https://doi.org/10.1590/1678-9865202134e200273

ORIGINAL

Evaluation of the effect of nutrition-related visual education on the comfort of patients receiving hemodialysis therapy

Avaliação do efeito da educação visual relacionada com a nutrição no conforto dos doentes que recebem terapia de hemodiálise

Cansu KOSAR SAHIN[1] 0000-0003-2366-3977
Sezgi CINAR PAKYUZ[1] 0000-0002-6598-8801

ABSTRACT

Objective

This study aimed to evaluate the effect of visual education on the comfort of patients receiving hemodialysis therapy.

Methods

A randomized controlled study design was used. This study was conducted in two dialysis centers with 90 chronic hemodialysis patients. A Patient introduction form, Hemodialysis Comfort Scale-Version II, Hemodialysis Patient Fluid Control Scale, Scale for Dietary Knowledge, and Scale for Dietary Behaviors were used. In the intervention group, three interviews were conducted. In the first interview, visual education was applied, and reinforcement education ensued after 15 days. In the control group, two interviews were conducted, and no intervention was performed.

[1] Celal Bayar University, Health Sciences Faculty, Internal Medicine Nursing Department. Şehit Prof. Dr. İlhan Varank Kampüsü, 45140 Yunusemre/Manisa, Turkey. Corresponde to: C. Kosar Sahin. E-mail: <cansukosar@hotmail.com>.

Article was elaborated from a doctoral dissertation by C. KOSAR SAHIN entitled "Evaluation the effect of visual education related to nutrition on comfort of patients receiving hemodialysis therapy", Manisa Celal Bayar University; 2019.

How to cite this article
Kosar Sahin C, Cinar Pakyuz S. Evaluation of the effect of nutrition-related visual education on the comfort of patients receiving hemodialysis therapy. Rev Nutr. 2021;34:e200273. https://doi.org/10.1590/1678-9865202134e200273

Results

The training program was found to have a significant effect on comfort, physical and psychospiritual ease, psychospiritual and environmental transcendence, and sociocultural ease, and a moderate effect on physical relief in the intervention group in the third month. It was determined that the visual education program applied had a large effect size on fluid control, diet knowledge, and behaviors in the intervention group.

Conclusion

Visual education was found to have a positive effect on the comfort status, dietary knowledge, and dietary behavior of patients receiving hemodialysis therapy.

Keywords: Food and Nutrition Education. Patient comfort. Renal dialysis.

RESUMO

Objetivo

O objetivo deste estudo foi avaliar o efeito da educação visual no conforto dos pacientes que recebem terapia de hemodiálise.

Métodos

Foi utilizado um projeto de estudo aleatório em um ambiente controlado. Este estudo foi realizado com 90 pacientes hemodialisados crônicos em dois centros de diálise, sendo que 45 pacientes pertenciam ao grupo de intervenção e os outros 45 pacientes perterciam ao grupo de controle. Formulário de dados do paciente, escala de conforto de hemodiálise – Versão II, escala de controle de fluidos do paciente de hemodiálise, escala de conhecimento dietético e escala de comportamentos dietéticos foram os documentos usados. No grupo de intervenção, foram conduzidas três entrevistas. Na primeira entrevista, a educação visual foi aplicada e reaplicada após 15 dias. No grupo de controle, duas entrevistas foram realizadas e nenhuma intervenção foi feita.

Resultados

Descobriu-se que o programa de treinamento tem um amplo efeito sobre o conforto e relaxamento físico do paciente, assim como relaxamento psicoespiritual, transcendência psicoespiritual, transcendência ambiental e relaxamento sociocultural. Além disso, foi notado um efeito moderado sobre o alívio físico no grupo de intervenção no terceiro mês. Dessa maneira, foi determinado que o programa de educação visual aplicado teve um amplo efeito no controle de fluidos, conhecimento de dieta e comportamento do grupo de intervenção.

Conclusão

Verificou-se que a educação visual tem um efeito positivo no estado de conforto, no conhecimento dietético e no comportamento dietético dos pacientes submetidos à terapia de hemodiálise

Palavras-chave: *Educação Alimentar e Nutricional. Conforto do paciente. Diálise renal.*

INTRODUCTION

Hemodialysis (HD) therapy is a complex and constraining treatment regimen and requires a significant level of patient participation [1-3]. Food and drinks are basic physiological needs for humans in the hierarchy of needs. It is difficult for patients to change their usual eating and drinking habits, and this is the primary factor affecting HD patients' comfort. Secondary factors affecting comfort are complications related to hyperkalemia, hyperphosphatemia, and edema, seen when medical nutrition therapy cannot be maintained. Another very challenging part of the treatment regimen for many patients on hemodialysis is fluid restriction. For these reasons, these patients' comfort is a complex and intertwined process highly affected by compliance with the treatment regimen. Failure to ensure effective compliance with nutrition and treatment causes complications and leads to a decrease in comfort; being uncomfortable, in its turn, also makes it difficult to adhere to the treatment [1,4-6]. For the HD patient, comfort is a multidimensional

concept, but its relevant part for this research is the presence of complications resulting from non-compliance with nutrition and fluid restriction.

Ensuring the sensitivity of the hemodialysis patients to complications and allowing alternative methods to facilitate nutrition is an important step to increase comfort. These interventions must be carried out without decreasing the motivation of the patients and without ignoring possible limitations. Kolcaba [7] stated that when comfort was increased with nursing interventions, individuals would increase behaviors geared towards improving health as well [8-10]. Studies indicate that patient education is one of the most important nursing interventions to provide comfort [11-14]. Nevertheless, the growing number of patients and factors such as complex diets, fluid, and treatment regimens make it difficult to meet these patients' educational needs [12-15].

Developments in information and communication technologies, especially videos and computer-based patient training, have provided better opportunities for creating flexible learning environments and improving the quality of patient training services [16-21]. Studies in the literature show that visual training has positive health outcomes for hemodialysis patients and different populations [21-24]. However, there is no research about nutritional visual training for patients receiving hemodialysis therapy that evaluates the effectiveness of the training on comfort. With this respect, this study aimed to examine the effect of visual nutrition training on the comfort level of patients receiving hemodialysis therapy.

METHODS

This study used a randomized controlled trial research design. It was carried out between August 2018 and February 2019 with patients receiving chronic hemodialysis therapy three times a week in hemodialysis units of Private Anemon Dialysis Center and Merkezefendi State Hospital, in Manisa (n=130).

The sample of the study was determined with the GPOWER statistical software based on a 0.05 significance level, a moderate effect size, and 80% power by using the results of the t-test analysis table for dependent groups, which was employed for the comparison of mean scores in Moonaghi *et al* [18]. Accordingly, the necessary sample size was found to be n=90 (Intervention Group=45, Control Group=45) patients. This research was carried out as a single-blind study. Participants were blinded in the research. Patients did not know whether they were in the intervention or control group.

Experimental and control-group patients were recruited from different sessions to avoid interference between the groups. We determined the intervention and control groups in this randomized controlled experimental study by assigning each patient who came to a certain hemodialysis session a number. Then, the patients were selected randomly by drawing lots.

The inclusion criteria were: being 18 years of age or older; having no communication problems; receiving hemodialysis therapy for at least the last three months; having no cognitive impairment; ability to speak and understand Turkish; and agreeing to participate in the study voluntarily.

During the research, two patients from the intervention group and one patient from the control group were separated. That was because one patient in the intervention and one in the control group changed the dialysis center, and the patient in the intervention group died. A new patient was determined by drawing in the same group for each patient leaving the intervention and control groups.

The hypotheses of the study was: H_0: Visual nutrition training does not affect comfort, fluid control, dietary knowledge, and dietary behaviors of patients receiving hemodialysis therapy; H_2: Visual nutrition training has effects on the comfort of patients receiving hemodialysis therapy experience; H_3: Visual nutrition training has effects on the fluid control of patients receiving hemodialysis therapy; H_4: Visual nutrition training has effects on the dietary knowledge and dietary behaviors of patients receiving hemodialysis therapy.

The study's data were collected using a Patient Information Form, the Fluid Control in Hemodialysis Patients Scale (FCHPS), the Scale for Dietary Knowledge in Hemodialysis Patients (SDKHP), the Scale for Dietary Behaviors in Hemodialysis Patients (SDBHP), and the Hemodialysis Comfort Scale-Version II (HDCS-II).

This form was developed by the researchers by reviewing the literature. It intends to collect descriptive information on the patients and other data related to diseases and hemodialysis therapy status [25,26].

This is a scale developed by Albayrak and Cınar in their work with 350 HD patients to evaluate fluid control in hemodialysis patients. The study affirms that it is a valid and reliable measurement tool that can be used to evaluate fluid control in HD patients [26]. The scale has 24 items and three sub-dimensions (knowledge, behavior, attitude). Its minimum score is 24, and the maximum score is 72. As the score obtained from the scale increases, patient compliance to fluid control increases as well. Cronbach's alpha coefficients of scale were 0.92 for knowledge, 0.80 for behaviors, and 0.67 for attitudes sub-dimensions [26]. Permission for using the scale was obtained from Albayrak via e-mail.

The Cronbach's alpha reliability coefficients of scale obtained in the intervention group in this study were 0.77 for the overall scale, 0.67 for knowledge, 0.70 for behaviors, and 0.77 for the attitudes sub-dimension. In the control group, coefficients were determined as 0.76 for the overall scale, 0.75 for knowledge, 0.71 for behaviors, and 0.67 for the attitudes sub-dimension.

The Scale for Dietary Knowledge and Dietary Behavior in Hemodialysis Patients are valid and reliable measurement tools, developed by Bulantekin and Cinar with 302 HD patients [27]. The SDKHP is a 3-point Likert-type scale, and the SDBHP is a 5-point Likert-type scale. The lowest score on the knowledge scale is 0, and the highest is 18. SDKHP consists of a single sub-dimension. Increased scores are evaluated as "a good level of knowledge" [27].

The behavior scale has a single sub-dimension. The lowest score is 13, and the highest score is 65. Increased scores are interpreted as "a good level of behavior". Cronbach's alpha coefficients for the SDKHP and SDBHP are 0.86 and 0.73 [27].

In this study, Cronbach's alpha coefficients for the SDKHP were found to be 0.73 for the intervention group and 0.70 for the control group. On the other hand, the coefficients of SDBHP were determined to be 0.75 for the intervention group and 0.77 for the control group. Permission for using scales was obtained from Bulantekin via email.

The Hemodialysis Comfort Scale-Version II was developed by Kosar Sahin and Cınar Pakyuz to evaluate comfort in patients receiving hemodialysis therapy. The scale, which was developed by interviewing 436 HD patients receiving treatment in five different HD units, is a valid and reliable measurement tool. The HDCS-II is a 5-point Likert-type scale. The scale consists of 26 items and 6 sub-dimensions. Sub-dimensions include Physical Relief (PR), Physical Ease (PE), Psychospiritual Ease (PSY-E), Psychospiritual Transcendence (PSY-T), Environmental Transcendence (ET), and Sociocultural Ease (SC-E). The scale scores range between 26 and 130. As the scale score increases, comfort increases as well. The relevant research states that the Cronbach alpha coefficient of the HDCS-II was 0.79 and the alpha values of the six-factor in the scale were PR: 0.83, PE: 0.71, PSY-E: 0.87, PSY-T: 0.85, ET: 0.82, and SC-E: 0.61 [28]. In this study, the Cronbach's alpha coefficients for the HDCS-II were 0.67 for the intervention group and 0.60 for the control group.

The content, text, set, and visuals of the training video were created by the researchers and presented by the first researcher. Professional support was taken from the "Karaca Production and Advertising Services" company. The content of the training video and training booklet were prepared to be used together. We did not receive any support from nutritionists in the preparation of the video content. However, since the second researcher worked one-on-one with patients for many years in the HD unit and was an academic expert in nutrition and care of HD patients, she made great contributions to the preparation of the content. In addition, we employed resource books and guides written on nutrition education for HD patients and the resources of the associations that have a say on this subject [29-37].

The content of the video tutorial and booklet included liquid and salt restriction, the importance of potassium and phosphorus restriction, complications when they are high, foods with low phosphorus and potassium, and alternative methods of cooking and flavoring. Turkish was the language of the video tutorial and booklet. While the first researcher presented the content of the video, the visuals, animations, and figures were reflected on the screen according to the flow, and thus, the attention of the audience was kept on the video both visually and audibly. The low-tone music in the background of the video also ensured the patients' motivation. The videos were shown to the patients on a tablet.

Three interviews were conducted with the intervention group and two interviews with the control group. Written consent was obtained from each patient before the interview. Biochemical parameters, interdialytic weight, ultrafiltration, and blood pressure were recorded from patient files.

In the first interview with a member of the intervention group, data were collected with the patient information forms HDCS-II, FCHPS, SDKHP, and SDBHP. Then, patients watched the visual content and had their questions answered. In the second interview, after the data collection, the patients were given a training booklet, and a brief interview was held to reinforce the content of training in the first interview. In the third interview, only data were collected with the same forms. In the control group, the first and second interviews only collected data. During the study, no intervention was applied to the patients in the control group. After the study was finished, visual education and training booklets were given to the patients in the control group.

We used the Statistical Package for Social Sciences Version 15 for the data analysis. Data were presented as mean, standard deviation, and frequency values. In parametric data, the difference between the two groups was analyzed using the t-test in independent groups and paired t-test in dependent groups. In non-parametric data, the difference between the two groups was determined with the Mann-Whitney U test for independent groups and with the Wilcoxon test for independent samples. In cases of more than two measurements, analysis of variance was used. The Chi-square test was used to analyze the data between categorical variables. Statistical significance was accepted as $p<0.05$ with a 5% error margin [38,39].

At the outset, we obtained the approval of the Health Ethics Committee of Manisa Celal Bayar University (date: 03.01.2018, process n.: 20.478.486) and the written institutional permission of the Merkezefendi State Hospital and Anemon Dialysis Center. After the patients were informed about the content and purpose of the study, the patients' informed consent was obtained.

RESULTS

There was no significant difference between the two groups in terms of gender, education status, occupational and economic status, and primary kidney disease status ($p>0.05$). There was a significant difference in terms of marital status ($p<0.05$). The number of married patients was higher in the intervention group compared to the control group (Table 1).

In the pre-test period, there was a statistically significant difference between the intervention and control groups in terms of overall HDCS-II and PSY-E scores ($p<0.05$, $p<0.05$). The overall HDCS-II and PSY-E scores of the intervention group were higher. Post-test, there was a statistically significant difference between the intervention and control groups in terms of total HDCS-II, PE, PSY-E, PSY-T, ET, and SC-E scores ($p<0.001$). The mean HDCS-II, PE, PSY-E, PSY-T, ET, and SC-E scores of the intervention group were higher than those of the control group.

In the intervention group, there was a statistically significant difference between pre-test and post-test in terms of overall HDCS-II, PE, PSY-E, PSY-T, ET, and SC-E scores ($p<0.001$). Compared to the pre-test, the overall HDCS-II, PE, PSY-E, PSY-T, ET, and SC-E scores were higher in the post-test of the intervention

Table 1 – Dıstrıbutıon of ıntervention and control groups accordıng to socıo-demographıc characteristıcs. Manısa, Turkey, 2018-2019.

Variables	Intervention Group (n=45)		Control group (n=45)		x^2	p
	n	%	n	%		
Gender						
Woman	19	42.2	18	40	2.186	0.139
Man	26	57.8	27	60		
Marital status						
Married	36	80	25	55.6	5.063	0.03*
Single	9	20	20	44.4		
Education status						
Literate	3	6.7	13	28.9	3.525#	0.338
Primary school	39	86.7	24	53.3		
Secondary School+high School+university	3	6.7	8	17.8		
Occupational status						
Working	1	2.2	3	6.7	0.073	0.787
Not working	44	97.8	42	93.3		
Economical status						
Income smaller than expense	16	35.6	16	35.6	0.728	0.394
Income equivalent to expense	29	64.4	29	64.4		
Primary kidney disease						
DM and/or HT	34	75.6	26	57.8		
PK + GN + UTI	4	8.9	7	15.6	3.987#	0.396
Others	7	15.6	12	26.7		

Note: *p<0.05; ; #Fisher Corrected Chi-Square Test. DM: Diabetes *Mellitus*; GN: Glomerulonephritis; HT: Hypertension; PK:Polycystic kidney; UTI: Urinary Tract İnfection.

group. In the control group, a statistically significant difference was found between the pre-test and post-test in terms of PR and PSY-T scores (p<0.05). Compared to the pre-test, PR scores were higher, but PS-G scores were lower in the post-test in the control group (Table 2).

In the intervention group, there was a significant increase in the mean HDCS-II, PE, PSY-E, PSY-T, ET, and SC-E scores in the post-test compared to the 15th day mean scores (p<0,001, p<0,001, p<0,01, p<0,01, p<0,00, p<0,001).

It was observed that in the intervention group, in the third month, the education program had an effect of 0.646 on patient comfort, 0.102 on PR, 0.631 on PE, 0.298 on PSY-E, 0.283 on PSY-T, 0.379 on ET, and 0.305 on SC-E.

In the pre-test, there was no significant difference between the intervention and control groups in terms of mean scores obtained from FCHPS and knowledge, behavior, and attitude sub-dimensions, SDKHP, and SDBHP (p>0.05).

Post-test, a statistically significant difference was determined between the intervention and control groups in terms of mean FCHPS and knowledge, behavior, attitude sub-dimension, SDKHP, and SDBHP scores (p<0.001). In the post-test, the mean FCHPS and knowledge, behavior, and attitude sub-dimension, SDKHP, and SDBHP scores were higher in the intervention group than for the control group.

There was a statistically significant difference between the pre-test and post-test of the intervention group in terms of mean FCHPS and knowledge, behavior, attitude sub-dimension, SDKHP, and SDBHP scores (p<0.001). In the intervention group, the mean FCHPS and knowledge, behavior, attitude sub-dimension, SDKHP, and SDBHP scores were higher in the post-test compared to those of the pre-test.

In the control group, a significant difference was found only in terms of mean SDKHP scores between pre and post-test. (p<0.001). The mean SDKHP score was higher in the post-test compared to the pre-test (Table 3).

Table 2 – Comparıson of hemodıalysıs comfort scale versıon II and sub-dımensıon scores of the ınterventıon and control groups. Manısa, Turkey, 2018-2019.

Scales	Differences Between Groups Significance	Pre-test (0.month) Mean ± SD	Post-test (3. month) Mean ± SD	t	p
HDCS-II	Intervention group	86.86±11.56	98.55±8.42	-9.905	0.000***
	Control group	82.24±9.03	82.02±8.34	0.527	0.601
	t	2.112	9.352		
	p	0.037*	0.000***		
PR	Intervention group	17.82±2.83	18.48±1.79	-4.811	0.000***
	Control group	17.11±2.88	17.71±2.29	-2.544	0.015*
	t	1.180	1.793		
	p	0.241	0.076		
PE	Intervention group	10.11±3.45	14.68±1.91	-9.678	0.000***
	Control group	10.28±3.51	10.44±3.22	-0.828	0.412
	t	-0.242	7.593		
	p	0.809	0.000***		
PSY-E	Intervention group	29.02±3.93	31.06±4.05	-4.782	0.000***
	Control group	27.11±4.69	26.33±4.50	2.553	0.014
	t	2.093	5.238		
	p	0.039*	0.000***		
PSY-T	Intervention group	14,0±3,03	16.46±2.37	-4.617	0.000***
	Control group	13.93±3.62	13.62±3.47	2.319	0.025*
	t	1.229	4.533		
	p	0.222	0.000***		
ET	Intervention group	3.75±1.53	4.95±1.31	-5.591	0.000***
	Control group	3.32±1.21	3.20±1.14	1.665	0.103
	t	1.595	6.771		
	p	0.114	0.000***		
SC-E	Intervention group	11.35±3.22	12.88±1.94	-4.763	0.000***
	Control group	10.51±2.05	10.71±1.72	-1.500	0.141
	t	1.483	5.616		
	p	0.142	0.000***		

Note: *p<0.05, ***p<0.001. ET: Environmental Transcendence; HDCS-II: Hemodialysis Comfort Scale Version-II; PE: Physical Ease; PR: Physical Relief; PSY-E: Psychospiritual Ease; PSY-T: Psychospiritual Transcendence; SC-E: Sociocultural Ease.

In the intervention group, there was a significant increase in the mean FCHPS, SDKHP, and SDBHP scores in the post-test compared to the 15th day mean scores (p<0,001).

It was observed that in the intervention group in the third month, the education program has an effect of 0.794 on fluid control, 0.716 on dietary knowledge, and 0.764 on dietary behaviors (Table 4).

DISCUSSION

It was not possible to consider the success of educational interventions, independent of the sociodemographic characteristics. In this study, no significant differences were found between the intervention and control group consisting of chronic kidney patients in terms of socio-demographic characteristics except for marital status. Accordingly, the two groups can be said to be homogeneously distributed.

Some studies have shown positive health outcomes through patient training [40,41]. Advances in information technologies have provided good opportunities to improve the quality of patient training [18,20,42-45]. In their study, Ozdemir *et al*. [43] found that 70.8% of the patients had visual learning styles. The use of audio-visual materials in education is important for achieving lasting learning [18,20,42-45].

Table 3 – Comparıson of Fluid Control in Hemodialysis Patients Scale, Scale for Dietary Knowledge in Hemodialysis Patients, and Scale for Dietary Behaviors in Hemodialysis Patients scores of the Interventıon (n=45) and Control (n=45) groups. Manısa, Turkey, 2018-2019.

Scales	Groups	Pre-test (0. month)	Post-test (3. month)	Significance	
		Mean ± SD	Mean ± SD		
FCHPS	Intervention group	48.71±6.20	61.26±4.79	t=-15.313	*p*=0,000***
	Control group	49.22±6.74	49.28±6.01	t=-0.179	*p*=0.859
	t	-0.374	10.444		
	p	0.709	0.000***		
FCHPS-K	Intervention group	17.22±2.15	20.62±0.53	Z=-5.748	*p*=0.000***
	Control group	17.93±1.83	18.04±1.73	Z=-1.032	*p*=0.302
	U	812.000	112.500		
	p	0.099	0.000***		
FCHPS-B	Intervention group	20.28±3.78	26±2.47	t=-12.044	*p*=0.000***
	Control group	20.06±3.51	19.68±3.61	t=1.570	*p*=1.123
	t	0.289	9.657		
	p	0.773	0.000***		
FCHPS-A	Intervention group	11.20±2.59	14.64±2.76	t=-8.203	*p*=0.000***
	Control group	11.22±2.97	11.55±2.76	t=-1.748	*p*=0.087
	t	-0.038	5.297		
	p	0.970	0.000***		
SDKHP	Intervention group	3.46±1.84	8.55±2.37	t=-16.432	*p*=0.000***
	Control group	3.22±1.90	3.60±1.89	Z=-3.545	*p*=0.000***
	U	929.000	106.000		
	p	0.494	0.000***		
SDBHP	Intervention group	35.80±5.34	45.15±3.61	t=-14.160	*p*=0.000***
	Control group	33.97±3.89	34.28±3.50	t=-1.683	*p*=0.099
	t	1.848	14.480		
	p	0.068	0.000***		

Note: ****p*<0.001. FCHPS: Fluid Control in Hemodialysis Patients Scale; FCHPS-A: Fluid Control in Hemodialysis Patients Scale-Attitude Sub Dimension; FCHPS-B: Fluid Control in Hemodialysis Patients Scale-Behavior Sub Dimension; FCHPS-K: Fluid Control in Hemodialysis Patients Scale-Knowledge Sub-Dimension; SDBHP: Scale for Dietary Behaviors in Hemodialysis Patients; SDKHP: Scale for Dietary Knowledge in Hemodialysis Patients.

In this study, the mean scores obtained from the HDCS-II, PR, PE, PSY-E, PSY-T, ET, and SC-E on the 15th day and in the post-test were determined to be higher compared to those of the pre-test. Provision of an increase in the mean scores obtained from the comfort scale and its sub-dimensions through the visual and the following reinforcement training showed that this training program targeting multiple sensory organs had an impact on the comfort of hemodialysis patients within three months. According to eta^2 values, it is possible to say that this effect was broad on comfort, PE, PSY-E, PSY-T, ET, SC-E, and moderate on PR [29]. Accordingly, the H_2 hypothesis can be said to be confirmed.

In the control group, there was an increase in PR scores and a decrease in PSY-T scores in the post-test compared to the pre-test period. The increase in this score may be related to the presence of the dialysis team, especially the dialysis nurse, to intervene immediately during any session that can interfere with any situation affecting the comfort of the patient. The decrease in psychospiritual transcendence scores seen in the control group may be due to any situation in the individuals' life processes or hemodialysis therapy (decreased support system, experiencing complications, *etc*.). In the literature, although there are studies evaluating the effects of different interventions on HD patients' comfort, only one study examines the effect of training on comfort [46-50]. Tabiee *et al*. [50] administered back massages and gave training to patients and families in the intervention group in six consecutive hemodialysis sessions, and they examined changes in patient comfort. They determined an increase in comfort scores of the intervention group compared to the control group. Also, they found a significant increase in comfort, psychospiritual, and environmental subscale scores in the intervention group in the post-test compared to the pre-test. Our results regarding the positive effect of visual training on comfort for patients receiving hemodialysis therapy were similar to those of Tabiee *et al*. [50].

Table 4 – Differences between Fluid Control in Hemodialysis Patients Scale, Scale for Dietary Knowledge in Hemodialysis Patients, Scale for Dietary Behaviors in Hemodialysis Patients, and Hemodialysis Comfort Scale Version-II scores in the Intervention Group on pre-test, 15th day and post-test (n=45). Manisa, Turkey, 2018-2019.

Scales	Follow-ups	Intervention Group						F	p
		Mean	±SD	Dual comparisons					
					t	p			
FCHPS	0.month	48.71	±6.20	I 1-2	t=-16.314	0.000***	2>1	169.097	0.000***
	15. day	55.48	±5.32	I 2-3	t=-7.745	0.000***	3>2	ES: 0.794	
	3.month	61.26	±4.79	I 1-3	t=-15.313	0.000***	3>1		
SDKHP	0.month	3.46	±1.84	I 1-2	t=-16.432	0.000***	2>1	111.163	0.000***
	15. day	6.46	±1.81	I 2-3	t=-5.135	0.000***	3>2	ES: 0.716	
	3.month	8.55	±2.37	I 1-3	t=-12.952	0.000***	3>1		
SDBHP	0.month	35.80	±5.34	I 1-2	t=-10.957	0.000***	2>1	142.430	0.000***
	15. day	41.55	±3.57	I 2-3	t=-7.578	0.000***	3>2	ES: 0.764	
	3.month	45.15	±3.61	I 1-3	t=-14.160	0.000***	3>1		
HDCS-II	0.month	86.86	±11.56	I 1-2	t=-11.178	0.000***	2>1	80.124	0.000***
	15. day	91.26	±9.75	I 2-3	t=-7.072	0.000***	3>2	ES: 0.646	
	3.month	98.55	±8.42	I 1-3	t=-9.905	0.000***	3>1		
PR	0.month	17.82	±2.83	I 1-2	t=-2.223	0.031*	2>1	5.016	0.023*
	15. day	18.04	±2.54	I 2-3	t=-1.827	0.074	3>2	ES: 0.102	
	3.month	18.48	±1.79	I 1-3	t=-2.544	0.015*	3>1		
PE	0.month	10.11	±3.45	I 1-2	t=-10.601	0.000***	2>1	75.082	0.000***
	15. day	12.57	±2.69	I 2-3	t=-5.609	0.000***	3>2	ES: 0.631	
	3.month	14.68	±1.91	I 1-3	t=-9.678	0.000***	3>1		
PSY-E	0.month	29.02	±3.93	I 1-2	t=-3.308	0.002**	2>1	18.644	0.000***
	15. day	29.51	±4.05	I 2-3	t=-3.128	0.003**	3>2	ES: 0.298	
	3.month	31.06	±4.05	I 1-3	t=-4.782	0.000***	3>1		
PSY-T	0.month	14.80	±3.03	I 1-2	t=-3.096	0.003**	2>1	17.393	0.000***
	15. day	15.08	±3.02	I 2-3	t=-3.755	0.002**	3>2	ES: 0.283	
	3.month	16.46	±2.37	I 1-3	t=-4.617	0.000***	3>1		
ET	0.month	3.75	±1.53	I 1-2	t=-1.633	0.110	2>1	26.879	0.000***
	15. day	3.88	±1.48	I 2-3	t=-5.094	0.000***	3>2	ES: 0.379	
	3.month	4.95	±1.31	I 1-3	t=-5.591	0.000***	3>1		
SC-E	0.month	11.35	±3.22	I 1-2	t=-16.314	0.000***	2>1	19.344	0.000***
	15. day	12.15	±2.40	I 2-3	t=-7.745	0.000***	3>2	ES: 0.305	
	3.month	12.88	±1.94	I 1-3	t=-4.763	0.000***	3>1		

Note: *p<0.05, **p<0.01, ***p<0.001. ES: Effect Size; ET: Environmental Transcendence; FCHPS: Fluid Control in Hemodialysis Patients Scale; HDCS-II: Hemodialysis Comfort Scale Version-II; I: Interview; PE: Physical Ease; PR: Physical Relief; PSY-E: Psychospiritual Ease; PSY-T: Psychospiritual Transcendence; SC-E: Sociocultural Ease; SDBHP: Scale for Dietary Behaviors in Hemodialysis Patients; SDKHP: Scale for Dietary Knowledge in Hemodialysis Patients.

Patient education is among the nurse's legal responsibilities and main roles. The literature shows that the video-based training approach is at least as strong as other training methods [17,18,21-23]. In our study, in the intervention group given video-based visual training, the mean scores obtained from the FCHPS and Knowledge, Behavior, and Attitude subscales, SDKHP, and SDBHP were found to be higher in the post-test compared to those of the control group. Also, in the intervention group, the mean scores obtained from the FCHPS and Knowledge, Behavior, and Attitude subscales, as well as SDKHP and SDBHP, were significantly higher in the post-test compared to those of the pre-test. According to eta ^{2} values, the visual training program applied had a broad effect on fluid control, dietary knowledge, and behaviors in the intervention group [39]. Accordingly, it is also possible to say that both visual and reinforcement training had a positive effect, improving knowledge, attitudes, and behaviors of patients regarding fluid control within three months. As a result, it can be said that H_3 and H_4 hypotheses were accepted. Our video-based visual training results were found to be in line with the evaluations of Bétrancourta and Bétrancourta [19] and Ronchetti [20].

In the literature, there is no research evaluating the comfort status of patients by giving video-based training. However, there are studies examining the effect of video training on quality of life, compliance with fluid and dietary restrictions, and the level of knowledge. In their study, Feizalahzadeh *et al*. [51] stated that in the video training group, the interdialytic weight decreased significantly compared to the face-to-face training group. Moonaghi *et al*. [18] determined significant improvements in attitude levels in both face-to-face and video-training groups, and they reported that video training was as effective in improving the patient attitude as the face-to-face training method. Maslakpak and Shams [52] stated that in both video training and face-to-face training groups, quality of life increased. Suk *et al* [53] administered video training on diets, medical therapy, and periodic exercise to HD patients. They reported that periodic video training contributed to the level of hemodialysis knowledge, patient role behaviors, and physiological status. Feizalahzadeh *et al*. [51] reported a significant decrease in systolic and diastolic blood pressure, pruritus, and serum urea levels in both the video education and face-to-face training group. They stated that both methods were effective in improving the clinical parameters and quality of life of the patients. Our study's findings on the effect of video-based visual training on fluid control, dietary knowledge, and behaviors were similar to the findings in the literature that evaluates the efficacy of video education in patients receiving hemodialysis therapy.

As private dialysis center managers did not allow any intervention in their institution, the study was conducted only in two institutions where the application permit could be obtained. Therefore, when deciding on the dialysis center, no draw was made. Two dialysis centers that allowed the research were directly included in the study. However, sufficient sample size was still reached. This situation constitutes the limitation of the research.

CONCLUSION

The research findings revealed that the training program had a large effect size on the majority of comfort, fluid control, diet knowledge, and behaviors in the intervention group. In addition, the mean scores in these areas were higher in the intervention group compared to the control group in the third month after the training. In light of this research's findings, it is recommended that healthcare professionals working with dialysis patients use visual training materials at some stage of patient education to make the complex nutritional patterns understandable and improve comfort levels.

ACKNOWLEDGMENTS

As a research team, we would like to express our gratitude to all patients who participated in the study and to all institutions that gave permission for the practice.

CONTRIBUTORS

Cansu KOSAR SAHIN and Sezgi CINAR PAKYUZ designed and conceived the research, the statistical analysis, prepared the tables and figures and prepared the manuscript for the appropriate journal. CKS conducted the permission procedure, carried out data collection, prepared the database, and entered the data; SCP critically reviewed the analysis and results.

REFERENCES

1. Efe D, Kocagoz S. Adherence to diet and fluid restriction of individuals on hemodialysis treatment and affecting factors in Turkey. Japan J Nurs Sci. 2015;12:113-23. https://doi.org/10.1111/jjns.12055
2. Neves Sousa C, Marujo P, Teles P, Nunes Lira M, Novais M. Self-Care on hemodialysis: behaviors with the arteriovenous fistula. Ther Apher Dial. 2017;21(2):195-9. https://doi.org/10.1111/1744-9987.12522
3. Mehrtak M, Habibzadeh S, Farzaneh E, Rjaei-Khiavi A. Effectiveness of teaching cognitive-behavioral techniques on locus of control in hemodialysis patients. Electronic Physician Journal. 2017;9(10): 5631-37. https://doi.org/10.19082/5631
4. Nagpal N, Boutin-Foster C, Melendez J, Kubiszeswki P, Uehara K, Offidani E. Experiences of patients undergoing dialysis who are from ethnic and racial minorities. J Renal Care. 2017;43(1):29-36. https://doi.org/10.1111/jorc.12185
5. Stevenson J, Tong A, Gutman T, Campbell KL, Craig JC, Brown MA *et al*. Experiences and perspectives of dietary management among patients on hemodialysis: an ınterview study. J Renal Nutr. 2018;28(6):411-21. https://doi.org/10.1053/j.jrn.2018.02.005
6. Sarafidis PA, Persu A, Agarwal R, Burnier M, Leeuw P, Ferro C, *et al*. Hypertension in dialysis patients: a consensus document by the European Renal and Cardiovascular Medicine (EURECA-m) working group of the European Renal Association–European Dialysis and Transplant Association (ERA-EDTA) and the Hypertension and the Kidney working group of the European Society of Hypertension (ESH). J Hypertens. 2017;32:620-40. https://doi.org/10.1097/HJH.0000000000001283
7. Kolcaba K. Evolution of the mid range theory of comfort for outcomes research. Nurs Outlook. 2001;49:86-92. https://doi.org/10.1067/mno.2001.110268
8. Pinto S, Fumincelli L, Mazzo A, Caldeira S, Martins JC. Comfort, well-being and quality of life: discussion of the differencesand similarities among the concepts. Porto Biomed J. 2017;2(1):6-12. https://doi.org/10.1016/j.pbj.2016.11.003
9. Tutton E, Seers K. An exploration of the concept of comfort. J Clin Nurs. 2003;12:689-96. Available from: https://doi.org/10.1046/j.1365-2702.2003.00775.x
10. Orak NS. Theory of comfort. In: Ocakcı AF, Alpar SE, (editor). Concept, Theory and model examples in nursing. Instanbul: Istanbul Medical Bookstores; 2013.
11. Bulantekin Duzalan O, Cınar Pakyuz S. Educational interventions for improved diet and fluid management in haemodialysis patients: an interventional study. J Pakistan Med Assoc. 2018[2020 Nov 24];68(4):532-7. Available from: https://pubmed.ncbi.nlm.nih.gov/29808040/
12. Vardar Inkaya B, Cınar Pakyuz S. The effect of case management with haemodialysis patients on the health perception and the symptoms: the case of Turkey. Pakistan Med J. 2018[2020 Nov 24];68(7):1032-38. Available from: https://www.researchgate.net/publication/326413526_The_effect_of_case_management_with_haemodialysis_patients_on_the_health_perception_and_the_symptoms_The_case_of_Turkey
13. Tabiee S, Akram Momeni A, Saadatjoo SA. The effects of comfort-based interventions (back massage and patient and family education) on the level of comfort among hemodialysis patients. Modern Care J. 2017;14(3):1-6. https://doi.org/10.5812/modernc.64687
14. Garagarza CA, Valente AT, Oliveria TS, Caetano CG. Effect of personalized nutritional counseling in maintenance hemodialysis patients. Hemodial Int. 2015;19:412-8. https://doi.org/10.1111/hdi.12260
15. Singh RG, Singh S, Rathore SS, Choudhary TA. Spectrum of ıntradialytic complications during hemodialysis and ıts management: a single-center experience. Saudi J Kidney Dis Transpl. 2015;26(1):168-72. https://doi.org/10.4103/1319-2442.148771
16. Adam M, McMahon SA, Prober C, Bärnighausen T. Human-centered design of video-based health education: an ıterative, collaborative, community-based approach. J Med Internet Res 2019;21(1):1-13. https:// doi.org/10.2196/12128

17. Adib-Hajbaghery M, Zeynab Karimi Z. Comparing the effects of face-to-face and video-based education on ınhaler use: a randomized, two-group pretest/posttest study. Iranian J Nurs Midwif Res. 2018;23(5):352-7. https://doi.org/10.4103/ijnmr.IJNMR_17_18

18. Moonaghi KH, Hasanzadeh F, Shamsoddini S, Emamimoghadam Z, Ebrahimzadeh S. A comparison of face to face and video-based education on attitude related to diet and fluids: Adherence in hemodialysis patients. Iranian Journal of Nursing and Midwifery Research. 2012 [2020 November 23];17(5):360–364. Available from: https://www.researchgate.net/publication/249322314_A_comparison_of_face_to_face_and_videobased_education_on_attitude_related_to_diet_and_fluids_Adherence_in_hemodialysis_patients

19. Bétrancourt M, Benetos K. Why and when does instructional video facilitate learning? A commentary to the special issue "developments and trends in learning with instructional video". Computers in Human Behavior. 2018 [2020 November 23];89:471-475. Available from:https://doi.org/10.1016/j.chb.2018.08.035

20. Ronchetti M. Using Video Lectures to Make Teaching More Interactive. International Journal of Emerging Technologies in Learning. 2010 [cited 2020 November 24];5(2):45-47. Available from: https://online-journals.org/index.php/i-jet/article/view/1156/0

21. Tan ML, Lee KH, Yong WS, Rodgers C. The effects of a video-based education in women with newly diagnosed breast cancer in Singapore. Supportive Care in Cancer. 2018 [2020 November 23];26:3891–3897. Available from: https://doi.org/10.1007/s00520-018-4258-2

22. Denny MC, Vahidy F, Vu KYT, Sharrief AZ, Savitz SI. Video-based educational intervention associated with improved stroke literacy, self-efficacy, and patient satisfaction. PLOS ONE. 2017 [2020 November 23];12(3):1-12. Available from: https://doi.org/10.1371/ journal.pone.0171952

23. Dahodwalaa M, Geransara R, Babiona J, Grooda J, Sargiousab P. The impact of the use of video-based educational interventions on patient outcomes in hospital settings: A scoping review. Patient Education and Counseling. 2018 [2020 November 23];101(12):2116-2124. Available from: https://doi.org/10.1016/j.pec.2018.06.018

24. Sahin Orak N, Cinar Pakyuz S, Kartal A. Scale Development Study: Comfort in Hemodialysis Patients. Turkish Society of Nephrology, Dialysis and Transplantation Nurses, Journal of Nephrology Nursing. 2017 [2020 November 24];12(2):68-77. Available from: https://dergipark.org.tr/en/download/issue-full-file/30695

25. Gunalay S, Taskıran E, Mergen H. Evaluation of non - compliance with dietary and fluid restriction in hemodialysis patients. FNG & Science Medical Journal. 2017 [cited 2020 November 24];3(1):9-14. Available from: https://dergipark.org.tr/tr/pub/ibufntd/issue/28279/311144

26. Albayrak Cosar A, Cinar Pakyuz S. Scale development study: The fluid control in hemodialysis patients. Japan Journal of Nursing Science. 2016; 13: 174-182. Available from: https://doi.org/10.1111/jjns.12083

27. Bulantekin Duzalan O, Cınar Pakyuz S. Scale development: Dİetary knowledge and behavıors assessment ın hemodıalysıs patıents. Acta Medica Mediterranea. 2017 [2020 November 23];33:457-463. Available from: https://www.actamedicamediterranea.com/archive/2017/medica-3/scale-development-dietary-knowledge-and-behaviors-assessment-in-hemodialy-sis-patients/document

28. Kosar Sahin C. Evaluation the Effect of Visual Education Related to Nutrition on Comfort of Patients Receiving Hemodialysis Therapy. [thesis] Manisa Celal Bayar University, Institute of Health Sciences; 2019.

29. Denis Fouque D, Vennegoor M, Wee PT, Wanner C, Ali Basci A, Canaud B, et al. EBPG Guideline on Nutrition. Nephrol Dial Transplant. 2007 [2021 March 30];22(2):45–87. Available from: https://academic.oup.com/ndt/article/22/suppl_2/ii45/1871238

30. Wrighta M, Jones C. Renal Association Clinical Practice Guideline on Nutrition in CKD. Nephron Clin Pract. 2011 [2021 March 30];118(1):153–164. Available from: https://pubmed.ncbi.nlm.nih.gov/21555894/

31. Parra EG. Iguacel CG. Egido J., Ortiz A. Phosphorus and Nutrition in Chronic Kidney Disease. International Journal of Nephrology. 2012 [2021 March 30];1-5. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3369467/

32. Zadeh KK. Patient education for phosphorus management in chronic kidney disease. Patient Preference and Adherence. 2013 [2021 March 30];7:379-390. Available from: https://pubmed.ncbi.nlm.nih.gov/23667310/

33. D'Alessandro C. Piccoli GB. Cupisti A. The "phosphorus pyramid": a visual tool for dietary phosphate management in dialysis and CKD patients. BMC Nephrology. 2015 [2021 March 30];16(9):2-6. Available from: https://bmcnephrol.biomedcentral.com/articles/10.1186/1471-2369-16-9

34. David E, Woolf K, Pompeii ML, Sevick MA. Exploring Problems in Following the Hemodialysis Diet and Their Relation to Energy and Nutrient Intakes: The BalanceWise Study. J Ren Nutr. 2016 [2021 March 30];26(2):118-124. Avail-

able from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4762735/https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4762735/pdf/nihms730626.pdf

35. Pehlivan S. Nutrition in kidney diseases. In: Karadakovan A. Nursing Care in Kidney Diseases. Nobel Academic Publishing. 2016; 339-369.
36. Biruete A, Jeong JH , Barnes JL, Wilund KR. Modified Nutritional Recommendations to Improve Dietary Patterns and Outcomes in Hemodialysis Patients. Journal of Renal Nutrition. 2017 [2021 March 30];27(1):62-70. Available from: https://pubmed.ncbi.nlm.nih.gov/27471172/
37. Ikizler TA, Cuppari L, Burrowes J, Byham-Gray L, Campbell K, Carrero JJ, et al. Clinical Practice Guideline For Nutrition in Chronic Kidney Disease: 2019 UPDATE. 2019 [2021 March 30];10-194. Available from: https://www.kidney.org/sites/default/files/Nutrition_GL%2BSubmission_101719_Public_Review_Copy.pdf
38. Bahar Z. Statistical Methods in Data Analysis. In: Erefe I. Nursing Research Principles Process and Methods. Odak ofset; 2012.
39. Buyukozturk S. Manual of data analysis for social science: Statistics, research design, SPSS applications and interpretation. 11. Press, Pegem Academy: Ankara; 2010.
40. Ebrahami H, Sadeghi M, Amanpoir F, Dadgan A. Influence of nutritional education on hemodialysis patients' knowledge and quality of life. Saudi Journal of Kidney Disease and Transpalntation. 2016 [2020 November 23];27(2):250-255. Available from: https://doi.org/10.4103/1319-2442.178253
41. Lim E, Hyun S, Lee JM, Kim S, Lee MJ, Lee SM ve ark. Effects of education on low-phosphate diet and phosphate binder intake to control serum phosphate among maintenance hemodialysis patients: A randomized controlled trial. Kidney Research and Clinical Practice. 2018 [2020 November 23];37(1):69–76. Available from: https:// doi.org/10.23876/j.krcp.2018.37.1.69
42. Chen CM, Wu CH. Effects of different video lecture types on sustained attention, emotion, cognitive load, and learning performance. Computers & Education. 2015 [2020 November 23];80:108-120. Available from: https://doi.org/10.1016/j.compedu.2014.08.015.
43. Ozdemir S, Akyol A, Iravul E, Temizkan Kırkayak A, Kaban F, Akdeniz F et al. Determining The Factors Affecting Learning Style in Hemodialysis Patients. Journal of Nephrology Nursing. 2016 [2020 November 24];11(2):40-49. Available from: https://dergipark.org.tr/tr/pub/hemsire/issue/34246/378596
44. Yalın I. Instructional Technologies and Material Development. 17. Press, Nobel Publications: Ankara; 2006.
45. Abdul Rahman KA, Abu Samah N, Bekri Rahim M, Nur Md Yunus FA, Abd Baser J, Ismail A. Characteristics of Video Learning Based on Competency Based Education. Innovative Teaching and Learning Journal. 2018 [2020 November 24];2(1):44-50. Available from: http://161.139.21.34/itlj/index.php/itlj/article/view/17
46. Mohmadi K, Shahgholian N, Valiani M, Mardanparvar H. The effect of acupressure on muscle cramps in patients undergoing hemodialysis. Iranian Journal of Nursing and Midwifery Research. 2017 [2020 November 23];21(6):557-561. Available from: https:// doi.org/10.4103/1735-9066.197684
47. Malekshahi F, Aryamanesh F, Fallahi S. The Effects of Massage Therapy on Sleep Quality of Patients with End-Stage Renal Disease Undergoing Hemodialysis. A Journal of Clinical Neuroscience and Psychopathology. 2018 [2020 November 23];20(2):91-95. Available from: https:// doi.org/10.5350/Sleep.Hypn.2017.19.0138
48. Amini E, Goudarzi I, Masoudi R, Ahmadi A, Momeni A. Effect of Progressive Muscle Relaxation and Aerobic Exercise on Anxiety, Sleep Quality, and Fatigue in Patients with Chronic Renal Failure Undergoing Hemodialysis. International Journal of Pharmaceutical and Clinical Research. 2016 [2020 November 24];8(12):1635-1639. Available from: http://eprints.skums.ac.ir/670/
49. Zarutati M, Pishgooje SAH, Farsi Z, Karbaschi K. The Effect of music therapy on comfort level and some vital signs of patients undergoing hemodialysis. Military Caring Sciences Winter. 2017 [2020 November 23];4(10):221-232. Available from: https:// doi.org/10.18869/acadpub.mcs.3.4.221.
50. Tabiee S, Akram Momeni A, Saadatjoo SA. The Effects of comfort-based ınterventions (back massage and patient and family education) on the level of comfort among hemodialysis patients. Modern Care Journal. 2017 [2020 November 23]; 14(3):1-6. Available from: https:// doi.org/10.5812/modernc.64687.
51. Feizalahzadeh H, Tafreshi MZ, Farahani MA, Zareh Z, Farhadmand N. Comparing the Impacts of Computer-Assisted Multimedia Education and Traditional Method on Clinical Parameters of Patients Receiving Hemodialysis. Modern Care Journal. 2015 [2020 November 24];12(2):84-90. Available from: file:///C:/Users/ASUS/Downloads/1030120150205%20(2).pdf

52. Maslakpak MH, Shams S. A Comparison of face to face and video- based self care education on quality of life of hemodialysis patients. International Journal of Community Based Nursing & Midwifery. 2015 [2020 November 24];3(3):234-243. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4495331/

53. Suk YM, Won Park J, Joong Jeon M, Yoon Kim C. Effect of periodic video education on knowledge about hemodialysis, patient role behavior and the physiologic index in patients with hemodialysis. Basic Nursing Science. 2013 [2020 November 23];15(3):122-132. Available from: https:// doi.org/10.7586/jkbns.2013.15.3.122

Received on: November 24, 2020
Final version: April 20, 2021
Approved: June 1, 2021