



## Health education program and healthy diet compliance in patients with primary hypertension

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### **Original Article**

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### **Abstract**

Compliance with preventive behaviors is essential to control hypertension among suffered patients. This study aimed to assess the effect of a designed educational program on nutrition behaviors among patients with primary hypertension referring to the hospitals in Qazvin, Iran. In this study, a number of 68 eligible patients suffering from primary hypertension was recruited from an intervention hospital (N=34) and a control hospital (N=34). Before the intervention, data on demographic characteristics and main variables including knowledge, attitudes, self-efficacy, and behaviors of the participants were gathered through the questionnaires. Then, the intervention group was provided by the educational program. The same data were collected 4 weeks after the intervention. The mean age was  $53.59 \pm 7.33$  for the intervention group and  $52.15 \pm 8.68$  for the control group. The two groups were equal in terms of all demographic and main variables except for attitude before the intervention. The results showed all variables such as knowledge, attitude, self-efficacy, and behavior were improved in the intervention group compared to the control group. In conclusion, this study verified the educational program could improve knowledge, attitudes, self-efficacy as well as behaviors regarding nutrition behaviors among patients suffering from hypertension.

**Keywords:** Behavior, Diet, Hypertension, Self Efficacy

### **Introduction**

Hypertension is an unsigned prevalent disease that in case of in-time detection, it will be cured. However, in case of failure to treatment, it may lead to lethal symptoms like heart attack, apoplectic stroke, and heart failure [1]. Studies have shown more than two thirds of the population in the United States aged more than sixty years old is suffering from hypertension [2]. It has been reported that the prevalence of hypertension among

Iranian men and women is 37% and 35%, respectively [3]. Also, a previous research suggested that 24.1% of men and 24.7% of women who were living in Semnan province, Iran, suffered from hypertension [4].

Results of the studies have shown that the blood pressure is controlled only in 58 percent of cases undergoing treatment. This study also indicates that the patients

suffering from hypertension did not comply with prescribed medication [5].

Controlling hypertension in order to minimize the subsequent complications seems to be the most effective approach against this disease. Although prevention and treatment of hypertension has been paid more attention in recent years, the reported prevalence rates of high blood pressure in different communities are disappointing [6].

The rate of success in the control of high blood pressure in various countries is different. The success of countries in controlling blood pressure depends on national development so that developed countries have successfully managed this health problem through health education and behavior change [7].

For example, the comparison of blood pressure control in five European countries (including England, Germany, Italy, Spain, and Sweden), Canada and the USA among patients with  $\geq 140.90$  blood pressure who were under treatment shows that the rate of controlling hypertension in European countries is 40.3% while this rate is 40.3% in Canada and 54.4% in the USA [8].

However, a significant difference is observed when these values are compared with those of developing countries like Greece with 2% success [9], China with 1.8% success [10], and an African country with 2.8% success [11].

Medical reports indicate that the failure in the control of blood pressure originated from patients' incompliance with treatment. Despite the higher frequency of blood pressure measurement and also the higher awareness of hypertension among women and the elderly, it was revealed that the rate of hypertension control in women is similar to men and the elderly succeeded to manage their blood pressure less than youth. Furthermore, it has been reported that the rate of blood pressure control in China and Greece is lower than the corresponding rate in Iran, even though the people living in these countries have more awareness regarding blood pressure. Therefore, it is

obvious that low patients' cooperation with the physician in management of blood pressure and incompliance with nutrition behavior change can cause uncontrolled blood pressure. This could be due to the lack of education and justification of patient to control their blood pressure. Different studies have indicated that blood pressure is not often well diagnosed and when diagnosed it is not well treated and controlled [11].

Compliance with hypertension treatment regime includes a range of behaviors according to the recommendations of health care providers about taking medication and healthy diet [12,13].

Failure to compliance with the regime therapy that is defined as the rate of incompliance of individuals with health or therapy recommendations is a complex behavioral process which is affected by several factors like individual characteristics of patients and mutual relation among physician, patient, and healthcare system. Despite numerous studies conducted on the patient's compliance with the therapy regime in other countries, the research in this field has been rare in our country, Iran. While with regard to the effect of hypertension on the health of the society, more researches in this regards seem necessary [14,15].

Based on what was mentioned above, it can be said that the compliance of patients with hypertension control measures is low and hence, the quality of health care system is in question. The expectation of patients could be better paid attention if we want to achieve their satisfaction [16].

The right of patients to obtain health literacy regarding their disease and self-care skills makes the health system to present health education services as an attempt to achieve the goal of health promotion.

Patients as the main stakeholder must participate in the process of treatment. The participation of patients is occurred only when physician and other medical caregivers pay attention to the necessity of

self-empowerment of patients for conscious participation in the treatment process.

Health education by focusing on the basic role of patient participation helps patients with achieving the right of participation in the process of treatment. Health education programs emphasize on upgrading patients' health literacy and self-efficacy in order to promote the participation and compliance of patients with the treatment measures [16]. Despite various studies in the field of interventional training to improve preventive behaviors against hypertension, yet there are Iranian people with high blood pressure without preventive behaviors like compliance with nutrition regime. It seems that despite having enough knowledge, attitude, and self-efficacy, the patients need educational interventions to change their risky behaviors. Therefore, this study aimed to assess the effect of health education program on promotion of attitude, self-efficacy, and behavior of individuals who suffering from hypertension.

### Method

This study was a quasi-experimental research with control group that was conducted from Sep to Dec 2011 in the central region of Iran. Because of the random allocation of participants and utilization of a control group, this study was categorized as experimental research type. Two hospitals of Ghazvin city that are under the supervision of the treatment deputy of Ghazvin university of medical sciences were considered as research setting. All patients with high blood pressure who referred to these hospitals were considered as study population. One hospital randomly was selected for intervention and another for control. To make the sample, the researcher referred to the hospitals during randomly selected days of a week and invited patients with hypertension to the study if they were eligible and satisfied with participation in the research. The participants were selected without any proceeded plan, so it was likely that the hypertensive individuals were selected randomly. The sampling was

kept until the number of participants in each group reached 34. The inclusion criteria included having the least reading/writing literacy, ageing between 30 to 65 years, having history of hypertension for at least the latest year, and taking at least one medication because of his/her blood pressure. If a person had an uncontrolled blood pressure, i.e. a person with at least two recorded blood pressure above 140.90 mm Hg, or suffered from cognitive disorders or serious medical conditions, he/she was excluded from the study. Also, if someone was not satisfied with the study, he/she was allowed to leave the study.

The tool used in this research was an unnamed questionnaire consisted of two main parts. The first part was about demographic variables such as age, sex, marital status, education level, and family history of disease. The second part included questions on knowledge, attitude, self-efficacy, and behaviors regarding compliance with the recommended diet, regular measurement of blood pressure, and frequency of cigarettes smoking or alcohol consumption. The questions of this part were first developed based on the relevant literature and in accordance with the Ajzen and Fishbein recommendations with regard to the fact that the constructs of models are based on the psycho cognitive structure. Then, the questions were matched with the views of 20 people suffering from high blood pressure through interview. Therefore, the questions were modified if there were any misconception. In this evaluation, each subscale was assessed directly or indirectly. In the domain of self-efficacy, 20 questions were used for which the patients were asked to answer how much they were sure that they could comply with the diet regime. The patients rated each item on a 3- point Likert scale composed of 1= I am not sure, 2= I am almost sure, and 3= I am completely sure. The Cronbach's alpha coefficient of this subscale was 0.92%, the test-re test coefficient with 2-week interval was 0.83%,

and the item- scale relationship ranged from 28% to 76%.

The attitude subscale included ten questions with 5-point scales rated from 1 as completely disagree to 5 as completely agree. The Cronbach's alpha coefficient of this subscale was 0.83% and the test-retest coefficient with 2-week interval was 83%. The sub-scale of behavior included five questions with 5-points scored in range of 1 (never) to 5 (always). The Cronbach's alpha coefficient of this sub-scale was 0.73% and the test-re test co-efficient with 2-week interval was 96%. Content and face validity of questionnaire were confirmed through a pilot study by considering the views of a special panel.

All data on questionnaires as well as blood pressure (both systolic and diastolic) were gathered before and two months after the educational intervention from two groups. The data were coded and entered into the SPSS-18 software and then were analyzed.

Before the intervention, data on demographic information, knowledge, attitude, self-efficacy, and behavior were collected using questionnaire. Then, patients in the intervention group attended training sessions for a week. Educational materials were developed with regard to the level of patients' literacy, DASH diet, and available texts especially regarding diet regime and blood pressure control behavior.

The content of educational program included definition of blood pressure and involved factors in the increasing blood pressure, classification of blood pressure and symptoms, complications of blood pressure and the organs that are damaged by hypertension. Furthermore, usual medications with emphasis on healthy behaviors like low fat and low salt diet were introduced. In this study, the skill of blood pressure measurement for those who were interested was also practiced.

The blood pressure was always recorded in right arms in sitting position by a skilled nurse. Systolic blood pressure was measured by korotkoff sounds (phase 1) and diastolic pressure was determined when this sound was

disappeared (phase 2). The measurement of blood pressure was done by a desktop barometric set with regular cuff (12×23 cm). The educational program was presented in sessions with 3 to 7 patients for 30 minutes. Furthermore, each patient was educated face to face by a skilled nurse for 30 minutes of which 15 minutes was for question and answer about his/her disease. The educational program was not exactly based on special evidence, but it was designed based on the different studies and situations of therapeutic centers and the existing opportunities in the centers. After four weeks of intervention, both groups were invited to the center and asked to complete the questionnaires such as knowledge, attitudes, self-efficacy, and behavior. Moreover, their blood pressure was measured again. Finally, the data were entered into the SPSS-18 software and analyzed using the descriptive and inferential statistics such as independent t-test, paired t-test, and chi-squared. The significance level was set at  $\leq 0.05$ .

To obey the ethical principles, all participants were informed about the procedures of the study at the beginning. The ethics committee of Tarbiat Modares University approved the study.

## **Results**

In total, 68 patients suffering from hypertension including 34 participants in the intervention group and 34 in the control group had mean age of  $53.59 \pm 7.33$  and  $52.15 \pm 8.68$ , respectively. At initial of the study, the two groups were equal in terms of all studied variables ( $p > 0.05$ ) except for the attitude variable ( $p < 0.05$ ).

Table 1 shows the characteristics of two groups at initial of the study.

Table 2 presents the scores of variables after the intervention. Independent t-test showed the two groups were significantly different in terms of knowledge ( $p < 0.0001$ ), attitude ( $p < 0.0001$ ), self-efficacy ( $p < 0.0001$ ), and behavior ( $p = 0.006$ ) after the intervention.

**Table 1** Comparison of demographic characteristics and studied variables between intervention and control groups before the intervention

Variable	Intervention group (N= 34)	Control group (N= 34)	p
	N(%)	N(%)	
Female	13 (38)	14 (41)	0.09**
Male	11 (32)	20 (59)	
Educational level			0.21**
<12 years	23 (68)	17 (50)	
≥12 years	11 (32)	17 (50)	
Knowledge	15.73 (4.10)	15.17 (4.07)	0.57*
Attitude	43.97 (5.06)	48.64 (7.33)	0.003*
Self-efficacy	38.35 (5.45)	38.47 (5.32)	0.92*
Behavior	12.61 (2.58)	13 (2.74)	0.57*
Age (Mean ±SD)	53.59 ± 7.33	52.15 ± 8.68	0.46*

\*T- test, \*\* Chi-square

**Table 2** Comparison of studied variables between two groups after the intervention

Variable	Intervention group (N= 34) Mean (SD)	Control group (N= 34) Mean (SD)	p-value
Knowledge	11.82 (1.73)	14.26 (2.39)	<0.0001
Attitude	55.73 (2.81)	50.29 (5.40)	<0.0001
Self-efficacy	46.02 (3.04)	50.29 (5.40)	<0.0001
Behavior	16.58 (1.98)	14.82 (2.99)	=0.006

## Discussion

The aim of the present study was to promote health behavior regarding compliance with medication and nutrition regime among patients with blood pressure via educational intervention. In this study, preventive behaviors regarding hypertension control included regular medication consumption that has been prescribed for blood pressure control, consumption of low fat and low salt diet, reduced smoking and alcohol consumption, regular blood pressure control and ordered consumption of fruit and vegetables.

In the present study, not only the compliance with the above mentioned preventive behaviors was assessed, but also knowledge, attitudes, and self-efficacy regarding these behaviors which are proceeding factors for disease prevention were examined. Furthermore, this study showed the promotion of these mediators of behavior change can lead to the promotion of preventive behaviors in the intervention group. In the control

group, however, who were not educated, there were no changes with regards to knowledge, attitudes, self-efficacy, and subsequently behaviors.

Previous studies have verified that changing high risk behaviors that could lead to health promotion need interventional education programs to be performed in health system [17]. Educational intervention is a new patient-oriented consultation that encourages patients to change their behaviors through diagnosis and solving differences between real situation and what it should be in ideal situation to obtain health goals.

Educational intervention consisted of rules and techniques that are deprived from theoretical literature. They are client-oriented that promote self-efficacy by focusing on psychological preparation to change behavior, helping patients to clear their goals, and recognizing the barriers to behavior change as well as being committed

to change high risk behaviors [18]. In this research, it was found that before changing dangerous behaviors in patients with blood pressure, their knowledge and attitude regarding the preventive behaviors were improved.

The educational intervention in the study caused patients to convince that the change of the current high risk behaviors can result in the promotion of his/her health and hence, it make him/her to insist on the healthy behavior. To this end, the patients first must be aware of their capabilities to create change in behavior. As the results of this study showed, self-efficacy in patients suffering from hypertension was improved after the intervention.

One finding of this study was attitude improvement of participants in the intervention group to comply with the healthy diet. Previous studies revealed that the elderly who became aware about the consequences of complex disease and were informed about the medical/ health recommendations were more likely to obey healthy behavior because of their anxiety for perceived threat [19]. To remove the wrong beliefs and negative attitudes, researchers and scholars should direct patients toward adopting with healthy behaviors [20].

Knowing that how long blood pressure treatment should be continued can cause high quality compliance with diet therapy. One wrong belief among the hypertensive patients is that the medication should be used only in time of blood pressure symptoms or stress. In this matter, the treatment measures must be removed after adjusting blood pressure. However, the education must justify patients regarding undamaged treatment blood pressure for lifelong. The results of this study in this section are in accordance with the results of other studies that showed educational intervention persuaded the hypertensive patients to comply with the diet forever [21]. One of the remarkable points of the present study is that before the intervention, the level of patients' attitude

was higher in the control group than the intervention group, but the designed educational intervention of this study led to the attitude of intervention group to be improved significantly even compared to that of control group. The results of this study showed that the interventional training program could improve the level of knowledge, attitude, self-efficacy and practice of the patients. Although this study tracked the subjects' ordered consumption of medicine, compliance with salt and fat restriction, and ordered consumption of fruit and vegetables as well as weight loss, other researchers worked with their patients only on one or two behaviors. In this regard, Redon educated 78 patients to reduce their daily salt consumption up to 3 grams during 2 weeks [22]. In the present study, there was no possibility to calculate the rate of salt consumption. Furthermore, despite suffering from hypertension, for many years, most participants stated there were no health records for them in health centers to control their blood pressure regularly while continues hypertension monitoring is essential to prevent subsequent complications. In this study, the participants in the intervention group were recommended for restricted salt, fat, sweet, and fast food consumption and regularly blood pressure measurement as well as consumption of fruits and vegetables. Moreover, they were educated how to measure their blood pressure and refer to their physician in time. The results of this study were similar to those of Miller study that was conducted on 56 hypertensive individuals. This researcher educated the participants based on a program regarding weight loss, medication use, smoking quitting, and healthy diet. Miller study revealed that the educational program could change knowledge, attitudes, and behavior of the subjects [23]. In our study, the participants were recommended to quit smoking. In the present study, more than 52 percent of the participants were obese and their body mass index was more than 25 kg/

m2. However, we did not have any program for weight reduction because of limited time. Conversely, in the Miller study, there was a special program for weight reduction which resulted in the promotion of knowledge and attitudes of the participants regarding weight loss [23]. Furthermore, the results of this study are in line with those of a previous research that was conducted by Mohammadi et al [7]. The present study could promote self-efficacy and behaviors of hypertensive patients. However, there was not similar previous research conducted on Ghazvin population. Despite strength points, there are some limitations for this study. The first limitation is that this study was conducted among referees to two hospitals and also among the individuals who were interested in taking part in the study. Therefore, these participants might not be representative of Ghazvin population and also might be more motivated to comply with nutritional behavior change. The second limitation is self-reporting manner for collecting data and the possibility of error in the accuracy of relevant scale. Another limitation is related to the short time follow-up (only for four weeks) that is proposed to be extended in future studies.

### Conclusion

Given the importance of hypertension management, this study was conducted. The results of this study showed that the educational program could improve knowledge, attitude, self-efficacy, as well as behavior after the intervention. Therefore, it seems this educational program could be applied for patients with hypertension to comply more with the healthy diet and regularly consumption of prescribed medication for four weeks. However, doing more studies with larger sample size and longer follow up period to confirm the results of this study is recommended.

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### Contribution

Study design: SST

Data collection and analysis: RF, SST

Manuscript preparation: RF, SST

### Conflict of Interest

"The authors declare that they have no competing interests."

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