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The Effect of Educational Program on Improving the Lifestyle of Hemodialysis Patients: Model of Planned Behavior

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ABSTRACT

The present study aimed to evaluate an educational program effect that is based on the model of planned behavior on improving the lifestyle of hemodialysis patients. A total of 112 hemodialysis patients who were referred to the hemodialysis wards of Ahvaz educational hospitals participated in this clinical trial. Randomly, patients were divided into test and control groups. One month after the completion of the educational sessions in the test group, using Chi-square, independent and even t-test, and Mann-Whitney tests, the questionnaires were re-completed by both groups and the data were was analyzed.
Based on the results, although the two groups did not have any significant difference in lifestyle before the intervention, the lifestyle scores of the test group showed a significant increase compared to the control group after the educational intervention ($p < 0.0001$). Also in addition, the scores of all structures of the theory of planned behavior, except for behavioral intension, showed a significant increase in the test group compared to the control group after the intervention ($p < 0.0001$). Behavioral intention scores in the two groups revealed a significant difference before and after the intervention. An educational program designed based on a model of planned behavior can be used as an effective method to improve all aspects of lifestyle in hemodialysis patients. Designing and implementing educational programs based on the model of planned behavior is useful in increasing the participation of nurses to provide better educations to patients.

Keywords: Educational program, Lifestyle, Hemodialysis patients, Model of planned behavior.

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INTRODUCTION

Chronic kidney disease is a major cause of death and diseases in the world, that in addition to physical health, also threatens other dimensions of health. The hidden nature of chronic kidney disease in the early stages prevents its early diagnosis, resulting in late diagnosis of disease in end-stage kidney disease and dialysis [1]. According to Iran's dialysis annual statistics in 2015, the number of patients with end-stage kidney disease in the world was estimated at 3730000, out of which 58000 were in Iran [2].
Despite the extensive use of hemodialysis, it has many problems such as high blood pressure, anemia, dehydration, lack of concentration for a long period, renal osteodystrophy, complications of the reproductive system, arterial tract infections, and long-term complications for patients and these problems

gradually decrease the quality of the patients [3]. Various approaches have been proposed to improve the quality of life of hemodialysis patients, the most important of which is to use behaviors that promote health and change the lifestyle. Health-promoting behaviors are the science and the art of changing the lifestyle to achieve maximum health by adopting behaviors such as proper nutrition, regular exercise, avoiding high-risk behaviors, controlling emotions and feelings, resisting stress and complications of the disease, and adapting to disease and developing of independence [4]. In their study, Benner *et al.* stated that improving nutrition in kidney patients improved their quality of life and had a significant relationship with reducing mortality in these patients [5].

Despite the importance and role of lifestyle in improving the quality of life of hemodialysis patients, evidence suggests that the lifestyle of these patients is not at a good level. The study conducted by Nonoyama *et al.* (2010) showed that most of these patients had a moderate level of life quality [6].

Therefore, given the undesirable lifestyle of these patients, it is necessary to consider interventions to train and empower them. In this regard, the first step to implement educational programs is using educational models. The educational programs will be effective if they are based on behavior change models. The model of planned behavior is one of the comprehensive models in the area of behavior change. According to this model, an individual is a rational agent, so that s/he processes information before s/he wants to do a behavior, and then, her/his basic beliefs and, consequently, her/his behavior may change [7, 8].

Although various studies have shown the effectiveness of educational programs according to the theory of planned behavior on advancing physical action in adolescents, following a low-salt diet in heart patients, preventing urinary tract infections in pregnant women, adopting anti-aggression behaviors, and promoting physical activity in patients with type 2 diabetes, increased consumption of dairy products in the elderly people, and adopting AIDS-preventive behaviors [9, 10], changing lifestyle in patients with a heart attack [11], weight control of hemodialysis patients [12], reducing of symptoms and signs of the disease in hemodialysis patients [11], nutritional behaviors and physical activity in hemodialysis patients [13], they have not examined all dimensions of lifestyle.

Nurses play a major role in educating the patient because they have more access to the patient and her/his family and spend much time to provide care for them, so they can provide frequent opportunities for educating and can also assess the quality of education. Enhancing the nurses' knowledge of the role and importance of education to patients improves their performance, leading to a higher level of satisfaction among the patients [14]. Thus, given the role and importance of lifestyle change in improving the life quality of dialysis patients and due to the limited number of studies conducted in this regard, the researchers decided to conduct a study to investigate the effect of training program according to the model of planned behavior on improving the lifestyle of hemodialysis patients.

MATERIALS AND METHODS

This randomized clinical trial study was conducted on 112 hemodialysis patients referring to the dialysis wards of Golestan and Imam hospitals in Ahvaz from October to November. In the present study, to select the samples, the medical files of all patients who were hospitalized up to 3 months before the start of the study with the diagnosis of dialysis were examined. The inclusion criteria of the study included having age above 18 years, being under hemodialysis for at least 3 months, lack of any physical or mental diseases that influence the ability to participate in the study, ability to communicate, having the skill of reading and writing, and ability to participate in education. The exclusion criteria of the study also included patients transferred to intensive care units for any reason, complications during dialysis, and need for medical measures, being absent in more than one session in educational sessions. In this study, individuals were assigned to test (n=56) and control (n=56) groups randomly and by permuted block randomization method and block size of 4 (using a table of random permutations). After randomly selecting and allocating the samples, the pre-test was

performed for both groups. After collecting the data, it was analyzed using statistical software and the educational intervention was designed for the test group according to the results of the pre-test data analysis.

The intervention included training according to the model of planned behavior, which was performed individually and face-to-face for the subjects in 8 sessions of 20 minutes (daily). A post-test was carried out using statistical tests and statistical software for the 2 groups one month after the intervention, and the data was analyzed. In this study, the researcher did not perform any educational intervention for the control group, and to observe the ethical principles and standards in the research, an educational pamphlet was submitted to the control group after performing the post-test. Data collection tools in this study included three questionnaires, including a demographic information questionnaire, a model of planned behavior questionnaire, and a lifestyle questionnaire. The questionnaire of demographic information involved questions on age, gender, education, job and income, number of hemodialysis sessions per week, duration of disease, current smoking, history of smoking, and history of dialysis in other family members. Questionnaire-based model of planned behavior structures: In order to prepare and develop this questionnaire, after review of literature based on the desired model, items to determine the level of attitude (9 questions), subjective norms (15 questions), perceived behavioral control (9 questions), behavioral intention (4 questions) were designed. The total questionnaire includes 37 items, scored on a 5-point Likert scale, ranging from I completely agree (5), I agree (4), I have no idea (3), I disagree (2) and I completely disagree (1). Item 3 is scored reversely (I completely agree (1), I agree (2), I have no idea (3), I disagree (4), I completely disagree (5)), the score of each subject in each of the subscales is obtained from the sum of scores of the items of the same subscale. In this questionnaire, the subscale of attitude is scored from 9 to 45, the subscale of subjective norms is scored from 15 to 75, the subscale of perceived behavioral control is scored from 9 to 45, and the subscale of behavioral intention is scored from 4 to 20. Higher scores in each of the sub-scales indicate a more desirable status.

The lifestyle questionnaire includes 52 questions and 6 subscales of nutrition, physical activity, health responsibility, stress management, interpersonal relationships, and self-actualization. Each question is scored on a 4-point Likert scale, ranging from never (1), sometimes (2), most often (3), and always (4). The total score varies between 52 and 208. It is calculated separately for each dimension of lifestyle so that the score of each subscale is obtained from the scores of the answers given to the questions of the same subscale, and the total score of the subject in the health promotion lifestyle is a score obtained from the subject's answer to 52 questions. Higher scores indicate a healthier lifestyle. In each subscale and the whole questionnaire, a score of less than or equal to 49% of the total score indicates a poor status, a score of 50 to 74% indicates a moderate status, and a score of 75 or higher indicates a good status in that dimension of lifestyle or the general lifestyle.

In this study, quantitative variables were reported as mean, standard deviation, minimum and maximum, and qualitative variables were reported as frequency (percentage). The normality of quantitative variables was assessed using the Shapiro-Wilk test. To investigate the relationship between qualitative variables, the Chi-square test (Fisher's exact test) was used, and to compare quantitative variables between two independent groups (intervention and control), independent t-test, or its non-parametric equivalent one (Mann-Whitney test) was used. A significant level of less than 0.05 was considered in the present study. Data was analyzed using SPSS version 22 software.

RESULTS AND DISCUSSION

In the present study, 112 hemodialysis patients referring to Golestan Hospital and Imam Hospital of Ahvaz participated. Their mean age was 53.67 ± 13.90 years in the treatment group and 52.17 ± 16.96 years in the control group. No significant difference was found between the two groups in terms of age using an independent t-test. In addition, there was no meaningful difference between control and experimental groups with regard to gender, marital status, education, job status, dialysis family history, current smoking, previous history of smoking, and disease other than

kidney disease based on chi-square test **(Table 1)**.

Table 1. The Comparison of Similarity between Experimental and Control Groups with regard to Demographic Characteristics

P-value	Frequency control group (percentage) N=51	Frequency test group (percentage) N=55	Group Variables	
0.14	40 (78.43)	37(67.27)	Man	Gender
	11 (21.56)	18 (32.72)	Female	
0.47	0	0	illiterate	Education
	20(39.31)	22(0.40)	Elementary	
	12(23.52)	6(10.9)	High school	
	10(19.6)	22(0.40)	Diploma	
	3(5.88)	0	Diploma and postgraduate	
	5(9.8)	2(3.63)	Bachelor	
	1(1.96)	1(1.81)	College education	
0/62	8(15.7)	6(10.90)	Single	Marital Status
	37(72.54)	44(0.80)	Married	
	1(1.96)	0	Divorce from spouse	
	5(9.80)	5(9.09)	Dead wife	
0.31	11(21.56)	10(18.18)	Free	Job Status
	7(13.72)	8(14.54)	Employee	
	4(7.84)	0	manual worker	
	11(21.56)	10(18.18)	Unemployed	
	12(23.52)	17(30.90)	housewife	
	6(11.76)	10(18.18)	Retired	
0.53	2(3.52)	3(5.54)	Yes	Family History of Dialysis
	49(96.03)	52(94.54)	No	
0.47	2(3.92)	1(1.81)	Yes	Smoking
	49(96.1)	54(98.2)	No	
0.59	9(17.64)	18(32.82)	Yes	Previous History of Smoking
	42(84.35)	37(67.27)	No	
0.36	28(54.90)	33(0.60)	Yes	Having a Disease Other than Kidney Disease
	23(45.09)	22(0.40)	No	

By the use of t-test, a comparison of mean lifestyle scores between the 2 groups indicated that though there was no meaningful difference between the 2 groups before the intervention, a meaningful difference was observed between the 2 groups after the intervention ($p < 0.05$). In the comparison of mean scores of intragroup lifestyle dimensions, the findings of the paired t-test showed a meaningful difference in the test group ($p < 0.05$); however, no significant difference was observed in the control group **(Table 2)**.

Table 2. The Comparison of Mean Scores of Lifestyle Dimensions and its Dimensions in Two Groups of Test and Control before and after the Intervention

p-value Between groups	standard deviation control group ± mean	Standard deviation test group ± mean	Group	time Variable
0.22	3.02 ± 17.15	4.27 ±17.05	Before intervention	Food pattern
0.031*	7.78 ±15.78	9.41 ±19.40	One month after the intervention	

	0.24	0.04**	p-value within the group	
0.77	3.17 ± 9.56	4.29 ±9.78	Before intervention	Physical activity
0.048	6.95 ± 10.54	8.06 ±13.36	One month after the intervention	
	0.33	0.001**	p-value within the group	
0.49	3.41 ± 11.21	4.50 ± 11.74	Before intervention	stress management
0.01*	6.78 ± 12.09	8.30 ± 15.85	One month after the intervention	
	0.40	0.001**	p-value within the group	
0.22	7.01 ± 29.58	9.01 ± 31.52	Before intervention	responsibility
0.023*	15.85 ± 29.33	19.60 ±37.38	One month after the intervention	
	0.91	0.03**	p-value within the group	
0.62	5.53 ±17.88	6.45 ±18.45	Before intervention	Interpersonal relationships
0.02*	9.88 ± 18.15	11.42 ± 22.87	One month after the intervention	
	0.85	0.007**	p-value within the group	
0.94	6.91± 24.17	8.70 ± 24.29	Before intervention	Self-flowering
0.01*	12.80 ± 23.98	17.07 ± 31.27	One month after the intervention	
	0.91	0.007**	p-value within the group	
0.46	26.20±107.62	32.08±111.78	Before intervention	General lifestyle
0.02*	57.44±109.32	68.92±137.45	One month after the intervention	
	0.84	0.01**	p-value within the group	

* t- test, ** paired t-test, significancy < 0.05

The findings indicated that there was not any significant difference between the mean attitude scores in the two groups before the intervention according to a statistical test of the t-test (p = 0.69), but there was a significant difference between the two groups after the intervention (p <0.001). p). In addition, in comparing the mean scores of intragroup attitude, the statistical results obtained from a paired t-test showed that there was a statistically meaningful difference between the mean scores of attitude before and after the intervention (p <0.001), but it was not significant in the control group (p = 0.39).

There was also a significant difference between the mean scores of subjective norms and perceived behavioral control in the two groups before and after the intervention. There was a statistically meaningful difference in the test group (p <0.05), but no significant difference was found in the control group. However, the behavioral intention scores in the two groups before and after the intervention showed a significant difference, and intragroup comparison of mean scores of behavioral intention based on the Wilcoxon and Mann-Whitney statistical tests showed that there was no statistically significant difference in the test group (p > 0.05), but a meaningful difference was observed in the control group **(Table 3)**.

Table 3. The Comparison of Mean Scores of Planned Behavioral Pattern Structures in the Two Groups of Test and Control before and after the Intervention

p-value Between groups	**standard deviation control group ± mean**	**Standard deviation test group ± mean**	**Group**	**Time Variable**
0.69	24.68±10.19	22.54±10.07	Before intervention	Attitude
*<0.001	23.29±11.40	29.27±9.63	One month after the intervention	
	0.39	**<0.001	p-value within the group	
0.97	61.46±11.71	51.32±18.88	Before intervention	Mental norms
*<0.001	43.00±26.69	52.61±27.66	One month after the intervention	
	0.28	**<0.001	p-value within the group	

0.77	27.70±7.74	24.40±9.71	Before intervention	Perceived behavioral control
*<0.001	25.84±14.84	29.70±16.49	One month after the intervention	
	0.14	**<0.001	p-value within the group	
0.071	16.00±3.75	14.32±4.96	Before intervention	Behavioral intent
*<0.001	10.94±6.88	18.83±7.17	One month after the intervention	
	**<0.001	0.52	p-value within the group	

* t- test, **paired t-test, significancy < 0.05
*Wilcoxon, Mann-Whitney

The present research was done to determine an educational program effect according to the model of planned behavior to improve the lifestyle of hemodialysis patients in Ahvaz. The findings of this research revealed that the mean scores of lifestyle in the test group increased in all dimensions so that there was a statistically significant difference between the control and test groups at dimensions of exercise, nutrition, stress management, and interpersonal relationships, self-actualization, responsibility and an overall score of lifestyle after the intervention. It suggests that an educational program of health-promoting behaviors was effective in improving the lifestyle of hemodialysis patients. This finding is in line with the finding of the studies performed by Hosseini *et al.* [15], Raheb *et al.* [13], Karimi *et al.* [14], and Najafi *et al.* [16]. In all of these studies, the educational intervention improved patients' lifestyles in the test group in comparison to the control group. In addition, the research performed by Hanson *et al.* (2012) showed that peer support increased the score of physical activity, responsibility, and stress management among breast cancer patients [17]. The results of the mentioned study are in agreement with the findings of our research in this regard. The findings suggest that the model of planned behavior has the potential to develop behavior change interventions, especially for behaviors that have become a habit. In a research done by Khavoshi *et al.* (2015) under the title of the effect of training intervention according to the health belief model on the lifestyle of elderly people referring to Islamshahr health centers, the mean scores of exercise, nutrition, and prevention increased 3 months after the treatment in the test group. The mean scores of stress management and interpersonal and social relationships increased three months after the intervention; however, the mentioned enhancement was not statistically meaningful. Concerning inconsistency in the results of the mentioned study and our study on dimensions of stress management and interpersonal relationships, it can be stated that different cultures in different cities might be influential in two areas of stress management and social and interpersonal relationships. Moreover, friends and relatives may have a main role in these two areas [18].

This study's result regarding the attitude dimension of the model of planned behavior indicates that the attitude score in the test group who participated in the educational class was higher and more desirable than the control group, indicating the positive effect of education in the test group. In a research performed by Fateh Kardari *et al.* in 2012, results indicated that training impacted the main indicator of compliance (behavior) and prerequisite indicators of compliance (knowledge and attitude), and some indicators of clinical outcome [19]. Jalali *et al.* (2015) also reported that the using a model of planned behavior in urinary tract infections and to improve patients' knowledge and attitudes led to positive changes in patients' knowledge and attitudes about the disease, greater responsibility for the disease, and prevention and control of the disease [20]. Moreover, concerning the dimensions of subjective norms, the perceived behavioral control, behavioral intention, the research findings showed the effect of the training program according to the behavior model on these structures. With the implementation of the educational program in the intervention group, the scores of subjective norms perceived behavioral control, and behavioral intention increased. In explaining the mentioned findings, it can be declared that the educational program has the full potential to change and perpetuate the educational behavior in patients based on

the model of planned behavior. Due to having the structures of subjective norms, perceived behavioral control, and behavioral intention, this model makes education more effective and leads to changes in patients' educational behavior.

Many studies have revealed the impact of the model of planned behavior. In this regard, Hosseini *et al.* (2014)'s research findings revealed that training according to the model of planned behavior improved the score of behavioral model structures in patients with hypertension [15]. In the research done by Merghati *et al.* (2014), results showed that there was a statistically meaningful difference between the mean scores of the BASNEF model before and after the educational intervention [21]. The results obtained in this regard are in line with the researched performed by Sharifi Rad *et al.* (2011) [22] and Haider *et al.* (2019) [23]. In addition, the findings of a research conducted by Karimi *et al.* (2016) showed that the educational program designed based on the theory of planned behavior could change subjective norms, behavioral control, and behavioral intentions of heart attack patients on adopting a healthy lifestyle and improving all dimensions of lifestyle in patients with a heart attack [14]. However, a research done by Taghdisi *et al.* indicated that the mean score of subjective norms after the intervention did not show a significant difference, so their results are not consistent with those of the extant research. This inconsistency in the findings of the two researches might be due to using different methods of education [24]. A research done by White *et al.* (2012) indicated that both perceived behavioral control and subjective norms of the physical activity section significantly increased in the intervention group compared to the control group after the educational intervention [25], which is directly related to the present study. In elaborating the mentioned findings, it may be mentioned that the dimensions of the model of planned behavior are an important predictor of people's intention in performing health behaviors and can empower people by providing favorable conditions to acquire the necessary skills and knowledge and achieve success.

This study, like any other study, had its strengths and limitations. The use of the model in educational intervention, random allocation, and follow-up of subjects can be considered as the strengths of this study. One limitation of the research was that the emotional state of the subjects during completing the questionnaire might affect the results of the study and it was out of the control of the researcher. To eliminate this limitation, it is recommended for future studies to use the necessary educational interventions to control patients' emotional-psychological state to obtain more reliable results.

CONCLUSION

The significant differences observed between intervention and control groups in the structures of the theory of planned behavior and the different dimensions of lifestyle after educational intervention suggest the training intervention effect according to the theory of planned behavior on improving the lifestyle of hemodialysis patients. Thus, it can be stated that using this theory of behavior change can change behavioral intention, perceived behavioral control, attitudes, and subjective norms of hemodialysis patients about unhealthy lifestyles and improve their lifestyle. Hence, it is recommended to use this theory of behavior change in other diseases and other health and examine its effectiveness in other patients with chronic diseases.

Practice implications

Considering the proven beneficial effects of using a model of planned behavior on educating of patients, this educational method can be used by nurses to enhance the level of knowledge and improve the lifestyle of hemodialysis patients, as nurses who necessary knowledge and skills to transfer information make patients continue to collaborate in the learning process, which will improve the quality of life of the patients.

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