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ORIGINAL ARTICLE

The Impact of Using BASNEF Model on Self-Control Behaviors among Patients with Hypertension

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ABSTRACT

Introduction: High blood pressure is the most important public health problem in developed countries. It is a reason for early mortality and a risk factor for cardiovascular diseases like stroke and kidney failure. This study determined the effect of an educational intervention based on BASNEF to control blood pressure. **Materials and Methods:** This quasi-experimental study was conducted in 160 patients with hypertension in urban health centers of Urmia. Data collection questionnaire included: demographic questions, knowledge base questions, self-control behaviors questions and structures of BASNEF model. Validity and reliability of the questionnaire were respectively 80% and 79%. The intervention group (n=80) took three 45 minutes sessions of speeches, questions and answers, posters, booklets, pamphlets, and a whiteboard. The information was collected through questionnaires, before and 3 months after the training. The data were analyzed in statistical package for the social sciences (v.16) software with chi-square tests, Fisher, independent and paired sample t-test. **Results:** The average age of intervention and control group were 56.01 ± 11.99 and 53.66 ± 12.75 years, respectively. There was no statistically significant difference (P=0.1) between the two groups before the intervention. After the intervention, in the intervention group, there was a significant decrease in average systolic blood pressure from 43.157 to 24.147 mm Hg and diastolic blood pressure from 21.93 to 52.87 mm Hg (P=0.001). **Conclusion:** The training program based on BASNEF model provided better results in controlling blood pressure than conventional training.

INTRODUCTION

High blood pressure is the most important public health problem in developed countries. It is a reason for early mortality and a risk factor for cardiovascular diseases like stroke and kidney failure (1).

Risk factors and predictors of hypertension include heredity, overweight, poor diet, alcohol consumption, and low physical activity, psychosocial and environmental factors (2). This chronic disease is called a silent killer because of unrecognizable symptoms (3). There are a billion patients with high blood pressure and annually it causes four million deaths in the world (4). High blood pressure has many dangerous complications. The effects will be minimal if the blood pressure is controlled. Despite the prevention and treatment measures, the report for blood pressure control is disappointing (5). High blood pressure is a major risk factor for cardiovascular disease. Lack of adherence to diet results in poor control of the disease and an increase in damage to target organs (6). World Health Organization (WHO) attributed 13% of all global deaths to high blood pressure in 2009. The World Health Organization slogan was "take blood pressure serious" in 2013. Finally, the World Health Organization announced the 22% prevalence of hypertension in people over 18 years, in 2014 (7). Rezazadeh and colleagues estimated that the hypertension is 23% more prevalent in 30 to

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55 years age group and 50% in above 55 years age group. At the same time the prevalence of hypertension is 3.1% lesser in men than in women (8). According to the results of studies in America, the rate of successful blood pressure control is only 27%, which is even lower in England, France and Germany (9). Planning and treatment based on blood pressure control, are necessary in order to decrease the mortality, morbidity, and complications and reaching the state of controlled hypertension (10-12).

Among the numerous models and patterns of health education, beliefs, Attitudes, Subjective Norms, and Enabling Factors model (BASNEF) is the most comprehensive model for studying, identifying and creating new habits in patients (13). This model focuses on knowledge, attitudes, interpersonal skills, subjective norms and environmental effects on behavior changes (14). According to this model, the behavior of people will change when they know that the behavior change seems to profit and favor (15). A person's behavioral attitude include the result value of the behavior (16). Subjective norms mean a kind of social pressure from those who are important to the patient, such as family, friends, acquaintances, religious leaders and health care systems (13). In this model, unlike the intention-behavior model, every plan (intention) does not necessarily lead to behavior but enabling factors are between plan and behavior, such as money, skill, precision, services available. To plan this model first of all the impact of these factors must be examined on behavior. Social pressures or attitude of people may force them to act the intention. However, enabling agents prevent them from the behavior (17). If patients are highly motivated to do the advised behavior, the inability and lack of required resources, and obstacles could frustrate and discourage them (15).

MATERIALS AND METHODS

This study was quasi-experimental, aimed to use BASNEF model to self-control blood pressure in patients with hypertension in urban health centers of Urmia in 2016. According to previous studies (5) and with α =5%, 95% confidence level, and β =2%, the sample size was considered 160 patients (80 in the intervention group and 80 patients in the control group). Four health centers selected randomly from urban health centers in each district of the city of Urmia, two as intervention centers and two as control centers. The patients were selected randomly, from the 4000 hypertensive patient cases. The selected patient group was uniform in terms of factors such as sex, level of education, other illness, occupation, marital status, and economic situation.

Data collection tools in this study include demographic identification questionnaire, blood pressure knowledge questionnaire, blood pressure self-control behaviors questionnaire and the BASNEF model questionnaire.

The Knowledge questionnaire contained 12 questions with answer options, Yes, No, and I do not know. Score for option "yes" was 2, t for "do not know" was 1 and "No" was zero. Knowledge Questionnaire total scores could range from zero to 24.

The self-control behaviors questionnaire had 9 questions to measure self-care behaviors; with the answers options "Yes, always", "Yes, sometimes" and "No". A score of option "Yes, always" was 3 points, of "yes, sometimes" was 2 points, and of "No" was zero. Self-Control Behaviors Questionnaire scores can range from zero to 27 (18).

BASNEF model questionnaire was based on the Likert scale had 5 answer options (strongly agree to strongly disagree); and questions on the attitude (12 questions), subjective norms (10 questions), and enabling factors (7 questions), behavior-intention (8 items). A minimum score of participants was zero in all these structures. The maximum score in the structure of attitudes was 48, in subjective norms was 40, in enabling factors was 28 and in behavioral intention was 32.

The content validity and Cronbach's alpha test methods were used to test the validity and reliability of the BASNEF model questionnaire. The questionnaire was sent to 10 experts in health education and cardiologists to determine the validity. According to experts, the necessary changes were applied to the questionnaire. The validity was higher than 80%. The questionnaire was completed by 30 patients with hypertension who were not part of the intervention or the control groups to measure the reliability. The reliability coefficient of knowledge questions 0.75, attitudes 0.77, subjective norms 0.82, enabling factors 0.81, and intention 0.84 calculated using Cronbach's alpha test.

The patients were divided into intervention and control group. The educational intervention was carried out only in the intervention group. Before the intervention, questionnaires were completed by the investigator during interviews in both the groups. Then the intervention group took three 45 minutes sessions of speeches, questions and answers, posters, booklets, pamphlets, and a whiteboard beside the speeches. Patients were followed for 3 months after the intervention. During this time, in order to review the content, in addition to holding three training class period (every two weeks), follow up by phone and track attendance by trained staff was also conducted. After the intervention, the questionnaires were completed again. Aims of the project, the research method and confidentiality were explained to the patients. Consent forms were completed by patients. The questionnaires were completed anonymously with the registration code. Data were analyzed using statistical package for the social sciences (SPSS) software (v.16), Chi-square and Fisher exact test, independent and paired sample T-test.

RESULTS

In this study, a total of 160 patients was included in the intervention group (n=80) and control group (n=80). In the intervention group, 48 (60%) patients were women and 32 (40%) men, while in the control group 43 (53.7%) were women and 37 (46.3%) men.

Mean Age (SD) of the patients in the intervention and control groups calculated using independent t-test were 56.01 ± 11.99 and 53.66 ± 12.75 years, respectively, which did not show a statistically significant difference (P=0.1). The test also showed that there was no significant difference between intervention and control groups in terms of sex, education level, history of other diseases, occupation, marital status and economic situation, (Table 1).

The independent samples *T*-test results showed that the assumption of an average parity between the two groups was not significant at the 5% level of mistake (*P*=0.3). In other words, there was no difference between the two groups in terms of awareness, model structures and also hypertension (Table 2).

After the intervention mean scores of knowledge, structures of model and blood pressure showed a statistically significant difference between intervention and control groups (Table 3).

Paired sample T-test results showed that in intervention group there was a significant increase in pre- and post-intervention scores of mean knowledge, structures model (with the exception of norm structures abstract) blood pressure. However, no significant changes were observed in the control group (Table 4).

DISCUSSION

The findings of this study indicate that the intervention based on the BASNEF model is effective in reducing and controlling hypertension. The mean score of knowledge in the intervention group increased from 13.29 ± 2.39 before intervention to 14.72 ± 19.3 after intervention which demonstrates the effect of an educational intervention to increase patient awareness. Mean score of knowledge of the control group was 12.83 ± 2.74 before intervention and reached 87.8 ± 1.86 after the intervention, which was not statistically significant. It can be said that the planned educational programs and active participation of patients in educational classes can partly increase the awareness about the behaviors associated with blood pressure control. The results were similar with the results obtained in studies by Jedghal et al. on drivers lifestyle (19), Yushni et al. on breast self-care education program (20), and Izadi-Rod et al. BASNEF model based education program in patients with blood hypertension(5).

The mean attitude score in the intervention group increased from 20.09 ± 5.55 before the intervention to 23.59 ± 4.59 after the intervention which indicates the effect of educational intervention on self-care behaviors. However, the mean score of the attitude of the control group was 21.23 ± 6.53 before the intervention and 20.37 ± 18.3 after the intervention.

It can be said that education improved the positive attitude in the intervention group. After the training, the patients perceived the risk and seriousness of the physical, psycho-

Table 1. Comparison of subjects based on demographic characteristics of patients with hypertension in both intervention and control groups

Variable	Intervention group		Control group		Test result
	number	percent	number	percent	
Sex					
Female	48	60	43	53.7	X^2=02.1 DF=1 *P*=0.41
Male	32	40	37	46.3	
Level of education					
Illiterate	27	33.7	24	30	X^2=20.1 DF=3 *P*=0.63
Primary	28	35	31	38.7	
Guidance	14	17.5	17	21.2	
Upper secondary	11	13.75	8	10.1	
History of other diseases					
Yes	51	63.7	44	55	X^2=86.1 DF=1 *P*=0.21
No	29	36.3	36	45	
Job					
Housewife	50	62.5	46	57.5	X^2=82.2 DF=3 *P*=0.2
Employee	11	13.7	10	12.5	
Farmer	7	8.7	6	7.5	
Free	12	15.1	22	27.5	
Marital status					
Married	61	76.2	63	78.7	*P* fisher=37.0
Single	8	10	1	1.2	
Widow	11	13.8	16	20.1	
The economic situation					
Good	8	10	14	17.5	X^2=37.4 DF=2 *P*=0.12
Average	49	61.2	39	48.7	
Weak	23	28.8	27	33.8	

DF: Degrees of Freedom

Table 2. Comparison of mean scores of knowledge, structures of BASNEF model between the two groups before intervention in patients with hypertension

Variable	Average	Standard deviation	Test statistics	*P*-value
Awareness				
Intervention group	14.72	3.19	–3.05	0.009
Control group	12.87	1.86		
Attitude				
Intervention group	23.59	4.59	2.03	0.30
Control group	20.37	3.18		
Norm abstract				
Intervention group	22.50	5.82	2.04	0.04
Control group	19.27	6.60		
Enabling factors				
Intervention group	23.37	5.33	2.02	0.02
Control group	20.09	4.86		
Behavior-Intention				
Intervention group	19.33	6.20	2.025	0.032
Control group	16.35	5.68		
Behavior				
Intervention group	20.48	2.68	–2.42	0.003
Control group	18.24	4.01		
Systolic blood pressure				
Intervention group	147.24	14.23	–01.6	0.001
Control group	155.62	15.92		
Diastolic blood pressure				
Intervention group	87.52	6.15	–0.60	0.05
Control group	92.70	7.89		

logical, social and economic complications. These findings were similar to that of the study by Hemmati et al. (21) and Baqaee et al. (22).

Subjective norms are one of the most effective factors that illustrate the impact of others on a person‘s behavior. Our findings indicate an increase in the mean score of subjective norms in the intervention group compared to the control group post-intervention.

The mean score of subjective norms in the intervention group increased from 18.24 ± 4.18 before the intervention to 22.50 ± 5.82 after the intervention. But in the control group, the average score of subjective norms was 20.25 ± 6.42 before intervention to 19.27 ± 60.6 after the intervention, which was not statistically significant. This confirms that after the intervention patients increased their subjective norms meaning they were more obedient to the orders of health and medical personnel. These results were consistent with the results of Daniel et al. (23) and Chobanian et al. (24), which emphasized the involvement of family members and social support in controlling blood pressure. In contrast to our results, Ahmadi Tabatabai et al. (25) found that the mean score of subjective norms in case group after intervention significantly decreased.

One of the structures studied in this study is the enabling factors. The enabling factors can be an effective facilitator for behavior (22). We found an increase in the mean score of the enabling factors in the intervention group in contrast to the control group after the intervention. The mean score of the enabling factors in the intervention group was 20.37 ± 4.69 before the intervention and 23.37 ± 33.3 after the intervention, but the mean scores of the control group were 21.11 ± 28.11 before the intervention and 86/20 ± 4/20 after the intervention, which did not increase, but in fact decreased. Therefore it can be said that patients had more enabling factors in the post-intervention phase than the pre-intervention stage and preventive behaviors were more effective in the complications of hypertension.

Bakiyani Moghadam et al. (26) and Sadeghi et al. (27), reported an increase in the mean score of contributing factors in the intervention group after the study, which are similar to our findings. However, the results of the study of Sedgheysh and colleague (28) and Momenabadi et al. (29) were not consistent with the results of this study.

Generally, behavior follows intention and without intention, the behavior will not occur. According to our results, after the intervention, the mean score of the behavioral intention construct in the intervention group significantly increased from 16.07 ± 4.26 before the intervention to 6.20 ±91.33 after the intervention but in the control group from 16.66 ± 4.75 before intervention to 16.35 ± 5.68 after the intervention, which was not statistically significant. It can be concluded that patients with hypertension in the intervention

Table 3. Comparison of mean BASNEF model scores between the two groups after the intervention in patients with hypertension

Variable	Average	Standard deviation	Test statistics	*P*-value
Awareness				
Intervention group				
Before intervention	13.29	2.39	-1.5	0.001
After intervention	14.72	3.19		
Control group				
Before intervention	12.83	2.74	-0.81	0.33
After intervention	12.87	1.86		
Attitude				
Intervention group				
Before intervention	20.09	5.55	-1.95	0.039
After intervention	23.59	4.59		
Control group				
Before intervention	21.29	6.53	0.91	0.36
After intervention	20.37	3.18		
Norm abstract				
Intervention group				
Before intervention	18.29	4.88	-2.89	0.006
After intervention	22.50	5.82		
Control group				
Before intervention	20.35	6.42	0.99	0.32
After intervention	19.27	6.60		
Enabling factors				
Intervention group				
Before intervention	20.37	4.69	-2.55	0.013
After intervention	23.37	5.33		
Control group				
Before intervention	21.11	11.28	0.57	0.56
After intervention	20.09	4.86		
Behavior-Intention				
Intervention group				
Before intervention	16.07	4.26	3.29	0.002
After intervention	19.33	6.20		
Control group				
Before intervention	16.66	4.75	0.34	0.22
After intervention	16.35	5.68		
Behavior				
Intervention group				
Before intervention	16.98	3.89	3.04	0.001
After intervention	20.48	2.68		
Systolic blood pressure				
Intervention group				
Before intervention	17.70	2.92	2.19	0.20
After intervention	18324	4.01		
Control group				
Before intervention	157.43	16.92	30.82	0.01
After intervention	147.24	14.23		

(Contd...)

Table 3. (Continued)

Variable	Average	Standard deviation	Test statistics	*P*-value
Control group				
Before intervention	147.24	15.92	32.18	0.30
After intervention	155.62	12.15		
Diastolic blood pressure				
Intervention group				
Before intervention	156.24	8.72	25.92	0.03
After intervention	87.52	6.15		
Control group				
Before intervention	92.7	7.92	28.08	0.40
After intervention	93.8	6.72		

Table 4. Comparison of mean scores of knowledge, attitude, behavior, structures BASNEF model and blood pressure before and after the intervention in two groups of patients with hypertension

Variable	Average	Standard deviation	Test statistics	*P*-value
Awareness				
Intervention group	13.29	2.39	−1.87	0.76
Control group	12.83	2.74		
Attitude				
Intervention group	20.09	5.55	−1.03	0.30
Control group	21.29	6.53		
Norm abstract				
Intervention group	18.29	4.88	−1.87	0.064
Control group	20.35	6.42		
Enabling factors				
Intervention group	20.37	4.69	−0.40	0.68
Control group	21.11	6.28		
Behavior-Intention				
Intervention group	16.07	4.26	−0.68	0.49
Control group	16.66	4.75		
Behavior				
Intervention group	16.98	3.89	−2.13	0.81
Control group	17.70	2.92		
Systolic blood pressure				
Intervention group	157.43	16.92	−1.28	0.35
Control group	155.62	15.92		
Diastolic blood pressure				
Intervention group	93.21	8.72	−1.68	0.25
Control group	92.70	7.92		

group were intended to behave more to perform the preventive behaviors of hypertension complications after the intervention compared to before the intervention phase.

In a study, Zende Taleb et al. (13) and Izadi Rad and colleagues (30) reported an increase in the mean score of behavioral intention in the case group after the intervention, which is consistent with the results of our study.

Although there was no significant difference between the mean scores of self-control behaviors before the intervention in the two groups, after the intervention, the mean score of the self-control behavior increased in the intervention group. Similar to the high mean score of knowledge, attitude, enabling factors and subjective norms in the intervention group after the intervention, self- control behavior also increased.

The mean score of self-care behaviors in the intervention group increased from 3.89 ±61.89 before the intervention to 2.68 ±02.84 after the intervention. The mean score of self-care behaviors of the control group increased from 17.77 ± 2.92 before the intervention stage to 18.24 ± 1.04 after the intervention, which was statistically not significant.This is consistent with the results of Baghini Moghadam (26) and Hazavi's study (31), which showed a significant increase in the mean score of self-control behaviors such as walking, exercise, regular use of the drug and the use of appropriate diet. The results of Mohebi's study (32) also strengthen the results of this study.

The systolic blood pressure in the intervention group was 157.43 ± 16.92 before intervention and reached 147.2 ± 14.23 after the intervention. While the systolic blood pressure in the control group was 155.26 ± 15.92 to 156.22 ± 15.12. The decrease in the intervention group was 10.9 mm Hg, indicating the intervention's effect. However, in the control group, where no intervention was performed, the systolic blood pressure level did not decrease, but in contrast increased by 0.62 mmHg, which was consistent with a group discussion with boys that resulted in a decrease in the blood pressure of systolic hypertrophy of 16.25 mmHg.

Diastolic blood pressure decreased in the intervention group from 93.21 ± 8.72 before intervention to 87.52 ± 6.15 after the intervention. Diastolic blood pressure in the control group changed from 92.7 ± 92.7 before the intervention to 93.8 ± 6.7 after the intervention.

The reduction in the intervention group was 5.69 mmHg, while the mean diastolic blood pressure in the control group did not decrease but increased by 1.1 mm Hg, This supports the assumption that educational intervention can reduce the patient's diastolic blood pressure and, consequently, reduce the complications of the disease. These findings were consistent with the results of Ezati (33) and Chodosh's studies (34).

Considering that there is no study using the BASNEF model on hypertensive patients in Urmia, this study, measured the effect of using the BASNEF model on self-control behaviors in patients with hypertension for the first time in this city, and healthcare planners and policymakers can use its results in planning and evaluating interventions in health education and health promotion.

CONCLUSION

The results showed that the formulation and implementation of theory-based training programs based on environmental factors could be more efficient than common educational programs.

Based on these results we recommend to use BASNEF model-based educational programs and role model behaviors to reduce blood pressure and control hypertension in the healthcare system.

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AUTHER CONTRIBUTIONS

All authors contributed equally in this study.

CONFLICT OF INTEREST

The authors have no conflicts of interest.

ETHICAL STANDARDS

None.

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