Original Article

Investigating the effect of an education plan based on the health belief model on the physical activity of women who are at risk for hypertension

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Abstract

Background: Hypertension is the main risk factor of many diseases and the main reason of death all over the world. Because the signs of hypertension are not clear, people do not feel its dangers and do not believe they are at risk. This problem makes preventing hypertension a great challenge for the health system. One factor that is related to lifestyle and is effective in preventing hypertension is increasing exercise. The aim of this study is investigate the effect of an education plan based on the health belief model on the physical activity of women who are at risk for hypertension.

Materials and Methods: This is a field experimental study. Field of study was two health care centers in Isfahan, which were selected through simple random sampling. Ninety-two females who were at risk for hypertension were the subjects of study. Subjects were selected through systematic sampling. Beck questionnaire was used to evaluate the physical activity of both experimental and control group subjects before and 2 months after the intervention. The intervention plan was three education sections that were conducted in 4 weeks. The data were analyzed by descriptive statistical tests and inferential tests of repetitive variance analysis and *t*-test through SPSS.

Results: The results showed that the average of physical activity increased significantly in the intervention group 2 months after education ($P = 0.03$).

Conclusions: The findings of the study confirm the efficiency of education plan based on the health belief model on the physical activity of women who are at risk for hypertension.

Key words: Health education, hypertension, Iran, physical activity, prevention, women

Introduction

Hypertension is the main risk factor for many diseases and is one of the main causes of mortality in the world. Furthermore, it is the most common cause for outpatients visiting physicians, and the simplest, treatable, and identifiable risk factor for stroke and myocardial infarction (MI), heart failure, peripheral vascular disease, aortic dissection, atrial fibrillation, and end-stage renal disease (ESRD).[1-3] Every year, 8.4 million people worldwide are diagnosed with this disease,[4] and in Iran, 31.7% of women have hypertension.[5]

Despite the importance of this disease and its role in acute and chronic diseases, the unknown symptoms of hypertension lead to risks of this disease being ignored by people. Prevention of hypertension has become a major health challenge.[6]

Although non-modifiable risk factors such as age, gender, genetics, and race are involved in the incidence of hypertension, hypertension can be prevented by lifestyle modifications.[6] Increasing physical activity is one of the lifestyle-related factors that are effective in preventing hypertension.[7-9] Studies showed that there is an association between physical activity and the risk of hypertension, and regular daily physical activity can reduce the risk of hypertension in women.[10,11] According to the American Public Health Association (APHA), regular physical activity (for at least 30 min in most days of the week) may reduce 4-9 mmHg of blood pressure.[6,12,13]

Prevention of hypertension in women is important for several reasons. They are: the prevalence of hypertension is

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higher in women;[14] their mortality caused by cardiovascular diseases is higher than that of men;[4] positive family history has a greater impact on hypertension;[6] and finally some of the risk factors of hypertension including obesity and lack of physical activity (stationary lifestyle) are more common in women (e.g. in Iran, 26.5% of women are obese and 46.5% have insufficient physical activity).[5]

Since habits are formed over time by the influence of beliefs, attitudes, and experiences of life, changing them is difficult because they are consolidated and are a part of an individual's identity.[15] To understand and practice the right way of life and avoid diseases, individuals and communities need to learn the proper behavior.[16-17] In this regard, the health belief model (HBM) is the first theory that was exclusively related to the field of health-related behaviors.[18] HBM was expanded to explain the reason for lack of public participation in the illness prevention and detection programs.[17,18] The use of this model helps to better understand the main factors affecting an individual's health decisions and preventing diseases.[19]

The HBM includes six constructs of perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy. Perceived susceptibility refers to the intuitive belief of people in regard to the risk of a disease.[20] Whatever an individual see herself or himself more in dangers it is more likely to take preventive actions.[21] According to HBM, by explaining the likelihood of negative consequences and representing the risks, perceived susceptibility can be established.[22] Perceived severity refers to the intuitive belief of a person about the severity and extent of the harm that can result from having a disease or a particular behavior.[20] Based on this model, by expressing serious consequences and misrepresenting them, the perceived severity can be established.[22] Perceived benefits and perceived barriers refer to the beliefs about true and expected costs of following new behavior.[18] To modify the behavior, change must be perceived beneficial and barriers must be considered and, if possible, they must be solved.[20] Cues to action are accelerating forces that cause a person to feel a need to act,[18,23] and self-efficacy is one's belief that he or she can change the behavior now.[24]

Newell *et al.*'s findings showed that by increasing the perceived severity about hypertension, systolic and diastolic blood pressures were significantly reduced.[25] In Mazloomy *et al.*'s study, there was a significant correlation between preventive behaviors and perceived susceptibility, perceived severity, perceived barriers, and self-efficacy to diabetes.[26] The study of Koch shows that women who had greater perceived susceptibility and perceived severity about lack of movement were much more likely to exercise.[27]

Due to the possible prevention of hypertension by HBM as well as its application in primary prevention programs, this educational model was used in this study. Researchers used this model in their studies for training preventive health behaviors[28-30] and physical activity.[28,31,32] Accordingly, this study was carried out to determine the effect of an educational program based on HBM on the physical activity in women at risk for hypertension.

Materials and Methods

Ethical considerations

The study is conducted in full accordance with the ethical principles. The Isfahan University of Medical Sciences approved the study and it has been cleared by the regional committee for medical research ethics. All the participants gave a written consent.

This was a double-group field trial with an assessment plan consisting of pre-intervention and 2 months post-intervention stages. The study was carried out from December to March 2013 in the health treatment centers of Isfahan, Iran. Ebnesina and Moutamed centers were chosen by draw between the two health network clusters of Isfahan.

Sample size of 44 people was calculated, when α was set at 0/95 and the power was set at 0/80 based on earlier studies.[28] Due to the potential infusion, 10% was added to the sample size; therefore, 49 people were included in each of intervention and control groups. Systematic sampling was performed in each center using medical family file numbers In each center, the subjects were randomly assigned to two groups by minimization software,[33] based on the demographic information of the subjects (age, education, and the number of children). Individuals in each experimental group from both centers were divided into groups of 10-13.

The study subjects included 18-60-year-old women who were not diagnosed with hypertension, besides having medical family files in the center with other inclusion criteria. The inclusion criteria included being literate, not pregnant, not having diabetes or limitation of motion, having a family history of hypertension in the first-degree relatives (parents, siblings), and willingness to participate in the study. To ensure that the subjects did not have hypertension, their blood pressure was controlled two times by the mercury sphygmomanometer made in China (brand 0483) which was calibrated prior to sampling. The individuals whose mean of two measurements of blood pressure was less than 140/90 mmHg were chosen as the study subjects. Exclusion criteria included having an acute disease during the study, being absent in one session of the training, and

unwillingness to cooperate in the research. Before the intervention, all participants signed a written consent form to participate in the study.

Beck physical activity questionnaire was used to assess the physical activity of the participants. The questionnaire contains 16 questions with three- and five-choice answers. Physical activity was evaluated by the sum of all the components that included three work factors with eight questions and sports and leisure with four questions each. The internal reliability of the questionnaire and Cronbach's alpha 0.79 were confirmed by Etemad and Ismaeilnasab.[34]

Three sessions were designed for the educational curriculum based on HBM, which were held during 4 weeks in Ebnesina and Moutamed centers. The first two sessions were of 75 min and the third session was of 60 min. In the first session, using lectures, questions and answers, and group discussion topics, the definitions, classifications, how to recognize, potential complications, and ways to prevent the development of hypertension were studied. Constructs of perceived susceptibility and perceived severity of the incidence of hypertension were discussed and a film was displayed showing interviews with patients having hypertension. In this film, two patients discussed about how they were diagnosed with hypertension, the complications they dealt with, and the problems they faced due to hypertension. One week later, the second session was held. In this session, aerobic exercises, how to calculate the intensity of the exercise, the beneficial structures, and perceived barriers of regular exercise were discussed. The third session was held in the fourth week of the intervention. In this session, the construct of perceived self-efficacy was discussed. At the end of each session, the subjects were given a booklet which was created according to the content of the sessions. It is noteworthy to mention that the nights before each meeting, the members were called. Finally, 2 months after the intervention, the subjects were invited to complete the Beck physical activity questionnaire again. A training session was held as lecture for the control group and they were also given educational booklets.

SPSS for Windows 20.0 (SPSS, Inc., Chicago, IL, USA) was used for data analysis. Statistical analysis was also performed by Mann–Whitney U test, Fisher's exact test, Chi-square, paired *t*-test, and independent *t*-test.

Results

In this study that is part of a research project, 92 subjects were studied: 45 in the experiment group and 47 in the control group. Mean age of participants in the experimental group was 40.67 ± 9.32 years and in the control group was 39.81 ± 8.67 years. Mean number of children in the experimental group was 1.96 ± 1.09 and in the control group was 2 ± 1.08. Mean income of participants in the experimental group was 634,444.44 ± 479,325.07 IRR (Iranian Rial) and in the control group was 654,255.32 ± 297,787.09 IRR. Most women in the experimental group (88.9%) and the control group (91.5%) were housewives. In both groups, most of the subjects were high-school graduates (55.6% in the experimental group and 36.2% in the control group). There was no statistically significant difference between the two groups in terms of demographic variables.

Independent *t*-test showed that before the intervention, the mean scores of physical activity ($P = 0.29$) and the components of work ($P = 0.122$), sports ($P = 0.15$), and leisure ($P = 0.51$) did not have a statistically significant difference between the two groups. Two months after the intervention, the mean scores of work ($P = 0.07$) and leisure ($P = 0.23$) components did not have a statistically significant difference, but the mean scores of sports component ($P = 0.001$) and physical activity ($P = 0.003$) in the experimental group were significantly higher than in the control group. Paired *t*-test showed that the two groups did not have a statistically significant difference regarding the mean score of work component before and after the intervention. Mean scores of physical activity ($P = 0.02$), sports ($P = 0.003$), and leisure ($P = 0.03$) components in the experimental group after the intervention were significantly higher compared to the pre-intervention stage. However, in the control group, they did not show a statistically significant difference before and after the intervention. Comparisons of the mean scores in physical activity and the components of work, sports, and leisure before and 2 months after the intervention in the control and experimental groups are illustrated in Table 1.

Discussion

Results showed that the application of educational program based on HBM caused a significant increase in the mean score of physical activity in the experimental group. This change was also observed in other studies. Goyer *et al*. showed that implementing primary prevention programs based on HBM and the theory of change stages led to a significant increase in the physical activity of patients at risk for cardiovascular disease.[35] Tavasouli *et al*. showed that HBM-based educational intervention led to a significant increase in the physical activity of female students of Isfahan.[30] Hang *et al*. indicated that HBM-based curriculum for preventing osteoporosisled to a significant increase in exercise endurance in Taiwanese women.[28]

Table 1: Comparison of mean scores of the variables under study before intervention and 2 months after intervention in the study and control groups

Variable	Time test	Study		Control		Student's *t*-test	
		Mean	SD	Mean	SD	*P*	*t*
Physical activity	Before education	7.71	0.97	7.47	1.16	0.29	1.06
	2 months after education	7.98	0.98	7.29	1.19	0.003	3.00
	Paired *t*-test						
	P	0.02		0.08			
	t	2.39		1.77			
Work component	Before education	3.12	0.41	2.97	0.50	0.12	1.56
	2 months after education	3.07	0.42	2.89	0.47	0.07	1.85
	Paired *t*-test						
	P	0.31		0.17			
	t	1.02		1.38			
Sports component	Before education	2.29	0.47	2.13	0.56	0.15	1.44
	2 months after education	2.48	0.46	2.10	0.55	0.001	3.59
	Paired *t*-test						
	P	0.003		0.58			
	t	3.16		0.56			
Leisure component	Before education	2.30	0.46	2.36	0.51	0.51	0.66
	2 months after education	2.43	0.47	2.29	0.56	0.23	1.20
	Paired *t*-test						
	P	0.03		0.16			
	t	2.28		1.44			

SD: Standard deviation

The results of the present study, which is one among the first studies based on the model applied for women at risk for hypertension, demonstrated that the design and implementation of curriculum can make a significant difference in the physical activity level of the experimental group. Although this study was conducted on a small sample of women, the results show that despite the importance of preventing hypertension, the women's physical activity level was not optimal, which shows the need for educational interventions for preventing hypertension. According to the results, it can be stated that the training program was suitable for enhancing the physical activity level which is one of hypertension risk factors. Moreover, given that majority of physical activity is done through work and transportation in Iran,[36] another success of the study was that the intervention program resulted in a statistically significant increase in the physical component scores of the experimental group.

Nurses can design their educational interventions based on HBM, and therefore, they can take effective steps toward modifying, changing, and promoting healthy behaviors.

By changing to a healthy lifestyle, such as doing regular exercise, many problems, chronic and non-communicable diseases can be prevented and result in the promotion of health and a longer life. The results of this study indicate that the use of HBM in the educational program can help patients to change the behaviors that increase the risk of disease. Although any form of training includes some benefits, this study shows that if education takes place based on this model, it can bring more positive effects and help to improve health and reduce medical costs.

Completing the Beck physical activity questionnaire self-report was among the study limitations. The researcher was not able to practically monitor all the participants. As mentioned earlier, another limitation was that the target groups were females; therefore, making schedules for the sessions was difficult with them as they were housewives with lot of responsibilities and also having children.

Conclusion

In summary, we can say that education based on HBM improved the level of physical activity in the intervention group. The results of the study confirm the efficiency of HBM in improving the physical activity of women at risk for hypertension.

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