

## Application of the Health Belief Model in Promotion of Self-Care in Heart Failure Patients

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**Abstract-** Heart failure (HF) is a condition due to a problem with the structure or function of the heart impairs its ability to supply sufficient blood flow to meet the body's needs. In developing countries, around 2% of adults suffer from heart failure, but in people over the age of 65, this rate increases to 6-10%. In Iran, around 3.3% of adults suffer from heart failure. The Health Belief Model (HBM) is one of the most widely used models in public health theoretical framework. This was a cohort experimental study, in which education as intervention factor was presented to case group. 180 Heart failure patients were randomly selected from patients who were referred to the Shahid Rajaei center of Heart Research in Tehran and allocated to two groups (90 patients in the case group and 90 in the control group). HBM was used to compare health behaviors. The questionnaire included 69 questions. All data were collected before and 2 months after intervention. About 38% of participants don't know what, the heart failure is and 43% don't know that using the salt is not suitable for them. More than 40% of participants didn't weigh any time their selves. There was significant differences between the mean grades score of variables (perceived susceptibility, perceived threat, knowledge, Perceived benefits, Perceived severity, self-efficacy Perceived barriers, cues to action, self- behavior) in the case and control groups after intervention that was not significant before it. Based on our study and also many other studies, HBM has the potential to be used as a tool to establish educational programs for individuals and communities. Therefore, this model can be used effectively to prevent different diseases and their complications including heart failure.

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**Keywords:** Heart failure; Health Belief Model; Perceived susceptibility; Perceived benefits

### Introduction

Heart failure (HF) is defined as a condition in which due to a problem with the structure or function of the heart it fails to supply sufficient blood flow to meet the body's needs (1). The most prevalent causes of heart failure are myocardial infarction (MI) and other forms of ischemic heart diseases, hypertension, valvular heart diseases and cardiomyopathy (2). Heart failure has a wide variety of symptoms like shortness of breath, coughing, ankle swelling and reduced exercise capacity. Heart failure is undiagnosed usually due to lack of a globally agreed definition and problems in definitive diagnosis.

Treatment commonly consists of lifestyle modification and medications, sometimes devices or even surgery are mandatory.

Heart failure is a prevalent, expensive condition with high morbidity and mortality (2). In developing countries like Iran, about 2% of adults suffering from heart failure, but this rate increases to 6-10% in people over the age of 65 (2,3). Based on recent estimations It assigns an amount to 2% of the total budget of the National Health Service in the United Kingdom, and more than \$35 billion in the United States, that this considerable cost mostly is related to hospitalization (4,5). Heart failure also reduces physical and mental

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health of patients significantly, resulting in a markedly decreased quality of life (6,7). With the exception of heart failure caused by reversible conditions, the disease is progressive and irreversible. Although patients even with high morbidities will survive for many years, about 10% of patients will die annually (8).

Heart failure is a serious public health in the United States, causing substantial morbidity and mortality in the later years of life. The risk of heart failure rises sharply with increasing age, with doubling rates every 10 years among older adults (9,5). In Iran, around 3.3% of adults suffer from heart failure.

The health belief model (HBM) is one of the most widely used models in public health theoretical framework. It can explain health behavior modification and can act as a foundation for health education intervention (10). Social psychologists developed the HBM during the 1950's to predict why individuals do not participate in preventive health behaviors such as immunization (11). The model assumes a value expectancy approach postulating that behavior depends upon the expected outcome of an action and the value of individual places on those outcomes (10-12).

It is needed to use valid measurement instruments to assess a theory-based health education program's impact on the theoretical mediating variable. Failing to develop and use of such an instrument can cause counterfeit findings (11,13).

The HBM has five constructs: 1-perceived susceptibility 2-perceived severity 3-perceived benefits 4-perceived barriers and 5-cues to action (10,13,12). Researchers have successfully applied and expanded the model's constructions in different preventable health behaviors, sick- role behaviors and clinic utilization behaviors (11,12,14).

We assessed the content and concurrent validity for constructs of HBM in promotion of self-care in Heart failure patients

## Materials and Methods

This was a cohort experimental study in which the intervention factor was education that was presented to case group. This study was conducted during the year 2008 in Tehran, Islamic Republic of Iran. 180 Heart failure patients were randomly selected from patients who were referred to the Shahid Rajaei center of Heart Research in Tehran. They were divided into two groups (case group-90 and control group-90). A patient met the inclusion criteria if he/ she were suffered from heart failure. Exclusion criteria were old patients that couldn't understand the questions.

HBM was used to compare health behaviors. The questionnaire was included in 69 questions (12 demographic questions and 57 questions of other variables), minimum and maximum scores of them were as mentioned in table 1.

HBM constructs were measured using 5-point Likert scales (totally agree= 4 thoroughly totally disagree =0).

For collecting data, researchers interviewed with patients were referred to Shahid Rajaei center of Heart Research in Tehran.

The questionnaires were completed before intervention by the two groups during interview. Then, patients in case group were educated by using lecturing, group teaching and performance in 40- minutes based on the Health Belief Model (HBM). An educational film in a CD was given to the participants. The participants were allowed refer to the researcher or call him in emergency situations.

**Table 1.** The number of questions of variables, minimum and maximum scores of them.

Variables	No of questions	Minimum scores	Maximum scores
Knowledge	6	0	15
Self- efficacy	6	0	18
perceived susceptibility	5	0	20
perceived severity	6	0	24
perceived threat	2	0	8
perceived benefit	6	0	24
perceived barrier	7	0	28
self-behavior	15	0	60
cues to action	4	0	4

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To ensure the clarity of questionnaires, pilot testing of the questionnaire was also done for coherence and consistency in 20 patients who were not included in the survey. Then after, the questionnaire was modified on the basis of their feedback. Then content and validity was established by five experts were chosen among the academic staff. A Cronbach alpha was calculated for each scale ( $\alpha=0.78$  for knowledge scale,  $\alpha=0.85$  for constructs of HBM) to determine the internal consistency. All data were collected before and 2 months after intervention were transferred directly to SPSS software, and analyzed using *t*-test and analyze–variance tests. The level of confidence interval was 0.95. Participants were assured about confidentiality of their responses to study questions. HBM is consisted of following parts:

Perceived Health Behavior  
Perceived susceptibility  
Cues to Action

Perceived Threat  
Perceived Benefits and Barriers  
Perceived severity

## Results

A total of 180 patients entered the study, 78.9% were men and 21.1% women. Mean age of patients was  $53.41 \pm 10.7$  (between 20-78 years old). 25% of patients were illiterate, 27.8% had completed primary school, 14.4% guidance school, 24.4% high school and 7.8% had university graduation. 17.3% of participants were obese ( $BMI > 30$ ), and 41.8% of them had excess weight ( $30 > BMI > 25$ ). About 38% of participants had no idea what the heart failure is. Also, 43% don't know that using salt is not suitable for them. More than 40% of participants didn't weigh their selves any time. There was no significant difference between the demographic variables of the case and control groups.

**Table 2.** The effectiveness of the intervention HBM variables was determined by comparing before and after assessments for the intervention condition and control condition.

Variables	Groups	Before intervention	After intervention	P
Knowledge	Case(n=90)	6.28 ±2.78	13.1 ± 1.73	<0.001
	Control(n=90)	6.49±2.83	6.53±2.84	=0.046
	P	>0.05	<0.001	
Self- behavior	Case	31.12±7.94	54.49±8.01	<0.001
	Control	31.28± 9.02	29.29±9.02	=1
	P	>0.05	<0.001	
Perceived benefits	Case	18.44±3.18	21.77±1.98	<0.001
	Control	18.33 ±3.32	18.36±3.33	=1
	P	>0.05	<0.001	
Perceived severity	Case	18.56±3.11	22.17 ±2.19	<0.001
	Control	18.65±3.40	18.68 ±3.39	=0.157
	P	>0.05	<0.001	
Perceived susceptibility	Case	12.58 ±3.37	15.89±2.67	<0.001
	Control	12.24± 3.24	12.28 ±3.24	=0.083
	P	>0.05	<0.001	
Perceived threat	Case	5.88±1.36	7.47±0.81	<0.001
	Control	6.16±1.61	6.18 ±1.62	=1
	P	>0.05	<0.001	
Perceived barriers	Case	15.06 ±4.55	19.24±4.14	<0.001
	Control	14.14±4.17	14.16 ±4.16	=1
	P	>0.05	<0.001	
Self- efficacy	Case	10.08±2.74	13.01 ±2.54	<0.001
	Control	10.04±2.7	10.06 ±2.68	=1
	P	>0.05	<0.001	
Cues to action	Case	2.99±0.97	3.24±0.87	<0.001
	Control	2.65±1.06	2.66±1.04	=1
	P	>0.05	<0.001	

**Table 3.** Rates of analyses regression for constructs of health belief model.

Independent Variables	$\beta$ standard	<i>P</i>	$R^2$	Dependent variable
Perceived benefits	0.154	0.008		
Perceived self- efficacy	0.099	0.093		
knowledge	0.457	0.001	0.689	Behavior for self- efficacy
severity× susceptibility	0.393	0.002		
perceived threat	0.116	0.059		

### Intervention

The effectiveness of HBM variables was determined by comparing the intervention and control groups before and after education.

The results showed no significant differences between the mean grades score of variables (perceived susceptibility, perceived threat, knowledge, Perceived benefits, Perceived severity, self-efficacy Perceived barriers, Cues to action, self- behavior) in the case and control groups before intervention (Table 2). The *t*-test, however, showed a significant difference between all variables mentioned in the case and control groups after intervention ( $P < 0.001$ ). There was a significant difference between mean grades score of all of variables in the case group before and after intervention ( $P < 0.001$ ). No significant difference was seen between mean grades score of variables in the control group before and after intervention ( $P > 0.05$ ). Variance in behavior for Self- efficacy was 69% (Table 3).

### Discussion

This study confirms that HBM can be used to predict and understand the intention of heart failure patients to design and follow long term and practical activities aiming prevention and control of the disease and their possible complications.

The HBM provides a means to understand the attitude, behaviors and educational needs of populations and, therefore, can be used as a practical tool to develop effective intervention strategies (15).

The results of present study point out several educational needs of heart failure patients which increase level of their knowledge and encourage them to modify their behavior to prevent and control their diseases. It was shown that the knowledge of patients regarding their disease was lower than average (6.28 out of 15), and more than 50% of them were unaware of their disease.

Findings of this study are consistent with the observation of Artinian study and also some other studies (16,17), all of which recommend increasing the

participants' awareness to the need for prevention and control of their disease through educational campaigns to improve their intentions to prevent and control heart failure. The awareness of patients, significantly increased after intervention in the case group, consistent with the results of Bockting et al who showed the increased knowledge about AIDS after education (18) and also findings of Tan et al who reported that HbA<sub>1c</sub> in diabetic patients was decreased after education and increase of patients' knowledge (19). Also Beranth (20) and Neil (21) reported similar findings too.

In present study the mean scores of perceived susceptibility was higher than average score in both case and control groups. These results also were confirmed by Beranth (19) and Tan (20); Tan suggested that the diabetic patients did not prevent the complication of diabetic foot because of their low level of perceived susceptibility.

Some other studies did not confirmed our results according to perceived susceptibility (22,23).

In this study we detected increased Perceived susceptibility of participants in the case group, shows possible influence of education on patient' behavior, this results were consistent with the findings of Beranth (20) and also the finding of a study in India (24) concluded that increasing perceived susceptibility in patients, helps them to prevent and control their diabetic foot complications. A study in USA suggested the low perceived susceptibility as a reason for patients not caring about their health (25). There were no significant differences according to the mean grade scores of perceived severity between the case and control groups, before intervention, results which indicates the lack of perceived severity among patients about their disease in all groups. Results of the Rith-Najarian (26) and Aljaseem (27) studies confirm our results. They disclosed that as long as the perceived severity of patients in their studies was not appropriate, the patients had ignored foot complications. In our study, following intervention, the perceived severity of case group was increased after intervention. These results are similar to Berant (20) and Cerkoney (28) findings. The usefulness of perceived

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treat as another construct of HBM has been shown previously. In present study the mean grade scores of both case and control groups were more than average. Mean scores were increased after intervention in case group more than control group suggesting possible positive effects of education upon participants' behavior. These results are concomitant with findings of Troein who found the increase of perceived threat and habitual practice (29). Also another study proposed that perceived treat is useful for prevention and control of brucellosis (30).

Driver et al (31) reported that Increase of perceived threat decreased foot amputation by 84% in diabetic patients. Also Vickie R pointed the higher amputation rate in group of diabetic patients with low perceived treat than others (31).

Perceived barriers and benefits had important role in the control and prevention of disease among patients who had experienced infarction for the first time (32). In a study was carried out in nurses with lower than two years of professional experience, those who followed the recommendation of not recapping the needle, had less barriers and more benefits (33). Based on our study finding, both perceived barriers and benefits constructs were increased significantly after interventions in the case but not in the control group ( $P<0.001$ ).

Robinson in his study revealed that perceived benefits among the diabetic patients were not acceptable that there was significant difference between foot care and perceived benefits (34). Findings of our study confirm the results of many other studies according to the perceived barriers and benefits (35-39).

The mean grade scores of self- behavior increased in the case group after intervention (before intervention and after intervention  $31.12\pm 7.94$ ,  $54.49\pm 8.01$  respectively), but decreased in the control group (before intervention and after intervention  $31.28\pm 9.02$  and  $29.29\pm 8.78$  respectively).

Our results revealed a significant difference between mean grades scores of the self- behavior in case group, before and after intervention ( $P<0.001$ ), that was not seen in the control group. These results are concomitant with Mohamaei (40) study findings.

In addition, significant differences between mean grades scores of self- behavior in the case and control groups after intervention is confirmed by our study and previous studies demonstrating improvement of patients practice toward healthy behavior after intervention(41-45).

In total the results of the present study demonstrated that, the mean grade scores of knowledge and constructs

of HBM in heart failure patients are at average level while practice towards self care is low.

Furthermore, with increasing the mean grades scores of knowledge and constructs of HBM, practice of patients toward self prevention of complications and self control of the disease was improved. Hence our study like many other similar studies on HBM punctuates on suitability of education based on HBM to improve the behavior of patients.

Our study also notes the potentials of HBM for establishing educational programs to individuals and communities. Therefore, we suggest that this model can be effectively used to prevent different diseases and complications including heart failure.

It should be noted that collecting data about behavior of participants in this study was based on patients' self-report, and we were unable to collect data by supervising the behavior and collect information through self-behavior that this was a limitation in our study.

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