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The Impact of an Educational Program Based on the BASNEF Model on Knowledge and Self-Care Behaviors of Patients with Hypertension

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Abstract

Background: Hypertension is an important health problem that can be controlled by self-care.
Objectives: The present study aimed to determine the impact of an educational program based (BASNEF) model on knowledge and self-care behaviors for hypertensive patients in Bastak, Iran.
Methods: This quasi-experimental study was performed on 180 patients with hypertension who were admitted to health centers of the Bastak city. The participants were randomly assigned to intervention (n = 90) and control (n = 90) groups. Data were collected using a questionnaire that had three sections of demographic information, knowledge, and BASNEF constructs. The questionnaires were completed before the intervention and two months after providing the intervention. After the pre-test, an appropriate educational intervention was designed and implemented only among the intervention group. To analyze the data, paired t-test, independent t-test, and Chi-square tests were run by SPSS version 19.
Results: The mean age of the participants was 50.62 $\pm$ 7.549 years. The results showed a statistically significant difference in the mean scores of attitudes, subjective norms, enabling factors, and self-care behaviors in the intervention group pre- and post-intervention (P = 0.001). Besides, it was found that enabling factors (0.311) play a significant role in predicting self-care behaviors.
Conclusions: The results of this study support the effectiveness of educational interventions in raising awareness and improving self-care behaviors in patients with hypertension using the BASNEF model. Therefore, with an emphasis on enabling factors, the BASNEF model can be used as a framework to develop educational interventions for self-care.

Keywords: BASNEF Model, Education, Self-Care Behavior, Hypertension

1. Background

Hypertension is an important risk factor for cardiovascular diseases, which its monitoring is of particular importance for health (1). The significance of hypertension as a major cause of common serious diseases has been recognized in most Western countries (2). As reported by the World Health Organization (2015), 24.1% of males and 20.1% of females over the age of 18 have systolic blood pressure higher than 140 or diastolic blood pressure higher than 90 mmHg. Besides, the number of adults with hypertension has risen from 594 million in 1975 to 1.13 billion in 2015, and this increase mostly occurs in low- and middle-income countries.

Therefore, controlling hypertension is of considerable importance because it can lead to multiple life- threatening complications (3). Controlling or decreasing blood pressure can help in preventing many complications, including renal problems, myocardial infarction, and cerebrovascular accident (4). One of the approaches that might improve the control of blood pressure is engaging patients in their care (5). It is widely accepted that self-care behaviors have an important role in blood pressure control (6). The Common National Committee of Prevention, Diagnosis, Evaluation, and Treatment of High Blood Pressure (JNC7) recommended six self-care practices, including adhering to anti-hypertensive drug regimens, maintaining or losing weight, consuming a low-salt diet, limiting the use of alcohol and tobacco, and participating in regular physical activity. Despite the positive impacts of these self-care behaviors in the treatment and management of hypertension, relatively few patients compile with self-care behaviors (7).

According to the literature, self-care is highly effective in controlling hypertension, such that systolic and diastolic blood pressures were lowered by 5 and 4.3 mmHg, respectively, after applying self-care (8). It seems that training alone is not effective for the treatment of diseases, and appropriate approaches to changing behaviors are also necessary (9). The primary focus of conventional educational programs is on concepts such as knowledge and attitude, and individual behaviors and environmental factors influencing the behavior are typically overlooked in this context (10). Therefore, to achieve better results, designing and implementing educational strategies should be considered with a focus on factors such as individual skills and economic capabilities of individuals (enabling factors) as well as family members, friends, acquaintances, and clergies who may positively influence the individual's behaviors (subjective norms) (10, 11).

The beliefs, attitudes, subjective norms and enabling factors (BASNEF) model is a useful educational model, which in addition to knowledge and attitude, considers environmental factors and abstract norms as effective in people's compliance with health behaviors (12). The BASNEF model is the most comprehensive model used to investigate behaviors and to foster new behaviors in society. BASNEF has combined proceed and behavioral intention models (13). Baghianimoghaddam et al. investigated the effect of the BASNEF model on self-esteem improvement in patients with hypertension (14). Furthermore, cultural and social norms in Hormozgan province seem to have contributed to the importance of environmental factors in the development of some particular individual behaviors.

2. Objectives

Therefore, the present study aimed to determine the effect of an educational program based on the BASNEF model on knowledge and self-care behaviors of hypertensive patients in Bastak, Iran.

3. Methods

This interventional study was conducted to determine the effect of an educational program based on the BASNEF model on self-care behaviors of patients with hypertension in 2017 in Bastak, Iran. The sample size was calculated as 180 people (90 in each group) based on the following formula.

$$n_1 = n_2 = \frac{\left(\delta_1^2 + \delta_2^2\right)\left(z_{1-\frac{\alpha}{2}} + z_{1-\beta}\right)^2}{\left(\mu_1 - \mu_2\right)^2} \quad (1)$$

The inclusion criteria were as follows: having a medical record in health centers, having primary hypertension, being aged 30 - 60 years old, willingness to participate in the study, and having a family member with the ability to read and write. The exclusion criteria included having illnesses such as diabetes, renal diseases, or cancer, consumption of psychoactive drugs, and missing more than one training session.

Subjects were selected using the multistage sampling method. Firstly, out of 17 urban and rural comprehensive health centers, two urban and rural health centers with similar social, economic, and cultural statuses were selected as the research environment. Then, among all patients with medical records in these centers, those who met the inclusion criteria were randomly selected and assigned to the intervention and control groups (with a 50:50 gender ratio in each group).

Data were collected using a questionnaire consisting of three sections: The first section consisted of six items on demographic variables including age, gender, marital status, job, educational level, and family history of hypertension. The second section comprised 13 items with 'Yes' or 'No' and 'I do not know' answers, where 'Yes' responses were assigned a score of 1 score, and 'No' and 'I do not know' were given a score of zero. Therefore, the maximum and minimum scores of this sub-scale are 13 and 0, respectively. The third section contained items on the BASNEF model's constructs, where the attitude construct was measured by 10 questions rated on a 5-point Likert scale ranging from completely agree (4) to completely disagree (0). The minimum and maximum possible scores were 0 and 40, respectively, with higher scores indicating a more positive attitude toward self-care. Enabling factors were measured by 11 questions scored based on the three options of 'Yes', 'Somewhat', and 'No'. 'Yes' responses received a score of 2, "Somewhat" was assigned a score of 1, and the option "No" was given a score of 0 (ranging from 0 to 22). In this sub-scale, higher scores suggest the presence of enabling factors for self-care. The construct of subjective norms was also measured by four questions rated based on a 5-point Likert scale ranging from very high (4) to not at all (0). The minimum and maximum scores were 0 to 176, with higher scores suggesting subjective norms encouraging self-care. The self-care behaviors of hypertension consisted of nine questions rated based on a 4-point Likert scale ranging from always (3) to never (0). The range of obtained scores was between 0 and 27.

The validity and reliability of the questionnaire are investigated by Izadirad and colleagues (15). Data on self-care behaviors status of patients with hypertension were collected and analyzed by the aforementioned questionnaire. In the current study, self-care behaviors included regular

control of blood pressure (the monthly measurement of blood pressure at a health center), reduced salt intake (salt intake less than 5g or less than one teaspoonful per day), not smoking cigarette or hookah, regular physical activity (physical activity for 150 minutes per week, equivalent to 30 minutes for 5 times a week), reduced fat intake, reduced anxiety, and regular use of medications.

Prior to implementing the intervention, the study objectives, procedures, and confidentiality of information were explained to the participants. The results were analyzed after completing the pre-test stage. Educational content was prepared based on the structure of the model and the pre-test results. The educational intervention was only performed for the intervention group. The intervention group received the training in groups via lecture and the question and answer techniques. Besides, a pamphlet and a self-care booklet for blood pressure monitoring were prepared for patients to repeat the educational materials; these materials were given to a literate member of the family to be read at home.

The intervention consisted of four 30 to 45-minute sessions. The target group (n = 90) was divided into three groups each with 22 participants and one group with 24. All training sessions were held at the health centers in groups via lecture and participants were free to ask their questions at the end of the sessions. A training session was also held at the health centers for family members, social workers, and community health ambassadors regarding the self-care behaviors for monitoring hypertension and based on the constructs of the BASNEF model (subjective norms and enabling factors). After two months, the questionnaire was completed again by both groups.

3.1. Statistical Analysis

To analyze the data, the chi-square test, independent *t*-test, paired *t*-test, and correlation and regression tests were used. Data were analyzed in SPSS version 19. A P-value < 0.05 was considered as statistically significant.

4. Results

The mean age of the participants was 50.62 ± 7.549 years (the mean age for intervention and control groups was 51.71 ± 7.43 and 49.53 ± 7.54, respectively). Based on the findings, 90 (50%) cases were female and 90 (50%) were male. The results of the chi-square test showed no significant difference concerning marital status, educational level, and occupation between the intervention and control groups (Table 1).

The mean scores of knowledge and the BASNEF model in both intervention and control groups before and after the intervention are presented in Table 2.

We considered the behavior variable as a dependent variable, and awareness, attitude, enabling factors, abstract norms variables were considered as independent. To investigate the association between the dependent variable (i.e. behavior) and independent variables (i.e. model's structures) in each intervention and control group, multiple linear regression was performed by the Enter method. In the intervention group, enabling behaviors (B = 0.509) were the most important in explaining the behavior. Other factors of the model also manifest a significant association in explaining the behavior, and in general, model factors determined 79% of the changes in the dependent variable. However, in the control group, only the awareness showed a significant statistical association (B = 0.436) in explaining the behavioral statistical behavior, and other structural models did not show a statistically significant relationship (Table 3).

R is the multiple correlation coefficients, which indicates the multiple correlation coefficient between the independent variable and the set of independent variables. It ranges from -1 to +1. If R = +1, it indicates a strong correlation between the dependent variable and the set of independent variables. As can be seen in R R is much stronger in the intervention group than the control group.

R square or the coefficient of determination shows the percent of the dependent variable changes that can be explained by investigated variables. As shown in the table, R square in the intervention group is stronger than the control group.

Adjusted R square shows the coefficient of determination after adjusting for independent variables. As can be seen in the table, adjusted R square in the intervention group is much stronger than the control group.

Durbin-Watson index: 1.5 to 2.5 is appropriate, and if it is lower than 1.5 or higher than 2.5, it is inappropriate (i.e. there is collinearity between the independent variables entered into the model). According to the table, this index is in the appropriate range (Table 4).

5. Discussion

The findings of the current study showed that educational intervention based on the BASNEF model was effective in the promotion of self-care behaviors in patients with hypertension. Besides, after providing the intervention, the mean score of knowledge in the intervention group was significantly increased compared to the control group, indicating the effect of the educational intervention on raising patients' knowledge. However, the role of training in improving knowledge was somewhat predictable in the study, since many studies had corroborated it (16, 17). The findings of the current study are con-

Table 1. Frequency Distribution of Demographic Variables in the Intervention and Control Groups

Variable/Group	Intervention		Control		P Value
	Number	Percent	Number	Percent	
Occupation					0.952
Retired/employee	9	10	9	10	
Housekeeper	44	48.9	42	46.7	
Unemployed/other	37	41.1	39	43.3	
Marital status					0.773
Married	83	92.2	84	93.3	
Single-widow	7	7.8	6	6.7	
Educational level					0.091
Illiterate	39	43.3	25	27.8	
Elementary school	24	26.7	23	25.6	
Junior high school	14	15.6	19	21.1	
Diploma	7	7.8	17	18.9	
Academic	6	6.7	6	6.7	

Table 2. The Mean Scores of Knowledge and the BASNEF Model Constructs in Both Intervention and Control Groups Before and After the Intervention.

Variable/Group	Before Intervention	After Intervention	P Value
Knowledge			
Intervention	8.01 ± 2.291	11.13 ± 2.255	< 0.001
Control	8.40 ± 2.258	8.94 ± 2.810	< 0.001
Attitude			
Intervention	28.19 ± 4.832	34.10 ± 5.465	< 0.001
Control	28.06 ± 4.012	27.52 ± 4.575	0.841
Abstract norm			
Intervention	136.93 ± 20.309	151.62 ± 23.225	< 0.001
Control	136.53 ± 20.318	140.36 ± 20.208	0.895
Enabling factor			
Intervention	10.93 ± 2.630	14.84 ± 3.028	< 0.001
Control	11.11 ± 2.733	11.37 ± 2.822	0.657
Behavior			
Intervention	14.56 ± 2.580	14.57 ± 2.715	< 0.001
Control	17.79 ± 3.241	14.93 ± 3.774	0.978

sistent with the results of the study by Pereira and colleagues, which its results showed a noticeable increase in diabetic patients' knowledge in different issues in intervention groups, while changes in the control group were unremarkable (18). Besides, Charkazi and colleagues and Zareipour and colleagues also reported similar results (19, 20). However, the results of the current study are not in agreement with the results of the study by Pajuhi and colleagues (21). This difference can be attributed to the different training approaches adopted in these studies. The subjects of the current study received training based on a health education model and using a pamphlet and an educational booklet. However, Pajuhi and colleagues only used a booklet to improve the knowledge and practice of patients with osteoporosis. The results of the present study also indicated a significant increase in the mean attitude scores in the intervention group compared to those obtained at the pre-intervention stage. This finding is congruent with the results of studies by Baghianimoghaddam and colleagues and Taghdisi and colleagues (11, 12), indicating the effectiveness of providing the intervention based on the BASNEF model in increasing patients' attitudes toward self-care behaviors for the management of hypertension.

The findings suggest that although gaining knowledge is arguably the first step to behavioral change, training based on BASNEF can change the attitudes towards hypertension-related self-care behaviors, which is not in agreement with the results of the study by Shabbidar and Fathi (22). This inconsistency may be due to the use of the BASNEF model to provide training in our study.

Further, the results of this study suggested a significant increase in the score of the enabling factors in the intervention group after providing the intervention. The enabling factors investigated in the current study included

Table 3. Multiple Linear Regression Results for Predictability of Behavior Based on Model Constructs for the Intervention and Control Groups After Training

Group/Variable	Unstandardized Coefficients		Standardized Coefficients	t	P Value	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Upper Bound	Lower Bound
Intervention							
(Constant)	-0.948	1.206		-0.786	0.434	-3.347	1.451
Knowledge.pos	0.239	0.110	0.166	2.173	0.033	0.020	0.458
Attitude.pos	0.129	0.047	0.218	2.751	0.007	0.036	0.223
Enabling factor.pos	0.509	0.079	0.475	6.473	0.000	0.353	0.665
Abstract norm.pos	0.027	0.008	0.194	3.309	0.001	0.011	0.043
Control							
(Constant)	4.267	3.694		1.155	0.251	-3.079	11.613
Knowledge.pos	0.436	0.156	0.326	2.802	0.006	0.127	0.745
Attitude.pos	0.076	0.085	0.092	0.896	0.373	-0.093	0.245
Enabling factor.pos	0.206	0.150	0.155	1.375	0.173	-0.092	0.504
Abstract norm.pos	0.016	0.019	0.088	0.838	0.404	-0.022	0.055

Table 4. Fit Indices and the Appropriateness of the Multiple Linear Regression Model for the Intervention and Control Groups After Training

Group	R	R Square	Adjusted R Square	Durbin-Watson
Intervention	0.893	0.797	0.788	1.655
Control	0.477	0.228	0.191	1.757

'how to prepare healthy foods', 'complying with the established guidelines for measuring blood pressure', 'seeking assistance from family members for care services (including the medicines and food)', and 'collaborating with healthcare providers and social workers for measuring blood pressure and providing training'. It seems that enabling factors play a significant role in fostering changes in knowledge, attitudes, and behaviors (23). This finding is in agreement with the results of studies by Sharifirad and colleagues (24), Shahnazi and colleagues (25), and Ahmadi and colleagues (26), while are incongruent with the findings of the study by Taghdisi and colleagues (11). This discrepancy can be attributed to differences in characteristics of participants as samples of the current study were selected from the patients with hypertension, but in the research conducted by Taghdisi and colleagues participants were cancer patients. Although hypertension is a chronic disease and requires special attention, it does not lead to severe stress and anxiety among patients. However, patients with cancer experience high levels of anxiety, and educational interventions may not improve the enabling factors for them; therefore, it is important that family and friends receive the necessary training and services in this regard.

Meanwhile, further analyses showed a significant difference in the mean scores of subjective norms in the intervention group between the pre- and post-intervention stages; this finding is also consistent with the results of the studies by Izadirad and colleagues (15), Pooreh and colleagues (27), and Arefi and colleagues (28), but are not in line with the results of the study by Khani Jeihooni and colleagues (29). This inconsistency can be attributed to the high similarity of the participants. Subjective norms depend on how much a person can adjust himself/herself with the target group or how much a person might feel pressure to do or to refuse to do something. Moreover, the intention to perform (or not to perform) a special behavior enhances when the significant people in the individual's life tell her/him to do (or not to do) something.

We also found a significant difference in the mean scores of Self-care behaviors after the implementation of the educational program in the intervention group compared to the control group. This finding is in agreement with the results of the studies by Baghianimoghaddam and colleagues and Hazavehei and colleagues (12, 30), but is not in line with the findings of the study by Serour and colleagues (31). This discrepancy could be attributed to the traditional context of the study and that most foods were homemade. However, in the study conducted by Serour and colleagues, the samples participated in friendly meet-

ings where food was distributed, and they had easy and extensive access to restaurants.

5.1. Conclusion

According to the findings, developing and implementing theory-based training programs with an emphasis on environmental factors can be effective in changing individuals' behaviors. Thus, we recommend using training programs based on the BASNEF model as an effective method for improving self-care behaviors in health care systems.

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Footnotes

Authors' Contribution: Sedigheh Abedini: design and topic; Shokrallah Mohseni-Farzaneh Pourjalil: data collection and analysis; all the authors: writing the article and statistical and numerical analysis

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