± 3.75	0.949	28	0.182
		Control	35.60 ± 2.23	0.928	28	0.054
	Posttest	Experimental	39.39 ± 3.78	0.953	28	0.238
		Control	35.96 ± 2.11	0.922	28	0.058
	Follow-up	Experimental	39.60 ± 3.61	0.963	28	0.403
		Control	35.92 ± 2.25	0.945	28	0.150

SD: Standard deviation; df: Degree of freedom

Testing and continuation of this work were in the follow-up phase. Therefore, it was concluded that the health promotion intervention was effective on the illness perception and somatic symptoms of asthma patients and its effectiveness continued throughout the 3-month follow-up period. Therefore, the Bonferroni test was used to compare the effectiveness of the health promotion intervention and the health belief intervention on the illness perception and somatic symptoms of asthma patients.

### Discussion

The findings indicated that there is no difference between the effectiveness of health promotion intervention and health belief intervention on the illness perception and somatic symptoms of asthmatic patients. The results of this research were in line with that of the studies by Mohammad Polarti et al. (2019), Naimi et al. (2009), Beshrpour et al. (2017), and Babaei et al. (2019).

It can be concluded that health promotion involves helping people to discover the synergy between their main emotions and optimal health, increasing motivation to strive to achieve optimal health, and supporting them in changing their lifestyle to move towards an optimal state of health. Optimal health refers to a dynamic balance of physical, emotional, social, spiritual, and intellectual health. Lifestyle changes can be facilitated through a combination of learning experiences, that lead to increased awareness and motivation, developing skills, and most important of all, instigating positive health behaviors by creating opportunities for open access to the environment (Calimero & de Mateus, 2016). Thus, both health belief and health promotion interventions each somehow reduced somatic symptoms in these patients.

**Table 3.** The results of repeated measures analysis of variance

Effect source		SS	df	MS	F	P	Eta square
Illness perception	Time	184.75	2	93.37	171.09	0.001	0.76
	Time*group	132.94	2	66.47	123.11	0.001	0.69
	Group	221.72	1	221.72	8.22	0.006	0.13
Somatic symptoms	Time	235.86	1.58	139.38	138.87	0.001	0.72
	Time*group	141.08	1.69	83.37	83.06	0.001	0.60
	Group	146.72	1	146.72	10.33	0.002	0.16

SS: Sum of Squares; df: Degree of freedom; MS: Mean of Squares

**Table 4.** The results of the Bonferroni test for pairwise comparisons of the means of the effect of time and group

Variable	Time effect	Mean $\pm$ SD	Times difference		Mean difference	SE	P
Illness perception	Pretest	35.50 $\pm$ 0.413	Pretest	Posttest	-2.17	0.141	0.001
			Follow-up	Follow-up	-2.26	0.135	0.001
	Posttest	37.6750 $\pm$ 0.410	Posttest	Pretest	2.17	0.142	0.001
			Follow-up	Follow-up	-0.089	0.140	1.000
Somatic symptoms	Follow-up	37.7650 $\pm$ 0.403	Follow-up	Pretest	2.26	0.135	0.001
			Posttest	Posttest	0.089	0.140	1.000
	Pretest	14.2550 $\pm$ 0.315	Pretest	Posttest	2.21	0.195	0.001
			Follow-up	Follow-up	2.73	0.189	0.001
	Posttest	12.0350 $\pm$ 0.302	Posttest	Pretest	-2.21	0.195	0.001
			Follow-up	Follow-up	0.518	0.132	0.001
Follow-up	11.5150 $\pm$ 0.306	Follow-up	Pretest	-2.73	0.189	0.001	
			Posttest	Posttest	-0.518	0.132	0.001

SD: Standard deviation; SE: Standard error

In general, it can be said that the health belief model is based on knowing the beliefs and understanding of the individual about the severity and sensitivity of asthma and the existing strategies, as well as the obstacles and benefits of doing them to reduce the probability of contracting the disease. Since most people consider their vulnerability to getting a disease to be low and have an unrealistic optimism about getting a disease and its risks, the investigation of how to perceive the risk of the disease based on this pattern is a priority. Therefore, according to this model, adopting an action to recover from a disease or to act on a disease depends on the understanding of its benefits, the person's perception of the disease, and the perception of the threat caused by the disease, which motivate the individual to perform health-related behaviors (Miloni et al., 2015).

Health education, which is referred to as health promotion, is an approach that is commonly used to teach and create health behaviors. A health-promoting lifestyle includes activities that improve and raise the level of well-being and potential health of individuals, families, and society. According to Walker et al. (1987), these behaviors affect the maintenance and improvement of the level of well-being, self-improvement, and development of people. Lifestyle is the normal daily activity that during the healthy lifestyle intervention of asthmatic patients, they accepted acceptably in their lives so that these activities affected their health. By choosing a lifestyle, these people took effective measures and performed activities to maintain and improve their health and prevent disease.

There was no difference between the effectiveness of health promotion intervention and health belief intervention on the illness perception of asthmatic patients, and their effectiveness continued for a 3-month follow-up period.

**Table 5.** Bonferroni test results for within-subject and between-subject groups pairwise comparisons

Variables	Groups difference		Mean difference	SE	P
Somatic symptoms	Health promotion	Health belief intervention	0.571	0.521	0.828
	Health promotion	Control	-1.86		0.001
	Health belief intervention	Control	-2.44		0.002
Illness perception	Health promotion	Health belief intervention	0.571	0.791	1.000
	Health promotion	Control	2.29		0.014
	Health belief intervention	Control	2.44		0.008

SE: Standard error



Based on the health belief model, if people believe that they are vulnerable to diseases such as asthma, or if they are aware of its side effects (perceived sensitivity) if they have the disease, and understand the depth of this risk and the seriousness of its various side effects in their lives (perceived severity), they will consider behaviors suggested as being useful in reducing the risk or preventing the worsening of disease (perceived benefits), will be able to overcome factors preventing action such as cost, time, etc. (perceived obstacles), will have the necessary confidence in their abilities to perform the behavior in a way that produces the desired result (perceived self-efficacy), and they will have a greater inclination to participate in health promotion behaviors (Sari, 2018). Self-efficacy beliefs refer to self-regulatory processes. Self-efficacy beliefs reflect the conceptualization of knowledge structures that have an effect on evaluation processes and, in turn, behavior. Belief in emotional self-efficacy is a significant factor in the constructive system of human competence. The performance of tasks by various people with similar skills in different situations in a weak, medium, or strong way or by an individual in different situations relies on changes in their efficiency beliefs. Skills could be easily influenced by self-doubt, and so, even highly talented people use their abilities less when they have low self-confidence. Thus, the sense of self-efficacy enables people to do extraordinary things by using their skills in tackling obstacles (Rogers, 1975).

## **Conclusion**

Every research may have a series of limitations, and the current study is not an exception. In this investigation, a self-report instrument was used to measure disease perception, and people may consciously or unconsciously try to make themselves look good and deny the opposite. It is possible that the demographic characteristics of participants, such as socio-economic stratum, which the researcher had no control over, and required a great deal of time and money to control, have affected illness perception and the findings of this study. The report of each research is written in the hope of continuing research on that subject and is presented to the community of scholars. Thus, every report requires suggestions that open the way for future research. Therefore, it is recommended that future researchers explore illness perception and identify other effective factors by conducting qualitative research, and using in-depth interviews. It is recommended that the present study be conducted on people from different socio-economic strata.

## **Conflict of Interests**

Authors have no conflict of interests.

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