Original Article

The Effects of the Education Program Applied to Hemodialysis Patients on Self-Efficiency, Treatment Adherence, Symptom Management, and Quality of Life

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Abstract

Background: The current study was carried out to determine the effects of the education given to patients undergoing hemodialysis treatment on self-efficacy, treatment adherence, symptom management and quality of life.

Methods: In this randomized controlled quasi-experimental study, using the random sequence boundaries program, a total of 52 patients. The data of the study were collected with the Personal Information Form, General Self-Efficacy Scale, End-Stage Renal Disease Adherence Questionnaire, Dialysis Symptom Index, and World Health Organization Quality of Life –Bref.

Results: It was found that the GSES mean scores of the intervention group at the beginning and the 8th week were higher than the mean scores of the control group, and there were statistically significant differences when both groups were compared (p=0.016), and there was a difference between the two groups in terms of the ESRD-AQ's subscale of Diet mean scores (p<0.05).

Conclusions: In this study, it was determined that hemodialysis patients experienced low levels of symptoms, had moderate self-efficacy, high compliance with hemodialysis and medication, low compliance with diet and fluid, and moderate quality of life mean scores.

Keywords: hemodialysis, education, self-efficacy, treatment adherence, symptom management, quality of life, nursing

Background

Chronic renal failure (CRF) is a leading public health problem that negatively affects patient health because it is a risk factor for cardiovascular diseases, directly affects morbidity and mortality, and decreases the quality of life in the world and in our country (Karabey and Karagozoglu 2021; Hill et al., Suleymanlar et al.2011). 2016; The prevalence of CRF in adults worldwide is 13.4% (Hill et al., 2016), and 15.7% in our country (Suleymanlar et al., 2011). CRF or end-stage renal disease (ESRD) is the condition that defines the 5th stage of CRF, in which toxins. fluid, and electrolytes accumulate in the body due to the progressive and irreversible loss of kidney functions

because of the decrease in glomerular filtration rate (Lee et al., 2021; Tayaz and Koc 2020; Arad et al., 2021). In the ESRD, dialysis [hemodialysis (HD), peritoneal dialysis (PD)], and kidney transplantation treatments are started and continue (Karabey and Karagozoglu 2021; Lee et al., 2021; Mousa et al., 2018). HD treatment for CRF patients is still the most preferred and most frequently applied renal replacement therapy (RRT) method both in the world (Ghadam et al., 2016; Tayaz and Koc 2020; Arad et al., 2021). Symptoms that occur due to CRF and its treatment and that negatively affect the daily life activities of patients (Mollaoglu and Baser 2021) are taken under control with HD treatment individuals' quality of life has increased (Tayaz and Koc 2020; Karabey and

Karagozoglu 2021; Mollaoglu and Baser 2021). However, HD treatment require adherence to a special diet (Arad et al., 2021). In addition, many disturbing physical and psychological symptoms (Tayaz and Koc 2020; Mollaoglu and Baser 2021).

The situation experienced adversely affects the psychosocial status, and physiological parameters of this patient group (Bektas-Akpinar, Ceran and Safak 2019; Mollaoglu and Baser 2021). In addition, HD treatment affects patients' adherence to disease and treatment, self-efficacy levels (Mousa et al., 2018; Bektas-Akpinar, Ceran and Safak 2019; Arad et al., 2021). It reduces the quality of life by affecting the level of being able to perform and maintain activities (Bektas-Akpinar, Ceran and Safak 2019; Mollaoglu and Baser 2021; Bakarman, Felimban and Atta 2019). Hemodialysis patients are getting tired of the restrictions day by day due to the difficult illness and treatment processes thev experience, and they have difficulty in coping with this situation (Bektas-Akpinar, Ceran and Safak 2019; Karabey and Karagozoglu 2021). In order to achieve success in lifelong HD treatment, these patients must comply with CRF, HD treatment, drug therapy, fluidsalt restrictions, and dietary restriction (Baser and Mollaoglu 2019; Arad et al., 2021; Yangoz, Ozer and Boz 2021). In this direction, individualized holistic nursing care education, together with patient and participation, is one of the effective methods for patients to acquire healthy lifestyle behaviors (Ghadam et al., 2016; Alikari et al., 2019; Isik and Erci 2020; Karabey and Karagozoglu 2021; Arad et al., 2021). In studies in the literature, many the programmed education given by the nurse increases the self-management skills and selfcare powers of the patients' ensures their participation in treatment and care, and increases their self-efficacy levels (Bahadori et al., 2014; Ghadam et al., 2016; Isik and Erci 2020; Lee et al., 2021; Ren et al., 2021). It has been determined that it alleviates the disease and reduces the symptoms by ensuring adherence to the treatment, and it prevents complications (Bahadori et al., 2014; Alikari et al., 2019; Parker 2019; Isik and Erci 2020; Karabey and Karagozoglu 2021; Arad et al., 2021). In line with the limited number of studies examining these four issues in

Methodology

Study design and Patients: The current research was planned as a randomized controlled trial with a pretest-posttest control group, and as a quasi-experimental study with patients admitted to the hemodialysis unit of a university hospital. The population of the study consisted of patients who applied to the hemodialysis unit for HD treatment with the diagnosis of ESRD. The daily dialysis treatment session of the first group of patients, which constituted the population of the study, was carried out as 2 sessions on Monday-Wednesday-Friday, and the second group of patients on Tuesday-Thursday-Saturday at 08:00am in the morning and 01:00pm in the afternoon. There was a total of 90 patients admitted for HD treatment. A list of all patients registered in the IT department of the HD unit where the research would be conducted was obtained. In determining the number of patients, patients who received regular hemodialysis treatment 3 days a week for one year before the baseline of the study were taken into account. Power analysis was performed using the G^*Power (v3.1.9.4) program to determine the number of samples. All HD patients aged between 18-65 years, literate and receiving HD treatment 3 days a week, who volunteered to participate in the study, and who met the inclusion criteria of the sample, were included in the study. Among these patients, 38 patients (under 18 years and over 65 years of age) who did not meet the inclusion criteria were not included in the study. The patients who met the sampling criteria were randomly blocked according to their education level and duration of dialysis treatment using the random sequence boundaries (assignment to random groups) program on the computer, and a total of 52 patients were appointed by dividing into the groups, 26 of whom were in the intervention group and 26 of whom were in the control group. However, due to the death of one patient in the control group, the study was completed with a total of 51 patients. When the patients came to the unit at each dialysis session, they were welcomed by the researchers throughout the study. The data of the patients were recorded in their files. The flow diagram of the processt of the study is shown in fig. 1.

Instruments: Personal Information Form, there are a total of 33 questions regarding the patients' sociodemographic characteristics such as age, gender, marital status, and economic level, as well as disease and dialysis treatment, medication, fluid restriction, and dietary adherence (Kim et al.2010; Ghadam et al.2016; Bektas-Akpinar, Ceran and Safak 2019; Alikari et al.2019; Arad et al.2021).

General Self-Efficacy Scale (GSES): The validity and reliability study of the General Self-Efficacy Scale was conducted by Usta Yesilbalkan et al., (2005) and his colleagues on patients undergoing peritoneal dialysis and adapted to the Turkish society. There are 10 expressions in the Turkish form and each receives scores ranging from 1 to 4. The lowest score can be obtained from the scale is 10, and the highest score can be obtained from the scale is 40. It was stated that the test-retest reliability of the scale was 0.80 and the internal consistency was 0.88. As the scale score increases, the self-efficacy score increases (Usta-Yesilbalkan, Karadakovan and Unal 2005). The Cronbach's alpha value of this study was found to be 0.85.

The End-Stage Renal Disease Adherence Questionnaire ESRD-AQ, developed by Kim et al., (2010), is a valid and reliable selfreport tool consisting of a total of 5 sections and 46 items that assesses patients' compliance with Hemodialysis, Medication, Diet, and Fluid (Kim et al., 2010). Turkish validity and reliability of the questionnaire were established by Ok and Kutlu (2017) on patients undergoing hemodialysis. The scores range from 0 to 300 points. The higher scores on the questionnaire mean higher levels of adherence to HD treatment. The content validity index (CVI) of the Turkish version of ESRD-AQ was determined as 0.94, the testretest correlation analysis of the questionnaire was found to be 0.83 (p<0.001), and the itemtotal score correlation analysis coefficients ranged between 0.48 and 0.80 (Ok and Kutlu 2017).

Dialysis Symptom Index (DSI): It was developed by Weisbord et al., in 2004. The Turkish validity and reliability study of the

index was conducted by Onsoz and Usta-Yesilbalkan (2013). The index consists of 30 items to evaluate physical and emotional symptoms and the severity of these symptoms. The lowest score can be obtained from the index is 0 and the highest score can be obtained from the index is 150, and as the score increases, dialysis symptoms also increase (Onsoz and Usta-Yesilbalkan 2013). World Health Organization Quality of Life - Bref (WHOQOL-BREF): The World Health Organization Quality of Life - Bref (WHOQOL-BREF) is the short form of WHOQOL-100, which was developed by the World Health Organization and consists of 6 subscales. The validity and reliability study of the scale consisting of 27 questions was made by Eser et al. in 1999 by adding one more environmental question to 26 questions in the Turkish adaptation. Each section is scored in two different ways, out of a maximum of 20 points or 100 points. A high score indicates a high level of quality of life (Eser et al., 1999). Data Collection and the Application of the **Education Program for the Intervention** Group: The education booklet was prepared by the researchers by scanning the relevant literature and taking the opinions of the experts. In the content of the education booklet, there is information regarding the introduction of the HD treatment team and the unit, the urinary system, the structure and functions of the kidneys, the definition of chronic renal failure, renal replacement therapies, HD adequacy and duration, HD complications, symptoms in HD patients, nutrition and diet in hemodialysis, fluid-salt restrictions, and medication (Dedeli-Caydam and Cinar-Pakyuz 2016; Sari and Ersoy 2016; Kiziltan 2018; Tayaz and Koc 2020; Karabey and Karagozoglu 2021). The data collection tools were applied in the form of face-to-face interviews with the patients in both groups who met the sampling criteria after the hemodialysis treatment was started, the vital signs were checked, they expressed verbally that they felt well and wanted to meet, the purpose of the study was explained, and their written consent was obtained. After the HD treatment of the patient was over, vital signs were taken and stability was checked, and the patient verbally stated that he/she felt well enough to listen and participate in the education to be given to him/her, the

education was started with the help of the booklet. The education was given in the form of face-to-face meetings for 45 minutes once a week for 8 weeks with a one-to-one teaching method (individual education), by utilizing the question-answer technique. The education given to the patients was carried out in a predetermined empty treatment room in the HD unit, a quiet and calm environment where the patients were comfortable. Education booklets were given so that the patients in the intervention group could benefit from the educational content whenever they wanted. No intervention was made to the patients in the control group, except for the routine HD treatment and nursing follow-ups in the dialysis unit. After the planned training program was completed, data collection tools were applied to the patients in both the intervention and control groups, and post-test data were collected.

Data Analysis: The conformity of the data to the normal distribution was tested with the Shapiro-Wilk test. Descriptive statistics of the data obtained in the study were presented with mean and standard deviation for the numerical variables; frequency and percentage analysis for the categorical variables. Chi-square test for categorical variables and independent samples t-test for numerical variables were used in the comparison of demographic characteristics obtained from the Personal Information Form and questions on the ESRD-AQ's subscales of Hemodialysis, Medication, Diet, and Fluid according to the groups. Repeated measures analysis of variance was used to compare the mean scores obtained from the scales according to the groups. Tukey HSD test was used for multiple comparisons. Statistical Package for Social Science (SPSS) for Windows Version 24.0 was used for the statistical analyses and p<0.05 statistically was considered significant.

Ethics: Permissions were obtained from the ethics committee (Year/Number: 2020/94), written and verbal permissions were taken from the participants; therefore, the Declaration of Helsinki was complied with.

Results

The sociodemographic and disease characteristics of patients and the comparison of the mean scores of the findings related to

the disease are presented in Table 1. In this study, it was determined that the mean age of the patients in the intervention group was 42.85 ± 13.17 years, and the mean age of the patients in the control group was 51.24±11.42 years, and there was a statistically significant difference between the groups (p < 0.05). The mean age of the control group was higher than the intervention group. In the intervention group, it was determined that 73.08% of the patients were male, 57.69% of them were married, 42.31% of them were primary school graduates, 80.77% of them were nonsmokers, and all of the patients did not use alcohol, the mean duration of hemodialysis was 7.54±6.26 years, the average of daily hemodialysis session was 3.71 ± 0.40 hours, 69.23% of them used fistula as an access route to hemodialysis, 69.23% of them had hypertension, 84.62% of them did not have diabetes, 80.77% of them had did not have heart disease.

On the other hand, in the control group, 64% of the patients were male, 68% of them were married, 44.00% of them were primary school graduates, 72.00% of them did not smoke, 96.00% of them did not use alcohol, the average duration of hemodialysis was 4.88 \pm 4.12 years, the average of daily hemodialysis sessions was 3.84 ± 0.31 hours, 72.00% of them used fistula as an access route to hemodialysis, 52.00% of them had hypertension, 88% of them did not have diabetes, and 80% did not have heart disease. Since the socio-demographic characteristics of the patients in the intervention and control groups were similar, there was no statistically significant difference between the groups in terms of socio-demographic characteristics (p>0.05).

It was determined that the patients in the intervention group received hemodialysis for an average of 7.54 ± 6.26 years, and the patients in the control group for an average of 4.88 ± 4.12 years, and there was no statistically significant difference between the groups (p>0.05). All of the patients (n=51) were on dialysis 3 days a week, the mean duration of weekly hemodialysis was 3.71 ± 0.4 hours in the intervention group, and 3.84 ± 0.31 hours in the control group, and there was no statistically significant difference between the groups (p>0.05).



Figure 1. Flow diagram of the process.

It was determined that 69.23% of the patients in the intervention group and 72% of the patients in the control group had a fistula as a hemodialysis access route, and there was no statistically significant difference between the groups (p>0.05). When the chronic diseases of the patients other than CRF were examined, it was found that 69.23% of the patients in the intervention group and 48% of the patients in the control group were diagnosed with hypertension, and there was no statistically significant difference between the groups (p>0.05).

The comparison of the mean scores of the patients at baseline and in the 8th-week GSES, ESRD-AQ, DSI, and WHOQOL-BREF are presented in Table 2. It was determined that the GSES mean score of the intervention group measured at baseline and

in the 8th week was higher than the mean score of the control group, and there was a statistically significant difference when both groups were compared (p=0.016). The GSES mean score of the control group was lower than the intervention group. There was no statistically significant difference between the mean scores of the ESRD-AQ's subscales of Hemodialysis. Medication. and Fluid measured at baseline and in the 8th week of the patients in the intervention and control groups (p > 0.05). When the mean scores of the ESRD-AQ's subscale of Diet at baseline and in the 8th week of both groups were compared, there was a statistically significant difference between the two groups (p=0.034). It was seen that the mean scores of both groups decreased in the 8th week. When the DIS mean scores of both groups measured at

baseline and in the 8^{th} week were analyzed, there was no statistically significant difference (p>0.05). Additionally, the WHOQOL-BREF mean scores measured at baseline and in the 8^{th} week did not present a statistically significant difference (p>0.05).

In the comparison of the mean scores of the WHOQOL-BREF's subscale of Physical Health of the patients in the intervention and control groups at baseline and in the 8th week, the interaction between the measurement time and the groups was found to be statistically significant (p=0.029). The mean score of the WHOQOL-BREF's subscale of Physical Health decreased more in the control group than in the intervention group. In the comparison of the mean scores of the WHOQOL-BREF's subscale of Psychological Health of the patients in the intervention and control groups at baseline and in the 8th week, the interaction between

the measurement time and the groups was found to be statistically significant (p=0.026). It was determined that while the mean score of the WHOQOL-BREF's subscale of Psychological Health decreased in the control group, the mean score of the intervention group remained stable. In the comparison of the mean scores of the WHOQOL-BREF's subscales of Social Relations and Environmental Health of the patients in the intervention and control groups, the interaction between the measurement time and the groups was found to be statistically significant (Social Relations and Environmental Health mean scores: p=0.007, p=0.018, respectively). Accordingly, it was determined that while the mean scores of the WHOQOL-BREF's subscales of Social Relations and Environmental Health of the control group decreased, the mean scores of the intervention group did not change.

| Characteristics | Intervention | Control | |
|-------------------------------|------------------------|------------------------|----------------------|
| | n (%) | n (%) | р |
| Gender | | | |
| Female | 7 (26.92) | 9 (36.00) | |
| Male | 19 (73.08) | 16 (64.00) | 0.485^{Ψ} |
| Marital Status | | | |
| Single | 11 (42.31) | 8 (32.00) | |
| Married | 15 (57.69) | 17 (68.00) | 0.447^{Ψ} |
| Education Level | | | |
| Literate | 6 (23.08) | 5 (20.00) | |
| Primary School | 11 (42.31) | 11(44.00) | 0.925^{Ψ} |
| Middle School/High School | 7 (26.9) | 8 (32.00) | |
| Vocational School-Faculty | 2 (7.69) | 1 (4.00) | |
| Smoking | 5 (19.23) | 7 (28.00) | 0.460^{Ψ} |
| Alcohol Consumption | 0 (0.00) | 1 (4.00) | 0.303^{Ψ} |
| Hemodialysis access | | . , | |
| Fistule | 18 (69.23) | 18 (72.00) | |
| Catheter | 8 (30.77) | 8 (30.77) | 0.828^{Ψ} |
| Hypertension | 18 (69.23) | 12 (48.00) | 0.124^{Ψ} |
| Diabetes | 4 (15.38) | 3 (12.00) | 0.725^{Ψ} |
| Heart disease | 5 (19.23) | 5 (20.00) | 0.945^{Ψ} |
| | $(\overline{X}\pm SD)$ | $(\overline{X}\pm SD)$ | |
| Age | 42.85 ± 13.17 | 51.24 ± 11.42 | 0.019 †* |
| Hemodialysis duration (years) | 7.54 ± 6.26 | 4.88 ± 4.12 | 0.080 † |
| Hemodialysis session (hours) | 3.71 ± 0.40 | 3.84 ± 0.31 | 0.212 * |

Table 1: Sociodemographic and disease characteristics of patients

*p<0.05 statistically significant difference, \dagger : t-test, Ψ : Chi-square analysis

| GSES | | | | |
|----------------------|----|---|---|---------|
| Crouns | | Baseline | 8 th Week | D |
| Groups | 11 | $\overline{\mathbf{X}} \pm \mathbf{SD}$ | $\overline{\mathbf{X}} \pm \mathbf{SD}$ | 1 |
| Intervention | 26 | 30.08 ± 5.71 | 30.88 ± 5.85 | |
| Control | 25 | 26.64 ± 7.61 | 25.76 ± 7.33 | 0.016* |
| Total | 51 | 28.39 ± 6.86 | 28.37 ± 7.05 | |
| | | | | |
| | | | | |
| ESRD-AQ | | | | |
| ESRD-AQ-Hemodialysis | | | | |
| Intervention | 26 | 188.78 ± 27.88 | 193.59 ± 18.46 | 0.000 |
| Control | 25 | 194.00 ± 17.76 | 189.67 ± 23.73 | 0.900 |
| Total | 51 | 191.34 ± 23.39 | 191.67 ± 21.08 | |
| | | | p=0.948 | |
| ESRD-AQ-Medication | | | | |
| Intervention | 26 | 188.78 ± 27.88 | 193.59 ± 18.46 | 0.050 |
| Control | 25 | 194.00 ± 17.76 | 189.67 ± 23.73 | 0.950 |
| Total | 51 | 191.34 ± 23.39 | 191.67 ± 21.08 | |
| | | | p=0.182 | |
| ESRD-AQ-Fluid | | | | |
| Intervention | 26 | 173.08 ± 47.39 | 153.85 ± 58.18 | 0.570 |
| Control | 25 | 176.00 ± 48.13 | 164.00 ± 56.86 | 0.570 |
| Total | 51 | 174.51 ± 47.30 | 158.82 ± 57.19 | |
| | | | p=0.104 | |
| ESRD-AQ-Diet | | | | |
| Intervention | 26 | 178.85 ± 42.83 | 161.54 ± 58.83 | |
| Control | 25 | 170.00 ± 59.51 | 140.00 ± 77.73 | 0 253 |
| Total | 51 | 174.51 ± 51.35 | 0150.98 ± 68.91 | 0.235 |
| | | | n=0.034 * / *p<0.05 | |
| | | | | |
| DSI | | | | |
| Intervention | 26 | 39.58 ± 18.45 | $40.58 \pm$ | |
| | 20 | 19.62 | | |
| Control | 25 | 40.60 ± 25.00 | $49.44~\pm$ | 0 3 2 2 |
| Control | 23 | 18.56 | | 0.522 |
| Total | 51 | 40.08 ± 21.69 | $44.92 \pm$ | |
| Total | 51 | 19.43 | | |
| | | | p=0.102 | |
| WHOQOL-BREF | | | | |
| | | | | |
| General health | 26 | 52.40 ± 20.62 | $55.77 \pm$ | |
| Intervention | 20 | 21.28 | | |
| | | 50 50 + 24 96 | 12 50 1 | 0 195 |
| Control | 25 | 30.30 ± 24.80 | 43.30 ± | 0.175 |
| | | 23.14 51 47 + 22 50 | 40.75 | |
| Total | 51 | 31.47 ± 22.39 | 49.73 ± | |
| | | 22.04 | p=0.579 | |
| | | | p=0.373 | |
| Physical health | | 55 22 + 13 18 | 53 08 + | |
| Intervention | 26 | 8.77 | <i>33.7</i> 0 ± | |

Table 2. Comparison of the Mean Scores of the GSES. ESRD-AQ. DSI. and WHOQOL-BREF at the Baseline and in the 8th Week.

| Control | 25 | 58.14 ± 14.12 12.24 | | $49.29\pm$ | |
|----------------------|----|---|----------|-------------|---------|
| Total | 51 | 56.65 ± 13.59 10.77 | | $51.68 \pm$ | 0.767 |
| | | | p=0.005* | | |
| Psychological health | | 61.06 ± 15.27 | | $61.06\pm$ | |
| Intervention | 26 | 12.30 | | | |
| Control | 25 | $\begin{array}{c} 62.83 \pm 13.60 \\ 11.18 \end{array}$ | | $54.67 \pm$ | 0.400 |
| Total | 51 | $\begin{array}{c} 61.93 \pm 14.36 \\ 12.08 \end{array}$ | | $57.92\pm$ | 0.480 |
| | | | p=0.020 | 5* | |
| Social relations | | 68.91 ± 15.19 | • | $69.87 \pm$ | |
| Intervention | 26 | 11.32 | | | |
| Control | 25 | 68.91 ± 15.19 | | $58.33~\pm$ | 0 1 1 8 |
| Control | 23 | 15.77 | | | 0.110 |
| Total | 51 | 68.46 ± 16.94 14.75 | | 64.22 ± | |
| | | 17.75 | p=0.024 | * | |
| Environmental health | | | | | |
| Intervention | 26 | 77.28 ± 13.01 9.97 | | 74.64 ± | |
| Control | 25 | 80.25 ± 16.05 13.63 | | $70.25\pm$ | |
| T-4-1 | 51 | 78.74 ± 14.51 | | $72.49\pm$ | 0.836 |
| 1 0tai | 51 | 11.99 | | | |
| | | | p=0.001 | * | |

*p<0.05 GSES: General Self-Efficacy Scale, ESRD-AQ: End-Stage Renal Disease Adherence Questionnaire, DSI: Dialysis Symptom Index, WHOQOL-BREF:World Health Organization Quality of Life – Bref

Discussion

In this study, it was found that the GSES mean scores of both groups were moderate, the GSES mean score of the intervention group did not change after the education, but the baseline and the 8th-week mean scores of the intervention group were higher than the control group, and when the two groups were compared, the GSES mean scores presented a statistically significant difference. In the study of Lee et al., (2021) it was found that the GSES mean scores of the patients were moderate self-management before the program and the GSES mean score of the intervention group increased significantly after the self-management program (Lee et al., 2021). In conclusion, the fact that the patients in the intervention group were younger than the control group and the number of male patients was higher may have been effective in the higher self-efficacy mean scores of the patients in the intervention group compared to the control group in this study. Because in some studies in the literature, younger age and male patients had higher self-efficacy mean scores, and there was a significant relationship between self-efficacy, younger age, and male gender (Mousa at al., 2018; Bektas-Akpinar, Ceran and Safak 2019).

Treatment adherence in hemodialysis patients is one of the important nursing goals to improve the quality of life of these patients (Naderifar et al.2019). According to a recent meta-analysis by Yangoz et al., (2021), it was determined that the education given to the patients had little effect on the mean scores of the ESRD-AQ's subscales of Medication, Diet, and Fluid. Although, in this study, there was no statistically significant difference between the intervention group's mean scores of the ESRD's subscale of Medication, it was observed that there was an increase in the intervention group's mean score in the 8th week (Yangoz, Ozer and Boz 2021). In the study conducted by Arad et al., (2021), the effect of the education program given to the patients on treatment adherence was examined, and no significant difference was found between the two groups before the intervention; however, after the education program, it was determined that the treatment adherence increased significantly in the intervention group compared to the control group (Arad et al., 2021). In the study of Alikari et al., (2018), it was found that the education program was not effective in the patients' mean scores of the ESRD-AQ's subscales of Hemodialysis and Medication; however, there were statistically significant differences between the mean scores of the ESRD-AQ's subscales of Diet and Fluid. After the education program given to HD patients by Parker (2019), a statistical difference was found between the mean scores of the ESRD-AQ's subscale of Fluid in the intervention and the control groups. As a result, the previous study is different from the current study in terms of the mean score of the ESRD-AQ's subscale of Fluid. In this study, there was no difference between the two groups in terms of the mean scores of the ESRD-AQ's subscale of Fluid measured at baseline and in the 8th week of the intervention group; however, in the 8th-week measurement, the Fluid mean scores of both groups decreased, although not significantly. In this study, a statistically significant difference was found between the intervention group and the control group in terms of the mean scores of the ESRD-AQ's subscale of Diet at baseline and in the 8th week. It was observed that the Diet mean scores of both groups decreased significantly in the 8th week. It is thought that the decrease in mean scores of the Diet and Fluid in the intervention group may be related to the fact that the majority of the participants were male and their educational levels were low.

In this study, the intervention and control groups' mean scores of the DSI at baseline and in the 8th week increased. It was observed that there were no significant changes in the posteducation DSI mean score of the intervention group compared to the 8th-week measurements of the control group. It was found that there was no statistically significant difference between both groups' DSI mean scores at baseline and in the 8th week. In addition, in the study conducted by Isık and Erci (2020), after the nursing care and education given to HD patients by face-toface interview method three times in every 2 weeks, according to the Neuman System Model, the DSI mean score of the patients in the intervention group decreased significantly compared to the control group; furthermore, there was a statistically significant difference between the pre-test and post-test DSI mean scores of both groups. This study differs from the current study in that there was a difference between the DSI mean scores of the pre-and post-training measurements of the groups, and the post-education DSI mean score of the intervention group decreased significantly. In conclusion, in this study, it was found that patients in both groups experienced low levels of dialysis symptoms, but the education given to the intervention group did not positively change the dialysis symptom levels of the patients. It can be thought that this situation may be related to the decrease in adherence to end-stage renal disease. A high level of treatment adherence can reduce dialysis symptoms. In order to further reduce the symptoms, it is necessary to closely monitor the symptoms experienced by HD patients, to raise the awareness of the patients, and to take measures for the effective management of the symptoms. In addition, we think that HD patients and including families should be supported by encouraging them to express themselves, establishing close communication, and providing regular and long-term education programs. including families, in order to increase adherence to the fluid and diet restrictions.

In a meta-analysis study, it was found that 6 weeks after the education program given to improve the quality of life of patients receiving CRF and dialysis treatment, their quality of life improved in terms of general health and psychological health, and quality of life improved in terms of physical health after 12 weeks (Chen et al., 2016). However, many studies found that the quality of life of patients receiving hemodialysis treatment was low (Naderifar et al., 2019; Bektas-Akpinar, Ceran and Safak 2019; Ravindran, Sunny and Kunnath 2020). In the study conducted by Bahadori et al., (2014), it was determined that there were statistically significant increases in the mean scores of the WHOQOL-BREF's subscales of general health, physical health, social relations, and mental health after the education program given to the patients in the intervention group compared to the preeducation mean scores. This study differs from the results of the current study. In the present study, a statistically significant difference was found in the mean scores of the WHOQOL-BREF's subscales of general health, physical health, psychological health, and social relations of the patients in the intervention group after the education compared to the pre-education. However, although the increases in the mean scores of the subscales of general health and social relations were not at a significant level, it was found that there was an increase in the mean scores, and the intervention group's quality of life mean scores after the education did not change significantly and remained constant. In addition, the difference between the measurement time of the physical health, psychological health, social relations, and environmental health mean scores and the interaction of the groups in the control group patients were found to be statistically significant, and overall, the scores of the control group decreased. In this study, it was thought that the education program did not statistically affect the quality of life mean score of the patients in the intervention group, and this might be related to the comorbid diseases of the patients, and the low level of education and self-efficacy mean score of the majority of them (Mousa et al., 2018; Bektas-Akpinar, Ceran and Safak 2019; Ravindran, Sunny and Kunnath 2 2020). In addition, although not significantly, the general health and social relations mean scores of the patients in the intervention group increased in relation to the quality of life in the 8th week compared to the control group, with no changes in the mean scores of other subscales, and decreased quality of life mean score of the control group can be explained by the fact that the mean age of the intervention group was statistically significantly lower than the control group and the majority of them were male. Many studies in the literature support this idea. According to the results obtained in

some studies, it was determined that the quality of life of young and male HD patients increased (Joshi et al., 2017; Mousa et al., 2018; Ravindran, Sunny and Kunnath 22020). In conclusion, in this study, it can be said that physical health, the general health. psychological health, and social relations mean scores of the patients in both groups, measured at baseline and in the 8th week, were at moderate levels, and the environmental health mean scores were at good levels. It was observed that the mean scores of all subscales of the quality of life of the patients in the intervention group did not change in general in the 8th week compared to the pre-training period. However, we can say that there is an increase in the general health and social relations mean scores; therefore, the education program had little effect on increasing the quality of life mean scores of the patients.

This study had some limitations. First, due to the small sample size, the power of the study was limited. Another limitation is that the groups were not similar in terms of age. In this study, assignments to groups were made using the computer program: Random sequence boundaries. Future studies should take these issues into account.

Conclusion: According to the results obtained from this study, it was found that hemodialysis patients who were given an education program for 8 weeks had a moderate level of self-efficacy, continued to experience dialysis symptoms, had a high level of adherence to hemodialysis and medication, had a low level of adherence to diet and fluid, had a moderate level of general health, physical health, psychological health, and social relations, and had a good level of environmental health. In this context, it is recommended for nurses to identify patients with low self-efficacy, determine the factors affecting their self-efficacy, and organize regularly planned and longer-term education programs to strengthen patients' self-efficacy. In addition, nurses should be required to provide counseling to patients and their families about treatment adherence and symptom management by using clear and effective communication techniques. Along with verbal education, it can be recommended to provide regular education programs by

using different and effective education methods such as video calling, talking on the phone, sending messages on the phone, watching videos, using visual materials, and one-on-one patient visits at home.

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