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Effect of educational intervention on promoting self-care in hemodialysis patients: Applying the self-efficacy theory

Tahereh Ramezani, Gholamreza Sharifirad¹, Fatemeh Rajati², Mojgan Rajati³, Siamak Mohebi

Abstract:

BACKGROUND: Hemodialysis patients experience many issues in self-care behavior. Patients require to control of manage the issue to improve the self-care. Educational intervention to behavior change can be effective on self-care behavior. This study was conducted to investigate the effect of an educational intervention, based on the self-Efficacy theory on promoting self-care in hemodialysis patients.

MATERIALS AND METHODS: Seventy hemodialysis patients recruited in this study and divided randomly into intervention group ($n = 35$) and control group ($n = 35$) with convenience sampling in 2016 from Qom city, Iran. Data were collected before and 3 months after education using demographic questionnaire, self-efficacy, a valid researcher-made questionnaire regarding to awareness and self-care. The educational intervention was performed for the intervention group in 4 1-h sessions over 2 months. The data were analyzed through Paired *t*-test, Independent *t*-test, Chi-square, and Mann–Whitney at the significant level of 0.05.

RESULTS: While variables in two groups did not show significant difference before education ($P > 0.05$), a significant increase was observed in variables of self-efficacy ($P < 0.001$), awareness ($P < 0.001$), and self-care dimensions ($P < 0.05$) between two groups after 3 months education.

CONCLUSION: The results of this research suggested that employing educational programs based on the self-efficacy theory can lead to the improvement of the self-care behaviors in hemodialysis patients.

Keywords:

Education, hemodialysis, self-care, self-efficacy

Introduction

Chronic diseases are considered as the leading challenge of the society's health-care system.^[1] chronic renal failure (CRF) or end-stage renal disease are of the most important causes of death and disability worldwide, and they happen when kidneys have lost more than 95% of their normal function.^[2,3] This disease prevalence of CRF is increasing in such a

manner that the average global growth of it has been 8% per year, in the past 5 years.^[4]

It is predicted that more than 70% of renal patients would be living in the developing countries until 2030.^[5] According to the United States' Renal Information system, about 90% of patients with CRF are undergoing hemodialysis, and in the 90% prevailing dialysis patients this treatment method is preferred.^[6] In Iran, according to the report of the association of renal patients' protection. Out of all 40,000, more

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Department of Health Education and Promotion, School of Public Health, Qom University of Medical Sciences, ¹Department of Public Health, Islamic Azad University, Qom Branch, Qom, ²Research Center for Environmental Determinants of Health, ³Department of Gynecology and Obstetrics, Kermanshah University of Medical Sciences, Kermanshah, Iran

Address for correspondence:

Dr. Siamak Mohebi, Department of Health Education and Promotion, School of Public Health, Qom University of Medical Sciences, Qom, Iran.
E-mail: mohebiamak@yahoo.com

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than 37% of renal patients are undergoing dialysis. The prevalence rate is in a high mode in Iran and is about 10%, while global dialysis rate is 3%.^[7]

As mentioned above, hemodialysis is the most common treatment among these patients and wide access to hemodialysis has led to prolonging hundreds of thousands patients' lives.^[8] During the process of hemodialysis, fluids overload is commonly occurred because of the kidneys failure.^[9] Hemodialysis patients suffer from several problems, including sleeping disorders, peripheral neuropathy, infections, anemia, itching, and changes in skin color, loss of consciousness, and affecting different aspects of patients' lives.^[10]

It is necessary for patients to participate in the process of treatment and care to decrease the complications and to improve quality of life. Self-care means that persons care themselves or change conditions or objectives in their environment to further their own life, health, or well-being.^[11] Tsay and Healstead stated that patients with renal failure who are confident toward self-care can take care of their affairs much better. Therefore, people who had higher self-care and self-efficacy can face the disease much better.^[3] However, according to previous studies, patients with hemodialysis have several problems in self-care in all the functional areas, meaning that self-care activities are very low among them.^[12-14] There are several evidence show that lack of knowledge and awareness in patients about self-care behavior including adherence to dietary, fluids intake volume, and taking care of vascular access lead to clinical outcomes resulting in death and different complications.^[15] Hence, patients undergoing hemodialysis need self-care training.^[16] Appropriate education regarding the kidney disease, treatment, and hemodialysis complication, can improve physical function, general health, and also their emotional, mental, and social conditions in people with chronic disease.^[17]

It seems that self-care behaviors achieve not only through promoting knowledge about kidney disease but also some cognitive factors such as self-efficacy. Since hemodialysis is a long-term process, these patients need to use approach to get along with and manage their disease more properly. Without patients' participation and promoting self-efficacy, hemodialysis treatment would not be effective, and the results would not be favorable.^[18] Evidence show that increasing self-efficacy in patients undergoing hemodialysis along with controlling weight during dialysis sessions is related to decrease in hospitalization rate, amputation, and to improve quality of life. Documents show promoting self-efficacy affects self-care, compliance with treatment, and physical and mental health promotion.^[19,20]

Self-efficacy theory is based on the person's judgment about themselves in managing self-care activities to achieve the desirable result. This judgment creates a bridge between self-care knowledge and behavior. Regarding patients with hemodialysis, this theory can be argued that if they are enough confident about self-care^[3] behavior. Hence, self-efficacy is a valuable factor for increasing patients' motivation for self-care.^[21] People who had a greater self-care they had more ability to take care their life events. Self-efficacy beliefs affect directly patients' behavior vital factor for success and failure throughout life.^[22] Self-efficacy is not in a favorable level among patients with hemodialysis in such for restricting sodium intake,^[23] as well as Khoshnazar *et al.*^[18] study. Previous studies focus on self-care behavior with a low or lack of attention to improve self-efficacy in patients undergoing hemodialysis.^[3] Therefore, the mediatory role of self-efficacy has been less used to increase the self-care behavior in the patients. To the best of our knowledge, there is a lack of kidney patient education to promote self-care behavior through applying self-efficacy theory. The aim of this study was to investigate the effect of an educational intervention based on self-efficacy theory on promoting self-care in patients undergoing hemodialysis.

Materials and Methods

Study design and participants

This is a randomized controlled trial study conducted in Kamkar-Arabnia Hospital Dialysis Section in Qom-Iran, from July to February 2016. The list of renal patients who met inclusion and exclusion criteria was extracted for sampling. Of all patients, 70 patients (control group = 35 and intervention group = 35) with hemodialysis were chosen using random sampling method. Written informed consent was obtained from patients who met the inclusion criteria and had agreed to participate. Patients were asked to complete the demographic and medical information, then given the specific questionnaires. The consort flow diagram of the study is available in the Chart 1.

Inclusion criteria included the age of 20–60 years, having ability of reading, writing, and answer the questions, having a medical record in dialysis section, undergoing hemodialysis 3 times a week for 4 h, not having cardiovascular and liver disease, mental disorders, and not being hospitalized in psychological hospital (according to the information of medical records), having stable physical condition, and being independent in doing self-care activities. Exclusion criteria also included getting sick and dying during the study, unable to tolerate hemodialysis. This study was approved by Research Ethics Committee of Qom University of Medical Sciences (Registration

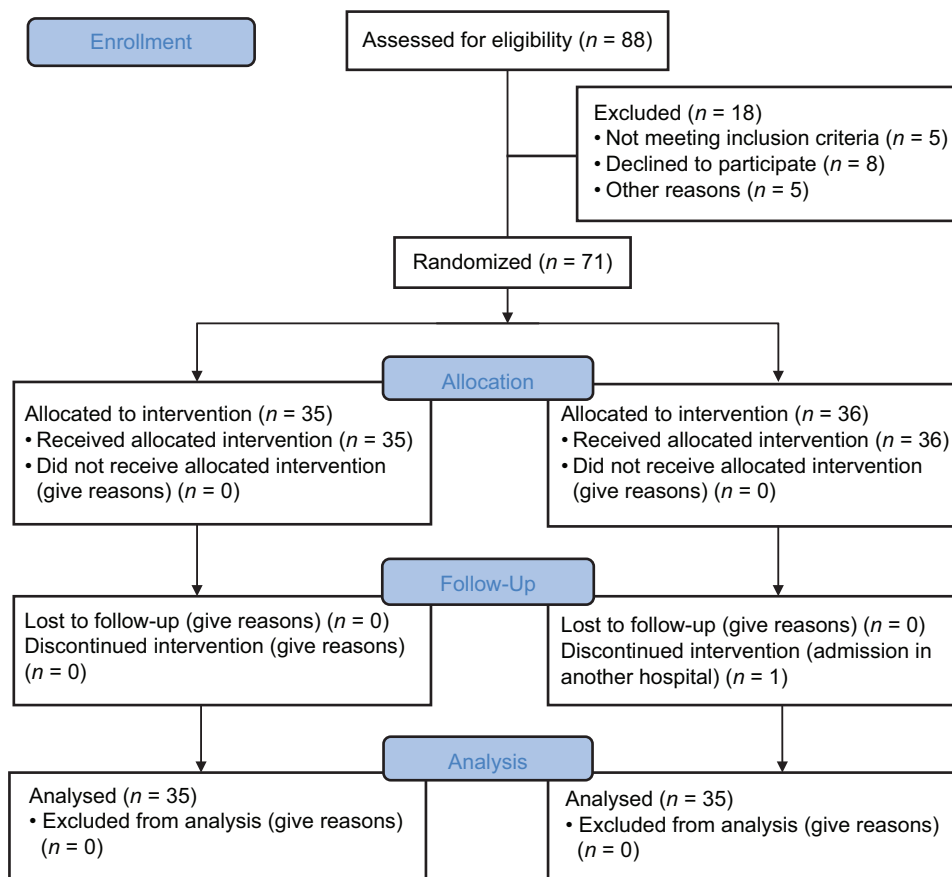


Chart 1: The flow diagram chart of the study

code = IR.MUQ.REC.1395.37). The study was also registered in Iran clinical trials registry (Registration code = IRCT201671628948N1).

Measures

Demographic and medical questionnaires

Demographic and medical questionnaires included demographic characteristics including age, sex, education level, marital, employment, insurance status, and smoking habits.

Self-efficacy factors (Strategies Used by People to Promote Health or SUPPH) were designed by Lev and Owen in 1996 to measure self-efficacy regarding self-care. The questions evaluate the individual's confidence rate. This questionnaire including 29 questions with the 1–5-point responses ranging from little confidence^[1] to quite a lot of confidence.^[5] Hence, the possible score is between 29 and 145. It composes four dimensions of coping, stress reduction, making decisions, and enjoying life.^[24] Reliability and validity of the instrument were calculated in Iranian Version with Chronbakh α coefficient of 96%.^[25] Reliability of Turkish version of the questionnaire was confirmed by Chronbakh α coefficient of 0.92%.^[26] However, the first author evaluated the reliability of the questionnaire in this setting. Out of all

patients, 22 individuals complete the questionnaire two times over 14 days. The intaclass correlation coefficients were calculated as 0.86. Internal consistency of the questionnaire was 0.91 (Cronbach α) in the current study.

According to lack of a standard questionnaire regarding the awareness and self-care of patients with hemodialysis, the questionnaire's items were designed. A researcher-made questionnaire for checking patients' awareness (10 questions, e.g., the use of high-fat foods can cause body build-up and overweight.) designed as "True" or "False." The possible score was ranged from 0 to 10.

Another researcher-made questionnaire of self-care behavior was designed. The questionnaire was designed using three sessions of focus group composing five patients, two physicians, three nurses, and two health educators. All data extracted from the focus groups were categorized and then checked with patients and experts. Finally, the categorizes changed to items including adherence to dietary (8 questions, e.g., I use animal proteins (meats more) than plant proteins (legumes, soybeans, and mushrooms), fluids-intake restriction (questions, e.g., during dialysis, I use fluid as much as I like), activity and rest (6 questions,

before bed, I take a warm shower), skin care (7 questions, e.g., I protect my skin with a sunscreen), fistula care (7 questions, e.g. when I work, I cover the fistula with my clothes), and mental health (6 questions, e.g., I'm trying to achieve my goals in life). It was assessed based on 5-point scale (always, most often, sometimes, rarely, and never) with a score of 0–4. Therefore, each person received a possible score was ranged between 0–32 in adherence to dietary dimension, 0–24 in fluids-intake restriction dimension, 0–24 in activity and rest dimension, 0–28 in skin care dimension, 0–28 in fistula care dimension, and a score of 0–24 in mental health dimension. Face and content validity index (CVI) and content validity ratio (CVR) of the questionnaire were confirmed holding an expert panel including eight faculty members from Qom University of Medical Sciences, and hemodialysis department nurses. Expert panel was asked to report the necessity of each question on the basis of a 3-point Likert-type scale (It is necessary, it is useful but not necessary, it is not necessary). If the value obtained for each question was more than 0.75 according to Lawshe table, it was considered as necessary for the questionnaire.^[27] The cut point of Kuder Richardson and internal consistency methods using Cronbach α -test were used to determine the reliability of awareness and self-care questionnaire, respectively, using 30 patients with hemodialysis and apart from the participants.

Procedure

After doing coordination arrangements with the head of hospital section and treatment staff agreement Patients were recruited in either intervention or control groups using randomization method. In this study, data were collected by a questionnaire (pre- and post-test), and when the patient was in dialysis section after being told of the research aims and delivering a written consent letter, the data were recorded in the questionnaire through an organized interview by the researcher.

Afterward, the intervention group received a call to attend training sessions. Four training sessions were held for intervention group in 60-min during 2 weeks, in days that the patients were not undergoing dialysis, in the hospital's conference hall, as a lecture, Q and A, group discussions, and patients' experience methods. During the first training session, after initial referral, general information about CRF was given and then following the adherence to dietary, and fluids-intake restriction areas were discussed. During the second session, skin care and fistula care areas were trained. In the third session, physical activity and rest among patients were explained. Some stretching exercises for flexibility were educated using a trainer. Practical solutions for improving each area were discussed during these sessions and patients also received educational content using pamphlets and guidelines. Educational intervention stages were

conducted according to self-efficacy theory, in such a manner that factors such as successful experiences, dividing behaviors into smaller steps, and substitution were applied for increasing self-efficacy. Furthermore, 1–2 patients who adopted favorable self-care behavior were assigned in each group to become as model and share their experiences with patients and encourage them. Intervention group also attended the sessions with their families to meet the family support.

After the educational intervention, patients from the intervention group were followed up for 3 months. During this time, the researcher visited the patients twice a month to receive the training feedback and assess the level of behavioral changes. In addition, educational handouts were sent to patients through a web-based network. Posttest was done 3 months after the educational intervention for both groups. Control group patients only received common dialysis department cares and received no other trainings. To ethic consideration, the same educational pack was also given to control group subjects after posttest.

Data analysis

Data were analyzed using SPSS software version 16 (SPSS Inc., Chicago, IL, USA). Descriptive and inferential statistics including frequency, percentage, mean, standard deviations, Independent sample *t*-test, Paired *t*-test, Chi-square, and Mann–Whitney tests were used. $P < 0.05$ was considered as statistical significance.

Results

Patients' age (mean \pm standard deviation) in the intervention and control groups was 41.80 ± 9.68 , and 43.74 ± 11.65 , respectively. The mean age was not significantly different between groups ($P = 0.45$). Patients suffered from disease for 8.48 ± 7.54 and 9.91 ± 7.91 in the intervention and control groups, respectively, with no significant difference between groups ($P = 0.44$). Baseline demographic variables also showed no statistically significant difference between two groups ($P \geq 0.05$) [Table 1].

In this study, CVR of self-care questionnaire was obtained more than 89% for all the questions. CVI was also determined to be 94%. Hence, all questions had high content validity.

Patients' self-efficacy improved significantly using independent *t*-test in the intervention group compared to control group ($P < 0.001$). While the mean score of awareness about the hemodialysis in the intervention group significantly increased from 7.77 ± 1.69 – 9.74 ± 0.50 ($P < 0.001$), this increase was very low and was not significant in the control group

Table 1: Demographic characteristic of participants mean±SD in intervention and control group

Variables	Intervention group	Control group	P
Age (mean±SD)	41.80±9.68	43.74±11.65	0.45 ^a
Sex (%)			
Male	20 (57.1)	26 (74.3)	0.13 ^b
Female	15 (42.9)	9 (25.7)	
Education level (%)			
Elementary	12 (34.3)	16 (45.7)	0.23 ^c
Junior school	7 (20.0)	8 (22.9)	
High school	13 (37.1)	9 (25.7)	
Academic	3 (8.6)	2 (5.7)	
Marital status (%)			
Married	29 (82.9)	27 (77.1)	0.55 ^b
Single	6 (17.1)	8 (22.9)	
Employment status (%)			
Employee	3 (8.6)	2 (5.7)	0.08 ^b
Worker	3 (8.6)	2 (5.7)	
Unemployed	9 (25.7)	8 (22.9)	
Housewife	11 (31.4)	7 (20.0)	
Retired	2 (5.7)	3 (8.6)	
Free job	7 (20.0)	11 (31.4)	
Other	0 (0.0)	2 (5.7)	
Smoking (%)			
Yes	5 (14.3)	7 (20.0)	0.52 ^b
No	30 (85.7)	28 (80.0)	
Insurance status (%)			
Yes	33 (94.3)	34 (97.1)	0.55 ^b
No	2 (5.7)	1 (2.9)	

^aIndependent t-test, ^bChi-square test, ^cMann-Whitney test. SD=Standard deviation

(from 8.37 ± 1.30 – 8.51 ± 1.09 ; ($P < 0.001$) [Table 2]. Mean score of self-care behavior also improved significantly in all dimensions ($P < 0.001$) [Table 2].

According to Independent t-test, an improved statistically change was observed in the mean score of awareness, self-efficacy, and self-care ($P < 0.001$) [Table 3].

Discussion

Results of this study showed the positive effect of a training program based on self-efficacy theory on increasing self-care behaviors among intervention group. Regarding these patients' problems and the fact that educational intervention should assure patients participation of the patients for self-care, it seems that using Self-Efficacy Theory is effective for making these patients believe that they are able to adopt self-care behaviors.^[28] The result of this study showed that mean of the self-efficacy increased significantly in the intervention group. Studies conducted by Lii *et al.*,^[29] *et al.*, Chen^[30] *et al.*, Al confirmed that educational intervention program led to an increase in patients' self-efficacy in self-care behaviors.

In this study, after conducting the educational intervention program, the mean awareness level of the

subjects in both groups significantly increased after the intervention. It can be stated that training patients regarding self-care, has promoted their knowledge and awareness. Some studies' results confirm this research findings.^[31] It should be stated that a lack of awareness about self-care in patients leads to several complications and death.^[15] In general, in this study intervention group patients showed a higher score of self-care behaviors in comparison to control group. This is in line with study of Lii *et al.*, Chen *et al.*, and Jaarsma *et al.*,^[27-29,30-32] In addition, the results of the study by Habibzade *et al.* were in line with the present's research.^[10] Another study was confirmed the effect of improving self-efficacy in decreasing weight gain.^[33] This study showed that educational intervention based on self-efficacy theory had a positive effect on improving adherence to dietary and fluid-intake restriction areas in intervention group. It seems that sharing experiences among patients with favorable self-care conditions and other patients, and encouraging them, made the education effective. A study by Zolfaghari *et al.*, with the title of "Effect of cognitive-behavioral intervention on adherence to dietary and fluid-intake restrictions in hemodialysis patients" showed a significant difference between both groups regarding the rate of following diet and limitations in liquid consumption after the educational intervention.^[34] Other studies also reported similar results.^[12,14]

Furthermore, in experience group patients, self-care score in activity and rest areas increased significantly in comparison to control group. Chen *et al.*, Duarte *et al.*, and Nasiri and Poodineh Moghadam, had similar results in their studies.^[14,30,35] Regarding the fact that physical activity, especially stretching exercises for flexibility improve physical function and patients' quality of life. Therefore, it is recommended that hospital care provide equipment for patients to perform physical exercises.

The increase of self-care score in skin care dimension among intervention group was higher than the control group. It seems that attending applying self-efficacy strategies have increased patients' self-efficacy and they have shown a successful function in this area. In other studies, also lack of skin care problem was solved.^[14,36]

In addition, after educational intervention the average score of self-care in fistula care area in experience group increased significantly in comparison to control group. A study conducted by Baraz-Pardenjani *et al.*, also after training program, patients' local problems of vascular path were improved.^[37] In a study by Atashpeikar *et al.* patients' ability in self-care regarding taking care of vascular accesses was recorded favorable.^[12]

Table 2: Comparison of mean and standard deviation of variables in intervention and control group

Variables	Mean±SD		P ^a
	Intervention group	Control group	
Self-efficacy (range: 29-145)			
Before	86.28±12.38	84.24±11.88	0.524
After	100.05±11.82	83.68±10.21	<0.001
P ^b	<0.001	0.454	
Awareness (range: 0-10)			
Before	7.77±1.69	8.37±1.30	0.102
After	9.74±0.50	8.51±1.09	<0.001
P ^b	<0.001	0.169	
Self-care areas			
Adherence to dietary (range: 0-32)			
Before	17.94±2.96	17.42±3.28	0.494
After	24.45±3.04	18.22±2.87	<0.001
P ^b	<0.001	0.002	
Fluids-intake restriction (achievable range: 0-24)			
Before	10.71±2.21	10.71±2.42	<0.001
After	15.77±2.93	11.22±2.52	<0.001
P ^b	<0.001	0.007	
Activity and rest (achievable range: 0-24)			
Before	9.11±2.39	9.17±3.56	0.397
After	14.97±2.81	9.60±2.99	<0.001
P ^b	<0.001	0.083	
Skin care (range: 0-28)			
Before	13.20±2.94	13.68±3.08	0.305
After	17.57±2.99	14.08±2.73	<0.001
P ^b	0.001	0.095	
Fistula care (range: 0-28)			
Before	16.80±3.42	17.82±4.03	0.254
After	22.37±2.26	18.11±3.04	<0.001
P ^b	<0.001	0.471	
Mental health (range: 0-24)			
Before	13.20±2.04	13.57±3.24	0.569
After	15.91±2.45	13.74±2.99	<0.001
P ^b	<0.001	0.487	

^aIndependent sample t-test, ^bPaired t-test. SD=Standard deviation

Table 3: Comparison of mean and standard deviation of variables' score changes in intervention and control group

Variables	Mean±SD		P ^a
	Intervention group	Control group	
Self-efficacy	13.77±10.38	0.74±5.79	<0.001
Awareness	1.97±1.72	0.14±0.60	<0.001
Self-care			
Adherence to dietary	6.51±3.51	0.84±1.41	<0.001
Fluids-intake restriction	5.05±3.13	0.51±1.06	<0.001
Activity and rest	5.85±3.59	0.42±1.42	<0.001
Skin care	4.37±3.25	0.40±1.37	<0.001
Fistula care	5.28±0.78	5.28±0.78	<0.001
Mental health	2.54±0.54	2.54±0.54	<0.001

^aIndependent sample t-test

The self-care score in the mental health area increased significantly in comparison to control group. It can be explained that training self-efficacy strategies have

led to reducing psychological problems especially depression and anxiety among these patients. This led to facilitate and increase the self-care behavior. It seems that psychological training program causes to improve mental health in hemodialysis patients. Nasiri and Poodineh Moghadam,^[14] and Rostami *et al.*,^[36] also approved the effect of self-care on improving patients' mental health. According to the results, training programs not only improve self-care behaviors and feeling self-efficacy but decreases depression symptoms and increases their self-confidence.^[14,36]

This study had three limitations. First, due to the small sample size, the power of the study was limited. The second, due to lack of hospital policy to allow us for evaluating clinical assessment, we could not assess the effect of education based on self-efficacy theory on changing some clinical outcomes. Future studies should be measure the clinical variable after the intervention.

The mediatory role of self-efficacy on self-care behavior was not statistically confirmed because we did not perform the pathway analysis.

Conclusion

This study showed that applying education based on self-efficacy theory leads to an improvement in patients' self-care behaviors. Therefore, to promote mental and physical health in hemodialysis patients, it is recommended that educational intervention programs base on self-efficacy being applied in health care centers. This research results can help health educators to design self-care intervention programs for patients according to their needs and abilities.

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Conflicts of interest

There are no conflicts of interest.

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