

## Research Paper:

## Empowerment Program Based on BASNEF Model and the General Health of Hemodialysis Patients



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## ABSTRACT

**Background:** Hemodialysis patients encounter various physical, mental, and social health problems. Empowerment programs may facilitate behavioral changes and improve general health. This study aimed to determine the effectiveness of the empowerment program on the general health of hemodialysis patients.

**Methods:** In this clinical trial, 60 patients undergoing hemodialysis were selected from Shahid Beheshti Hospital in Kashan City, Iran. The patients were randomly divided into two groups. In the intervention group, the empowerment program based on the BASNEF (belief, attitude, subjective norm, and enabling factors) model was implemented in 8 sessions. No intervention was performed for the control group. Before and after the intervention, Goldberg's General Health Questionnaire (GHQ) was completed by the two groups and compared. The obtained data were analyzed using the independent-test, paired t-test, and Chi-square test in SPSS V. 13.

**Results:** A significant decrease in the GHQ scores was observed after the intervention in the intervention group but the difference was not statistically significant between the groups ( $P=0.2$ ). However, the difference between the scores of GHQ subscales, including "somatic symptoms", "anxiety and insomnia", and "social dysfunction" were significant ( $P<0.05$ ). The paired t-test results showed significant differences in the mean scores of GHQ subscales in the intervention group before and after the intervention ( $P<0.05$ ). But these differences were not significant in the control group ( $P=0.2$ ).

**Conclusion:** The BASNEF model empowerment was effective on the general health of patients undergoing hemodialysis. Using this program is suggested for these patients.

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## Highlights

- Hemodialysis patients suffer from poor physical, mental, and social health conditions.
- The BASNEF (belief, attitude, subjective norm, and enabling factors) model is used to change the behavior and create new behavior in clients.
- The empowerment program based on the BASNEF model is effective on the general health of patients undergoing hemodialysis.

## Plain Language Summary

The health status of patients undergoing hemodialysis should be monitored in four areas of fluid restriction, special diet, avoiding addictive drugs, and regular dialysis. Patients should be involved in the process of self-care to control the side effects of their disease. According to the results of the empowerment program, BASNEF (belief, attitude, subjective norm, and enabling factors) model was effective on the general health of patients undergoing hemodialysis.

### 1. Introduction

**H**emodialysis is a long-term treatment in patients with chronic renal failure and used everywhere in the world (Li, Jiang & Lin 2014; Saran et al., 2017). According to the reports, 80% of the world population, and 50% of Iran population are under hemodialysis (Saran et al., 2017). The treatment keeps the patient alive by removing body wastes and excess fluids and restore acid-base balance (Schmidt & Holley 2017; Checheriță et al., 2010). On the other hand, this treatment is associated with various complications, including gastrointestinal, skin, hemodynamic, and musculoskeletal problems, as well as anemia (Checheriță, et al., 2010). Besides, different psychological problems like sleep disorders (Raj et al., 2017), anxiety, stress, and depression (Sattar et al., 2016; Ghane et al., 2016) may also occur. Patients under hemodialysis suffer from poor physical, mental, and social health conditions (Masoudi-Alavi, Sharifi & Ali Akbarzadeh 2011; Yarlal et al., 2011). Thus, the health status of these patients should be controlled in four areas of fluid restriction, special diet, avoidance of addictive drug, and regular dialysis (Morgan 2001). The control of disease problems and complications depends on the patient's participation in the self-care process (Storm & Edwards 2013). The participation of these patients in the treatment programs would help them to be empowered (Castro et al., 2016). It has been shown that in chronic diseases, a significant relationship is observed between general health and empowerment programs. Also, evidence has shown that care programs promote self-efficacy in hemodialysis patients (El-Melegy et al., 2016; Moattari et al.,

2012). Meanwhile, the results of some studies have shown that empowerment programs are not useful. As reported in a study, the empowerment program has improved the patient's knowledge but failed to effect on adhering to medical orders in hemodialysis patients (Karamanidou, Weinman & Horne 2008). Sharp et al. (2005) employed some cognitive-behavioral and educational strategies for hemodialysis patients and despite their significant effect on the patients' emotional condition, no change was observed in the general health of the patients. It was also reported that self-management program for hemodialysis patients has been only effective on some aspects of quality of life, while it was ineffective on work condition, self-care, general and emotional health, and cognitive, sexual, and social performance (Baljani, Rahimi & Sasan 2014). Studies on the empowerment of dialysis patients have only focused on the self-management aspect and neglected the other elements of empowerment like participation, effective relationship, goal adjustment, care environment, social-political awareness, and knowledge (Tims, King & Bennett 2007). Nurses should be aware of the factors influencing the change in the patient's behavior and use it to empower the patient. Models and behavioral theories like health belief model, BASNEF (belief, attitude, subjective norm, and enabling factors) model, theory of reasoned action, social support, and Precede model facilitate the process of change (Charkazi et al., 2013; Hazavehei et al., 2010). Among these approaches, the BASNEF model has been used to examine behaviors and change them in people seeking health (Charkazi et al., 2013). According to this model, people do new behavior when they are beneficial to them. Also, this model alters the motivation and factors that cause behavior change (Hubble 1988).

The results of some studies have shown that employing traditional methods without joining with an educational model is not effective in changing behavior (Hazavehei, Sharifirad & Kargar 2008; Izadirad, Masoudi & Zareban 2014). In this regard, it has been determined that using an educational model such as the BASNEF model is effective in changing people's behavior (Hazavehei, Sharifirad & Kargar 2008). The results of studies show that the use of the BASNEF model is effective in changing behavior. In Iran, this model has been used to promote the healthy lifestyle of taxi drivers (Amiri, Rkshshany, & Farmanbar, 2014), improve self-care in women with high blood pressure (Izadirad, Masoudi & Zareban 2014), raise the health status of cancer patients (Taghdisi et al. 2011), and promote preventive behaviors effective on the health of young girls (Ebadifard Azar et al. 2010), and enhance the life quality in diabetic patients (Zendehtalab, Vaghei & Emamimoghadam 2013). It was reported that attitudes, influencers, and mental norms can predict the self-care behaviors of patients with hypertension (Izadirad, Masoudi & Zareban 2014). Moreover, Ebadifard Azar et al. (2010) and Afshari et al. (2015) found no significant difference between subjective norms and behaviors in young girls and patients with diabetes, respectively (Afshari, et al. 2015; Ebadifard Azar, Sohi & Goldoošt 2010). Another study on the effectiveness of the BASNEF model on enabling patients with patients undergoing hemodialysis face many physical and psychological problems (Anderson & Funnell 2010). Studies have shown a significant relationship between empowerment programs based on educational models and public health promotion in different diseases (Kayser et al. 2019; Zendehtalab, Vaghei & Emamimoghadam 2013). This study aimed to determine the effect of the BASNEF empowerment model on the general health of hemodialysis patients.

## 2. Materials and Methods

### Study Design and Setting

In this clinical trial, 60 patients referred to the hemodialysis center of Kashan Shahid Beheshti Hospital, Iran in 2017 were selected and randomly divided into the intervention and control groups.

### Study Sample

The following items were considered to determine the sample size. Type 1 error ( $\alpha$ ) in the formula was considered as 0.05 and type 2 error ( $\beta$ ) as 0.20 (power =80%). Based on a previous study (Rahimi et al., 2014),  $d$  (the difference between the two mean scores) and  $\delta$  (standard deviation) were respectively 10 and 7. First, 100 patients were

assessed for eligibility. Of them, 30 patients did not meet the inclusion criteria. Ten patients did not attend at all. In the end, 60 patients remained that were randomly assigned to the intervention ( $n=30$ ) and control ( $n=30$ ) groups by blocked randomization method (Figure 1). A block size of four random allocations was done by the second researcher and a code was given to each patient. Random placement in groups was performed using a computer application.

The inclusion criteria were being 18 to 65 years old, undergoing hemodialysis three times a week for 4 hours, being diagnosed of kidney failure by a specialist, providing written consent to participate in the study, lacking mental illness, brain diseases such as dementia and stroke, and being able to attend the sessions. The exclusion criteria were the patient's death, the occurrence of an acute problem for the patient during the study, and the absence of more than two study sessions.

The study patients were selected by available sampling methods and those who met the inclusion criteria were divided into the intervention and control groups.

### Study procedure

The first researcher referred to the Kashan hemodialysis center in the morning and evening shifts and selected the study patients. The purpose of the study and its procedure and the confidentiality of the information was described to the participants. They signed a written informed consent form. Study instruments were filled out by the subjects and the illiterate and disabled patients were interviewed.

In the intervention group, the patients were divided into four subgroups. Each subgroup had 4 to 10 members. For each subgroup, 8 empowerment sessions were held based on the BASNEF model. Sessions were held for 4 weeks, twice a week for 40 to 60 minutes in a specific part in the hemodialysis center.

The control group did not receive intervention but routine care of dialysis patients was provided for them. At the end of the study, they received a booklet about hemodialysis care. The contents of this booklet were based on the teachings of the Kidney Patients Support Association (Anderson & Funnell 2010). Before and after the intervention, the General Health Questionnaire (GHQ) was filled out by both groups.

The empowerment program was implemented according to the studies by Tsay and Hung (2004), Moattari et al., (2012), and Zendehtalab, Vaghei & Emamimogha-

**Table 1.** The content of the empowerment program

Model Structures	Session	Content of the Session
Belief	First	<ul style="list-style-type: none"> <li>- The first session included the definition of hemodialysis, the purpose of the program, the number of sessions, and the benefits of attending the sessions.</li> <li>- Discussing the patient's problems, feelings, and emotions about living with hemodialysis</li> <li>- Explaining about chronic renal failure and its effects on different parts of the body and the need for hemodialysis in these patients</li> </ul>
Attitude	Second	<ul style="list-style-type: none"> <li>- Expression of patients' expected behaviors about the complications, prevention, and treatment by the members of the treatment team.</li> <li>- Teaching the behaviors that the patient should show when complications occur.</li> <li>- Expression of common complications of hemodialysis such as itching, hemodynamic disorders, sleep disorders, hypotension, etc. and ways to prevent and treat it</li> </ul>
Subjective norms	Third	<ul style="list-style-type: none"> <li>- Educating patients about diet, physical activity, and self-care in the presence of a family member.</li> <li>- Expressing the necessity of daily control of weight, blood pressure and limb edema</li> <li>- Explaining the concept of dry weight and how to measure it. Explaining the methods of detecting excess fluid in the body</li> <li>- The introduction of drug use and their effects</li> <li>- Fistula site care methods</li> <li>- Explaining the balance between physical activity and patient rest.</li> <li>- Expressing appropriate exercises for hemodialysis patients</li> </ul>
Subjective norms	Fourth	<ul style="list-style-type: none"> <li>- Teaching methods to improve the patient's lifestyle and control anxiety and stress:               <ol style="list-style-type: none"> <li>a. Defining anxiety and stress and ways to prevent them</li> <li>b. Symptoms of anxiety and stress</li> <li>c. Methods of managing and controlling anxiety and stress</li> <li>d. Teaching relaxation techniques such as yoga, deep breathing, mental visualization, and so on</li> <li>e. Expressing the important role of prayer in general health</li> </ol> </li> </ul>
Subjective norms	Fifth	<ul style="list-style-type: none"> <li>- Dealing with negative emotions and remaking them               <ol style="list-style-type: none"> <li>a. Teaching problem-solving methods and ways to adapt to problems</li> <li>b. Expressing thoughts and feelings</li> <li>c. Expressing negative and positive behavioral habits</li> <li>d. Explaining the connection between thoughts and feelings</li> <li>e. Learning to deal with negative thoughts with techniques such as taking notes, recording them, replacing them with positive thoughts, etc.</li> </ol> </li> </ul>
Enabling factors	Sixth	<ul style="list-style-type: none"> <li>- Explaining the effective factors in the disease such as money, knowledge, time, skills, and so on               <ol style="list-style-type: none"> <li>a. Explaining the way to access the services of clinics and their financial support if necessary</li> <li>b. Explaining to patients that some services such as blood tests, and so on are performed for free or at a low cost for the patient</li> <li>d. Giving a booklet to the patient and her/his family about hemodialysis care</li> </ol> </li> </ul>
Behavioral intention	Seventh	Evaluating patients regarding the impact of the empowerment program and change in their behavior and beliefs
Behavior constructs	Eighth	Motivate the patient, solve problems and answer their questions

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dam (2013), based on the BASNEF model. The model included attitude, belief, enabling factors, subjective norms, behavior constructs, behavioral intention (Table 1). Eight hemodialysis specialists confirmed the contents of the empowerment content. The empowerment program for these patients included diet training, exercise, ways to prevent and control the complications of hemodialysis, self-care, treatment depression, anxiety control, and stress management.

During the first to third sessions, the importance of changing misbehaviors and its effects on health and improving the quality of life (belief, attitude, subjective norms structures) was mentioned.

The second session was held by attending a doctor and a nurse, and in the third session, a family member of the patient who lived with her or his and played a key role in caring for the patient also participated. Besides, for

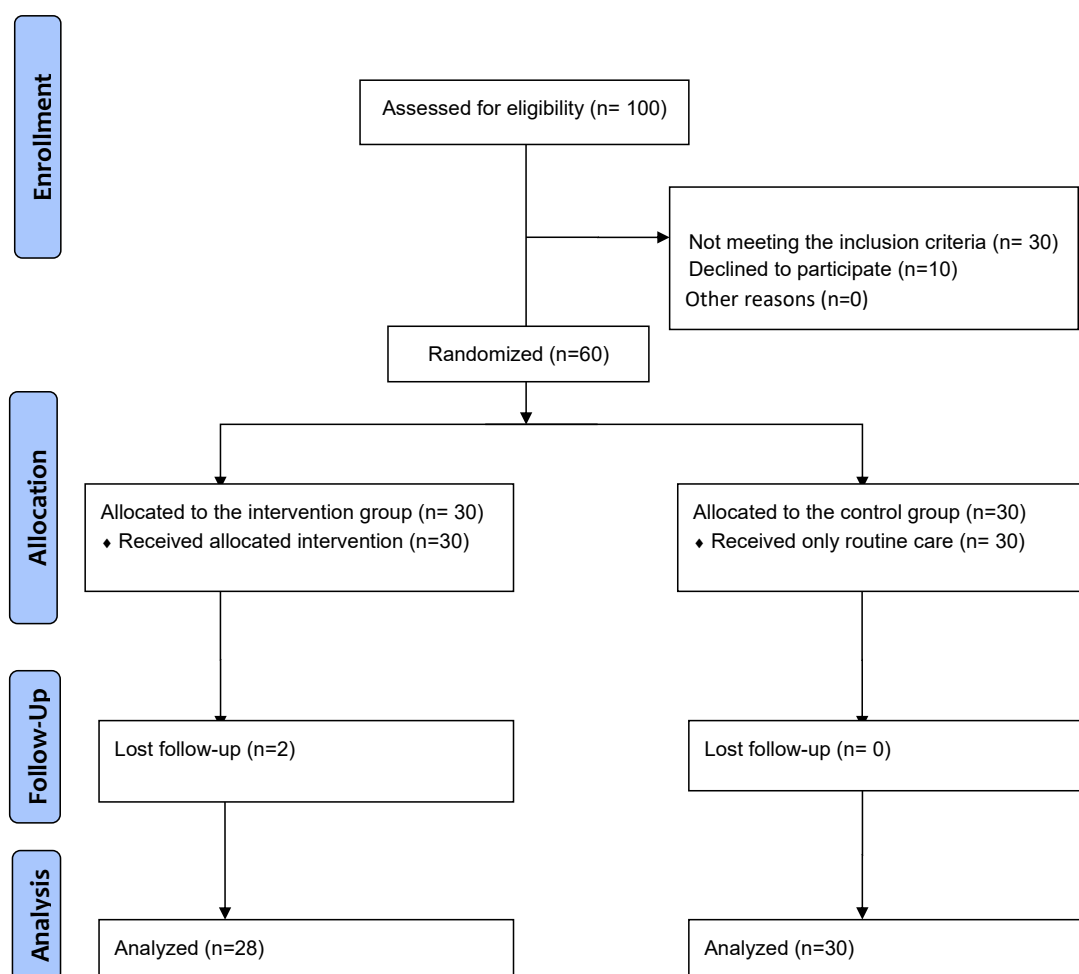


Figure 1. Sampling flow diagram

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better effectiveness of the empowerment program, the trained materials

were given in a booklet to the patients' family members. Other topics discussed in the last four sessions included behavioral intention, enabling factors, and behavior constructs (Table 1). At the end of each session, the patients were given homework, including materials taught during sessions, recording the patient's daily issues, complications of hemodialysis, and performing relaxation exercises. At the beginning of the next session, the homework was reviewed and feedback was given. In addition to patient follow-up during the sessions, the researcher would call the patient during the week to ensure the correct implementation of the trained behaviors. She also answered the patient's questions.

### Study instruments

The research instruments included a demographic questionnaire with 8 questions about age, gender, marital status, education level, occupational status, financial situation, hemodialysis history, and the number of hemodialysis sessions per week and Goldberg General Health Questionnaire (GHQ). The questionnaires were filled out before, one week later, and one month after the intervention by two groups, and were compared.

Goldberg and Hillier devised GHQ-28 in 1979 (Goldberg & Hillier 1979). Different versions of 12 to 60 items of this questionnaire are available. The GHQ-28 questionnaire consists of 4 subscales (physical symptoms, anxiety, social function, and depression). Example questions are "Have you been feeling pain lately?" "Have you recently dreamed of dying and being away from everything?" and so on. Each subscale contains 7 questions rated on a 4-point Likert-type scale from 0 (never)

to 3 (always). The total score of the instrument ranges between 0 and 84. A higher score means lower general health (Bashiri, Aghajani & Masoudi Alavi 2016). The psychometric characteristics of this questionnaire have been confirmed in 15 different populations in the world (Werneke et al., 2000). The Persian version of this questionnaire was reviewed by Javanmard and Mamaghani in (2013) and was approved in terms of face validity, content validity, and internal consistency (Javanmard & Mamaghani 2013). In this research, the Cronbach alpha coefficient of 88% was calculated for this scale.

### Data analysis

The obtained data were analyzed in SPSS-PC version 16 (SPSS Inc., Chicago, IL, USA). The results of the Kolmogorov-Smirnov test showed the normal distribution of study data variables. For comparing demographic data between the intervention and control groups, we used Chi-square, Fisher exact-test, and t-test. For comparing the general health score and its subscales between the two groups, we used the independent t-test. For comparing each group regarding the general health score and

its subscales before and after study, we used the paired t-test. The significance level was set at 0.05.

### 3. Results

In the intervention group, two patients were excluded due to irregular participation in the sessions during the study. In the end, the statistical tests were performed on the data of 58 patients (Figure 1).

The Mean±SD age of the intervention group was 51.75±12.15 years and of the control group was 51.33±11.48 years. About 51.7% of the intervention group and 76.7% of the control group were males. The intervention and control groups were not significantly different with regard to demographic variables ( $P > 0.05$ ) (Table 2).

The results of the independent sample t-tests revealed no significant difference between the two groups before the intervention in the general health and its subscales ( $P > 0.05$ ). After the intervention, the mean general health decreased significantly in the intervention group but comparing the two groups was not significant ( $P = 0.2$ ); however, the difference means some general health sub-

**Table 2.** Demographic characteristics of the two groups \*

Variables	Mean±SD/No. (%)		P	
	Intervention (n=28)	Control (n=30)		
Age, y	51.75±12.15	51.33±11.48	0.89**	
Gender	Male	16 (57.1)	23 (76.7)	0.09***
	Female	12 (42.9)	7 (23.3)	
Marital status	Single	2 (7.1)	3 (10)	0.9****
	Married	22 (78.6)	23 (76.7)	
	Divorced or widowed	4 (14.3)	4 (13.3)	
Education level	Illiterate	7 (25)	6 (20)	0.5
	Primary and secondary	11 (39.3)	16 (53.3)	
	Diploma and higher	10 (35.7)	8 (26.7)	
Occupational status	Employed	14 (50)	20 (66.7)	0.15
	Unemployed and housekeeper	14 (50)	10 (33.3)	
Financial situation	Weak	11 (39.3)	10 (33.3)	0.7
	Average	14 (50)	18 (60)	
	Good	3 (10.7)	2 (6.7)	
Hemodialysis history, month	27.03±22.92	27.76±27.62	0.9	
Number of hemodialysis sessions per week	2.96±0.18	2.87±0.34	0.19	

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\* Data are presented as No. (%) except age, hemodialysis history, and the number of hemodialysis sessions per week that is presented as Mean±SD;

\*\* Obtained from the independent t-test;

\*\*\* Obtained from the Fisher exact-test;

\*\*\*\* Obtained from the Chi-square test.

**Table 3.** Comparison of general health at the baseline between the two groups

Variables	Mean±SD		P *
	Intervention (n=28)	Control (n=30)	
Somatic symptoms	16.07±4.84	13.96±3.95	0.07
Anxiety and insomnia	15.57±5.49	14.33±5.82	0.4
Social dysfunction	14.64±2.98	14.7±3.05	0.9
Depression	13.07±7.63	12.53±6.52	0.7
General health	59.35±15.53	55.53±12.63	0.3

\*\* Obtained from the independent t-test.

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**Table 4.** Comparison of general health at the end of study between the two groups

Variables	Mean±SD		P*
	Intervention (n=28)	Control (n=30)	
Somatic symptoms	12±2.4	13.9±3.28	0.015
Anxiety and insomnia	10.92±3.09	14.63±4.8	0.001
Social dysfunction	21.35±4.87	15.73±3.08	0.0001
Depression	9.64±4.92	13.03±7.91	0.057
General health	53.92±7.41	57.3±13.1	0.2

\* Obtained from the independent t-test.

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**Table 5.** Comparison of general health between the two groups\* in the pretest and posttest

Variables	Mean±SD					
	Intervention (n=28)			Control (n=30)		
	Baseline	After the Intervention	P**	Baseline	End of the Study	P
Somatic symptoms	16.07±4.84	12±2.4	0.001	13.96±3.95	13.9±3.28	0.9
Anxiety and insomnia	15.57±5.49	10.92±3.09	0.001	14.33±5.82	14.63±4.8	0.6
Social dysfunction	14.64±2.98	21.35±4.87	0.001	14.7±3.05	15.73±3.08	0.1
Depression	13.07±7.63	9.64±4.92	0.001	12.53±6.52	13.03±7.91	0.6
General health	59.35±15.53	53.92±7.41	0.015	55.53±12.63	57.3±13.1	0.2

\*\*Obtained from the paired t-test.

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scales, including “Somatic symptoms”, “Anxiety & insomnia” and “Social dysfunction” were significant ( $P < 0.05$ ). Using paired t-test, it was found that general health and its subscales differed significantly in the intervention group before and after implementing of empowerment program ( $P < 0.05$ ). This difference was not significant in the control group ( $P > 0.05$ ) (Tables 3-5).

#### 4. Discussion

Empowerment techniques remarkably affect the self-management of patients with end-stage renal disease (Tsay & Hung 2004). The present study evaluated the effects of an empowerment program on the general health of hemodialysis patients. The findings indicated signifi-

cant changes after the intervention in the mean score of general health and all its subscales, including physical symptoms, anxiety and insomnia, social dysfunction, and depression in the intervention group. However, the mean score of general health in the intervention group was not significantly decreased compared to that of the control group. The authors found no study on the BASNEF model in hemodialysis and chronic renal failure patients. Still, there are studies on using this model for other patients with chronic diseases. For example, Zendehtalab Vaghei and Emamimoghadam (2013) studied the effectiveness of the model on the quality of life of diabetic patients. The result of their study showed that education based on the BASNEF model increased the quality of life in diabetic patients Zendehtalab Vaghei and Emamimoghadam (2013).

The results of Deldadeh Arani, Taghadosi and Gilasi (2016) study acknowledged that education based on the BASNEF model positively affected the lifestyle of patients with hypertension (Deldadeh Arani, Taghadosi & Gilasi 2016). Izadirad, Masoudi & Zareban (2014) reported that an educational program based on BASNEF model was effective on changing the behavior of women with high blood pressure regarding their self-care (Izadirad, Masoudi & Zareban 2014), and also Tol et al. (2017) reported the positive effect of empowerment program based on BASNEF model on decreasing the blood pressure in patients (Tol et al., 2017). Taghdisi et al. (2011) utilized the model to improve the health of cancer patients and reported that knowledge and attitude of the subjects changed significantly, while the changes of subjective norms and enabling factors were not significant (Taghdisi et al., 2011). Taking into account that hemodialysis patients suffer more physical, mental, social, and even financial problems comparing with diabetic and hypertension patients, it appears that achieving a higher level of effectiveness by BASNEF model to improve the general health of hemodialysis patients depends on more the support by nursing managers and charity bodies of implementing the program. Moreover, the condition must be first prepared for more contribution of the family members of the patients.

The results of the present study regarding the effectiveness of education on the general health of the subjects are inconsistent with Moshtagh et al. (2013) study results. They studied the effectiveness of nutrition education on the mental health of hemodialysis patients. Moshtagh et al. (2013) and Weiner et al. (2010) determined the effectiveness of a cognitive-behavioral intervention on the mental health of hemodialysis patients (Weiner et al., 2010). Also, Sharp et al. (2005) employed cognitive-behavioral and educational strategies on hemodialysis patients and despite the significant effect on the emotional role of the patients, they found no change in the general health of patients after 10 weeks (Sharp et al., 2005).

Baljani, Rahimi & Sasan (2014) acknowledged that self-management program in hemodialysis patients was only effective on some aspects of quality of life, while it was not effective on job condition, self-care capabilities, general and emotional health, and cognitive/sexual/social performance (Baljani, Rahimi & Sasan (2014) Baraz, Mohammadi and Broumand (2005) stated no significant change in the general health, body pain, and emotional role after two educational sessions on diet, drinking, taking care of vascular access, and skin health (Baraz, Mohammadi & Broumand 2005). Their results are consistent with our findings. In general, what is needed to achieve a behavioral change in every educational program is to increase the knowledge and awareness level of the participants (Zendehtalab Vaghei & Emamimoghadam 2013). This finding is supported by the positive results of similar studies and the significant difference between the mean scores of general health and the subscales before and after implementing the empowerment model. On the other hand, other studies have shown the higher effectiveness of educational models like BASNEF on inducing change and improving the behavior of patients. One explanation for this outcome is that in addition to improving knowledge and awareness of the patients, the model also handles the attitudes and beliefs of the subjects about the disease and life. Through examining the enabling factors and engaging subjective norms and participation of family members, the model is more effective in inducing behavioral changes (Deldadeh Arani, Taghadosi and Gilasi (2016); Izadirad, Masoudi and Zareban (2014); Zendehtalab Vaghei and Emamimoghadam (2013).

Apparently, creating changes in attitudes and beliefs of hemodialysis patients about the general health need more time and longer intervention programs, continuous follow-up, supplying enablement factors, and more support by the family and charity organizations.

Although a significant difference was not seen between the control and intervention groups in the mean score of the general health, a significant difference was observed between the two groups in means of general health subscales of "physical symptoms", "anxiety and insomnia", and "social dysfunction". Moreover, a decrease in the mean score of depression in the intervention group was observed compared with the control group, which was not significant. To measure general health, Goldberg's GHQ was used. The instrument is originally designed for diagnosis and screening mental disorders (Sterling 2011) so that after dealing with a physical condition, a mental condition over the past month is examined (Taghavi 2002). Taking into account the above issue, the lack of a significant difference in the general health score of the two groups can be due to depression of the sub-



jects. Several authors like Tsay and Hung (2004), Sharp et al. (2005), Sajjadi et al. (2008), Marvi et al. (2011), Aghajani, Afazel & Morasai (2014), and Mohammadi-Kalaveh et al. (2017) have studied anxiety and depression in hemodialysis patients. These studies have been conducted on a variety of interventions such as empowerment (Tsay & Hung 2004), cognitive-behavioral (Marvi et al., 2011; Sharp et al., 2005), self-care (Sajjadi et al., 2008), spirituality counseling (Aghajani, Afazel & Morasai 2014), and multidisciplinary rehabilitation (Mohammadi-Kalaveh et al., 2017) in hemodialysis patients and most of them induced a significant improvement of depression and anxiety in the patients. Moreover, the BASNEF model has been effective in the improvement of mental health in young people (Ebadifard Azar et al., 2010) and stress management in patients with multiple sclerosis (Ebadifard Azar et al., 2012).

The subjects in this study received educations on the techniques of dealing with and decreasing anxiety and stress, relaxation techniques (e.g. visual imagery, diaphragm breathing, and muscles progressive relaxation), the importance of prayer, and religious practices in physical and mental health, and cognitive reconstruction using different techniques. Consequently, a significant decrease in the mean score of depression was observed in the intervention group. Still, there was no significant difference between the control and intervention groups after the study regarding the depression and general health.

Due to the chronic nature of the disease and the complications and problems associated with the hemodialysis, 8 sessions may not be enough to train these patients. Moreover, failure to use research instruments specially designed for depression, lack of a special tool to measure the effectiveness of the BASNEF behavioral model, and the absence of follow-up periods might have affected the findings. Future studies may utilize special instruments for these purposes. Moreover, other variables such as blood pressure and laboratory tests like urea, creatinine, potassium, phosphorus, and serum calcium, as well as health and self-care indices, should be measured along with examining the effectiveness of the intervention and longer follow up.

The use of educational models such as BASNEF is effective in improving the general health of patients with chronic renal diseases. This program was effective on physical symptoms, anxiety and insomnia, and social dysfunction subscales. Therefore, it can be acknowledged that with increasing the general health of hemodialysis patients, the complications and problems of these patients should reduce.

## Ethical Considerations

### Compliance with ethical guidelines

This research was approved by the Ethics Committee of Kashan University of Medical Sciences (IR.KAUMS.REC.1395.145). Research purposes were described to two groups and they signed their written consent form. Participating in the study was voluntary and they had a right to withdraw at any time. The participants were assured that their information would remain confidential. This research was registered in Clinical Trials Registration Center (Code: IRCT2017022514086N10).

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### Authors' contributions

Designing and obtaining funding for the study: Zahra Saiednejad, Neda Mirbagher Ajorpaz, Mohammad Aghajani; Developing the analytical plan: Mohammad Aghajani; Final drafting of the manuscript: Neda Mirbagher Ajorpaz; Revising manuscript and analyzing data: All authors.

### Conflict of interest

The authors declared no conflict of interest.

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