The Effect of Two Educational Methods on Knowledge and Adherence to Treatment in Hemodialysis Patients: Clinical Trial

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ABSTRACT

Introduction: Patients with chronic renal disease (CRD) deal with many potential problems with hemodialysis for all their life. Regarding the importance of preventing dialysis adverse effects, which are in close connection with lack of knowledge and report on how to train the patients? This study aims at comparing the impact of two methods of face to face training and training pamphlet on complying and informing of hemodialysis treatments.

Methods: This clinical trial study was conducted on 58 hemodialysis patients who visited Shahid Rahnemun Teaching hospital, Yazd, Iran, and had required conditions of the research. Data were collected through a questionnaire including personal-social information, several questions to assess the level of compliance and to inform the treatment method. The quantitative analysis of this study used the Statistical Package for Social Sciences SPSS version 13 and descriptive (frequency, mean, standard deviation) and inferential (Chi-square, paired t-test, ANOVA, ANCOVA) statistics were employed.

Results: The mean scores for informing both groups (face to face and training pamphlet) were significantly increased. The mean score for adherence to treatments was also significant.

Conclusion: In this research, face to face training was found to be more effective than training pamphlet. It seemed to have more strong effect on increasing the level of information and adherence to treatment. To train these people, thus, face to face training should be, thus, preferred.

Introduction

The epidemiology of chronic diseases is one of the major phenomena and the health societies are dealing with on the threshold of twenty first century. Chronic renal disease (CRD) is one of the most prevalent diseases that around two to three percent of the world population has now become entangled in.[1] Chronic renal disease starts gradually and chronically and finally a problem appears in kidneys' performance. One of the alternative treatments is then required in such a situation.[2]

The prevalence of chronic renal disease was increased by 8 percent in 2004 to 2009. In USA, there are more than 280,000 patients (65%) with chronic renal disease under dialysis treatment, more than 120,000 (28%) have transplanted kidney, and more than 24,000 (7%) are under peritoneal dialysis treatment.[3]

Hemodialysis is the most common alternative treatment for dialysis patients in Iran.[4] More than 15,000 dialysis patients are under treatment three times a week. Scientific statistics released by the ministry of health

show that there is an annual growth rate of 20 percent for the prevalence of the diseases.[5]

Although blood dialysis can prolong the patients' life, no change is made in the natural process of renal diseases and it does not totally replace kidney functions. So, patients are exposed to some problems and adverse effects.[3]

As hemodialysis treatment is a long-term process, patients need to use a set of guidelines to manage and deal with their illness.[6]

At the final stage of renal diseases, foods and liquids intake should be consistently adjusted. A group of medicines should be daily consumed and the lifestyle should be changed. However, many patients are not obedient to their prescribed food or the time of dialysis.[7]

The threat of death is predicted high in first months. Although cardiovascular factors and Infectious diseases are the main reasons of deaths, 20 percent relates to arbitrarily ignoring dialysis treatment.[8]

In the advanced levels, medical prescriptions should be followed to reach positive results. Medical care of these patients is a very complicated job. Patients have to deal with their life changes and tolerate health interventions. Adherence to medical directions is the secret of survival for the patients.[9]

Non-adherence to treatments is a common issue among dialysis patients[10] and can affect many care aspects, including prescriptions of medication, drugs, food and liquid limitations. About 50 percent of hemodialysis patients are estimated not to follow at least a part of their dialysis diet.[11]

Lack of information about the reason of non-obedient behaviors has been referred to many research studies.[12] Studies have shown that many people with advanced renal diseases do not have sufficient knowledge for managing their food and medical diet.[13] Patients with chronic diseases do not consume a half of their prescribed drugs.[14] As it has been reported, many patients eliminate their drug dosage and stop their medication without consultation with physicians or improperly change the drug dosages.[15] These decisions are made because of not having the required knowledge or any other factors.[9]

According to Orem, as patients are not able to take care of themselves, nurses can help them look after themselves by encouraging and training them. This would have a positive effect on the hemodialysis patients' quality of life and highlight the importance of nursing.[16] By suitable training strategies, nurses can make positive changes in the quality of life.[17] They are in a good situation to coordinate training renal patients. Patient-based training, which results in the improvement of patients and the quality of their life, is one of the primary components of nursing and patients' right. It is one of the main components of nurses' professional responsibilities.[8] Nurses are directly committed to take care of patients who are under dialysis treatment. They should inform patients and their families the pertinent information and support them in taking after themselves.[18] Patients, who are well-informed of their illness, can more effectively participate in the treatment process.[19]

Other training achievements refer to the elevated satisfaction and independence, prolonged life, and improved health.[20] The research studies carried out on this field have revealed the positive effect of teaching self-care and increasing the knowledge of the disease to prevent secondary adverse effects.[21] Giving information to patients about their chronic diseases, such as diabetes mellitus, dyslipidemia, and congestive heart failure, is followed by improvement.[22-25]

Limited studies have worked on the association between dialysis patients' knowledge and the adherence to the medical prescriptions and food diets.[26] Given to time and place conditions, we can use various methods of training. Training is, in fact, a tool for changing the learners' behavior through active participation.[27]

Although the importance and impediments of training patients with chronic renal disease have been widely studied, research studies on the methods of teaching these patients are limited. As there is a significant difference between the effect of different training methods and the results obtained in different cultures and regarding the importance of preventing dialysis adverse effects and their relation to the lack of knowledge among patients and the lack of related reports on the suitable method of training. This research examines the effect of two methods of training (face to face and training pamphlet) on being informed of an obedient in the hemodialysis treatment.

Materials and methods

This is a clinical trial research study and the statistical population includes all patients with chronic renal failure under hemodialysis treatment in Shahid Rahnemun Teaching Hospital, Yazd, in 2012.

Participation criteria in this study consisted of age (over 18), literacy, the experience of at least one year hemodialysis, having at least two hemodialysis sessions in a week and being in the patients' list of the hospital.

Patients with psychological problems or advanced chronic diseases (advanced heart failure, etc.) were eliminated from the research based on their illness case, physical limitation in self-care, official training by other resources during the research or lack of interest to participate in the study in any stage of training.

Due to the lack of access to a research study to derive mean and standard deviation, we carried out a pilot study over 15 (five individuals of each group). Using mean and standard deviation of variables for groups and possible 10% loss of sample, the required sample size for the Alpha 0.05 and test power of 80%, 20 patients were calculated in each group.

Regarding the defined criteria, 70 out of 160 patients could participate in the present

study. After interview with all qualified patients, 60 of them were selected and divided into three groups: face to face training, training pamphlet and control.

Groups were randomly selected according to interventions and controlling process by random number table and the internet (Figure 1).

Data were collected through a three item questionnaire; first section including questions about personal-social information (age, sex, marital status, education, job, hemodialysis years and background diseases); second section including Chronic Hemodialysis Knowledge Survey (CHeKS) (consisted of 23 multiple choice questions with one correct answer). This tool was developed by Cavanaugh in 2009 with score range of 0 to 23.[28] Being translated and localized; it was used to assess hemodialysis patients' knowledge of their illness. In case of scoring, one credit is considered for any correct answer and zero for any wrong answer. The third section was developed by Hays in 1994 to assess the patients' adherence to treatment by Medical Outcome Study (MOS) and included five questions about adherence to general treatment.[14] The score range of Likert, 6 item scale (never, very low, low, very, very much, always) was from 1 to 6. The score range of five questions was from 5 to 30 and higher score meant higher adherence to treatment.

Face and content validity was used to achieve scientific credit. This means that the instrument was presented to 10 faculty members of Nursing and Midwifery Department at Tabriz University. The final questionnaire was developed after collecting comments and making the required corrections.

The reliability of the research assessment tool for adherence to the treatment was calculated by Cronbach's alpha at 0.80. The reliability of knowledge assessment tool was evaluated by Kuder- Richardson coefficient at 0.79. It was estimated by Cronbach's alpha at 0.76.

The researcher visited Shahid Rahnemun Teaching hospital and started sampling from hemodialysis patients with the agreement of the management. Samples were randomly divided into three groups of face to face training, training pamphlet and control group. A study code was given to any individual to keep the privacy of information.

The researcher visited hemodialysis center three times a day (morning, afternoon, night) to complete the questionnaires. Patients had 20 minutes to fill in questionnaires. Patients' knowledge of the disease and adherence to treatment were first assessed by questionnaires. A training intervention, including kidneys' function, hemodialysis, laboratory values (potassium, phosphor, hematocrit, hemoglobin, and creatinine), how to consume drugs (phosphate binders and Eprex), liquid limitations, and food diet, was introduced by researchers through the face to face method in two 20 minutes sessions after initiation of hemodialysis. The second group received training pamphlet including above matters and the third group received common training of assessing knowledge and adherence to treatment. To prevent information exchange among groups, training was presented in different shifts (morning, afternoon and night). To obey the research ethic rules, training pamphlet was given to all patients in control group after finishing the study.

Data were analyzed in the statistical package for social sciences SPSS version 13 and through descriptive (frequency, mean, and standard deviation) and inferential (Chi-square, paired t-test, ANOVA, ANCOVA) statistics. The balanced mean was estimated by covariance analysis.

Results

Two patients, due to transplant and changing the center, were eliminated from 60 patients. Data was collected and analyzed through remaining 58 patients. 19 patients in control group, 19 patients in training pamphlet group and 20 patients in face to face group. Findings on patients' social-personal traits showed that the age mean for control, training pamphlet and face to face training group were 61, 47 and 50 respectively. As to patients were randomly divided into groups, the age difference between groups was significant (Table 1). For this reason, the effect of this variable was regulated by statistical tests. The maximum number of subjects in control (52%), training pamphlet (63%) and face to face training (75%) groups are men. The number of women (21) and men (37) in all three groups were the same. In terms of economic condition, 42 had lower income than revenue and 16 had equal income and revenue. 68 percent of control group, 73.7 percent of training pamphlet and 75 percent of face to face training group had less income than revenue. Regarding education, 33 had elementary education and 25 had higher elementary education. These people had equally been distributed among three groups (Table 2). In connection with dialysis experience, three groups had 2.5 years, 3.39 years and 4.42 years respectively. The pretest scores of knowledge for all groups were statistically significant. The mean scores for the control group was 6.89, for training pamphlet group was 10.10 and for face to face group was 9.20. The effect of this variable was regulated by statistical tests. As the total score of the questionnaire was 23, patients had low scores before interventions.

This indicated the patients' training needs. Pretest mean scores of adherence to treatment for control, training pamphlet and face to face training were 17, 18.1, and 16.35 respectively. As the total score of the adherence was 30, it can be concluded that patients had average scores.

According to Chi-square test, patients were significantly different from each other in terms of social-personal traits and in qualitative variables (sex, education, and economic condition). Tukey's statistical test showed a significant correlation on age variables and pretest knowledge score. As
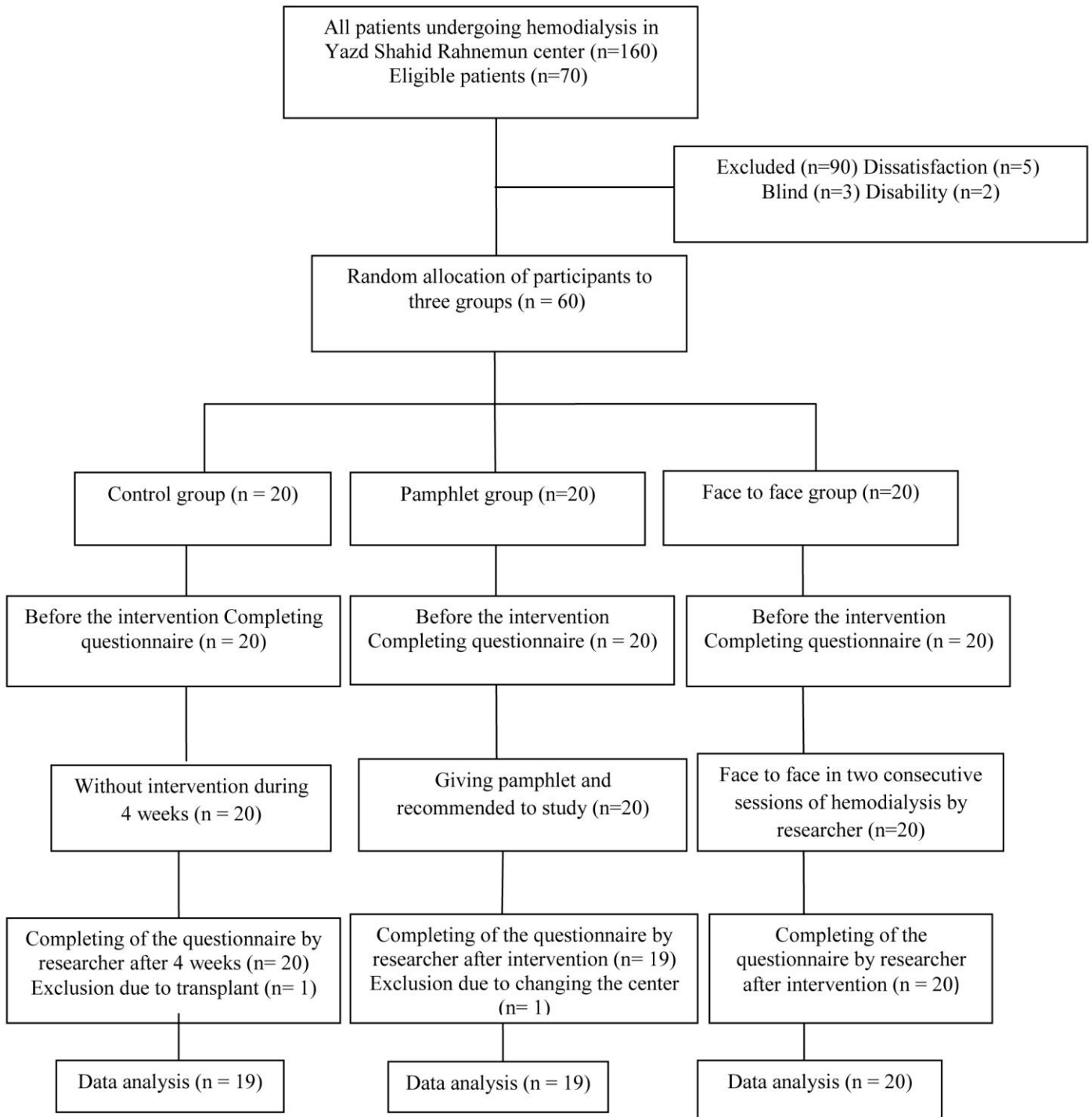
Figure1. Clinical trial flowchart

Table 1. Demographic data of quantitative variables participants

Variables	Control group Mean (SD) (n=19)	Pamphlet group Mean (SD) (n=19)	Face to face group Mean (SD) (n=20)	Statistical indicators
Age	61.37 (13.37)[a]	47.16 (13.96)[b]	50.50 (11.43)[b]	P = 0.04[c]
Years of dialysis	2.50 (1.52)[a]	3.39 (2.60)[a]	4.42 (4.51)[a]	P = 0.17[c]
Pre-test Knowledge	6.89 (3.63)[a]	10.10 (3.41)[b]	9.20 (3.83)[b]	P = 0.025[c]
Pre-test Adherence	17.00 (4.42)[a]	18.10 (5.26)[a]	16.35 (4.90)[a]	P = 0.53[c]

SD: Standard Deviation, [a, b] Non-similar small letters show the significant statistical difference which has been obtained by Tukey's test, [c]ANOVA.

Table 2. Demographic data of qualitative variables participants

Variables	Control group N (%) (n=19)	Pamphlet group N (%) (n=19)	Face to face group N (%) (n=20)	Statistical indicators
Sex				P = 0.34[a]
Male	10 (52.6)	12 (63.2)	15 (75)	
Female	9 (47.4)	7 (36.8)	5 (25)	
Education				P = 0.45[a]
Literacy	13 (68.4)	10 (52.6)	10 (50)	
More than literacy	6 (31.6)	9 (47.4)	10 (50)	
Economic status				P = 0.89[a]
Equal income and expense	13 (68.4)	14 (73.7)	15 (75)	
Income more than expense	6 (31.6)	5 (26.3)	5 (25)	
Income less than expense	0 (0)	0 (0)	0 (0)	

[a] Chi-square test

indicated in table 2, dialysis experience and adherence to treatment are not statistically different.

In knowledge mean scores of paired t-test, no significant difference was observed between knowledge score before and after intervention. This indicates patients' knowledge of their treatment in all groups after medical interventions. Patients' knowledge in control group increased by less than one unit, in training pamphlet by 6 units and in face to face group by 11 units (Figure 2). Adherence mean scores of paired t-test revealed that the adherence to treatment had not changed in control group after intervention. However, a rise was observed in two other groups. The increase was even more in the face to face training group (Table 3).

Covariance analysis was employed to estimate the regulated mean. As it was shown in demographic variables, some variables such age and knowledge score before intervention were different between groups. The results showed that after training, the knowledge scores were higher for training pamphlet groups and control groups. The scores were even higher for training pamphlet group. There is no significant change in the score of adherence in control group. However, it increased in two other methods and it was higher in face to face training group (Table 4).

Discussion

This study showed that the knowledge scores of control group before and after intervention were 6.89 and 7.78 and the difference was statistically significant. These scores for training pamphlet before and after intervention were 10.1 and 16.57. These scores were observed for face to face training group at 9.20 and 19.45. The differences were statistically significant. The adherence scores of control group before and after intervention
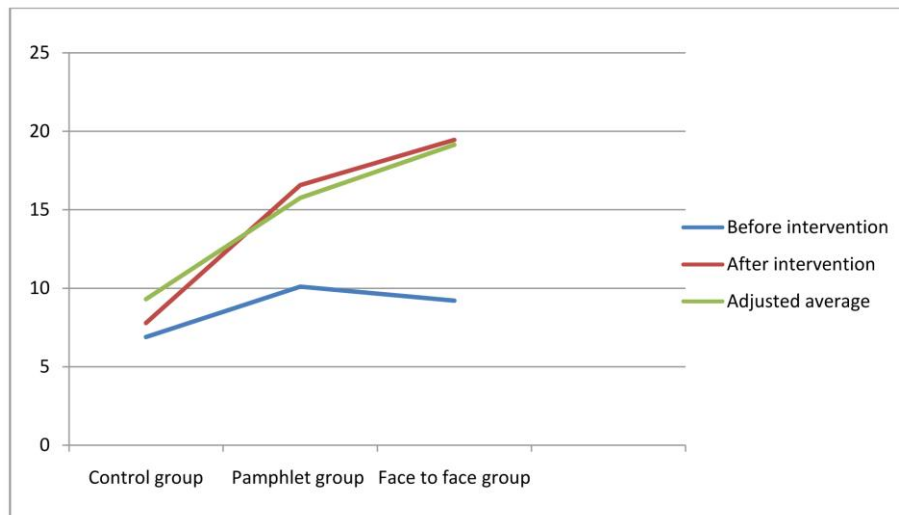
Figure 2. Comparing mean scores for groups' knowledge

Table 3. Comparing mean scores for knowledge and adherence to treatment according to research groups before and after interventions

Variables	Control group Mean (SD) (n=19))	Pamphlet group Mean (SD) (n=19)	Face to face group Mean (SD) (n=20)	Statistical indicators
knowledge				$P < 0.001^c$
Before intervention	6.89(3.63)	10.10(3.41)	9.20(3.83)	CI:95%
After intervention	7.78(3.20)	16.57(3.20)	19.45(1.66)	
Adherence				$P = 0.70^{c*}$
Before intervention	17.00(4.42)	18.10(5.26)	16.35(4.90)	$P < 0.001^c$
After intervention	17.10(4.21)	20.26(4.42)	20.55(3.73)	CI:95%

SD: Standard Deviation, ^{c}Paired t-test, *Control group

Table 4. Comparing raw and regulated scores for knowledge and adherence to treatment by means of ANCOVA test after intervention for the research groups

Groups	Raw average before intervention		Raw average after intervention		Adjusted average		Statistical indicators
	knowledge Mean (SD)	Adherence Mean (SD)	knowledge Mean (SD)	Adherence Mean (SD)	knowledge Mean (SD)	Adherence Mean (SD)	
Control (n=19)	6.89 (3.63)	17.00 (4.42)	7.78 (3.20)	17.10 (4.21)	9.30 (1.03)	16.60 (1.35)	CI:95% $P < 0.001^c$
Pamphlet (n=19)	10.10 (3.41)	18.10 (5.26)	16.57 (3.20)	20.26 (4.42)	15.76 (0.88)	20.00 (1.24)	
Face to face (n=20)	9.20 (3.83)	16.35 (4.90)	19.45 (1.66)	20.55 (3.73)	19.15 (0.84)	21.13 (1.10)	

SD: Standard Deviation, CI: Confidence Interval, ^{c}ANCOVA,* in this research, age variables and the base score of knowledge were regulated

were 17 and 17.1 and the difference was not statistically significant. These scores for training pamphlet before and after intervention were 18.1 and 20.26. These scores were observed for face to face training group at 16.35 and 20.55. The differences were statistically significant.

In Routine's method, knowledge and adherence to treatment trivially increased. This could be due to the effect of intermediary variables such as media training or other resources. Therefore, as these diseases are chronic and regarding the problems of patients and non-efficiency of

dialysis in totally solving problems and the necessity of continuous nursing, training can help patients actively participate in their self-care.

In a research study in Southern Louisiana titled "Hemodialysis knowledge and medical adherence in african americans diagnosed with end stage renal disease: results of an educational intervention", Wells JR reported a significant rise in patients' knowledge of treatment after intervention.

This agrees with our research results. However, no significant rise was observed in adherence to treatment. This can be attributed to the few number of dialysis sessions (one training session).[9] Toney Barnett et al., in Malaysia in their research titled "Fluid compliance among patients having hemodialysis: can an educational programme make a difference?" disclosed that there was a 0.43 kg reduction in overweight after intervention. There was an insignificant difference after and before intervention in average blood pressure. The level of adherence to liquid limitation increased from 47 percent before intervention to 71.5 percent in the stage of follow-up. Although results disclosed an obvious reduction in overweight, lack of a control group leaves this question that if changes result from interventions or other factors. Results agreed with our research findings on elevated knowledge and adherence to liquid limitation.[12]

In a research titled "The effect of self-care educational program on decreasing the problems and improving the quality of life of dialysis patients", Baraz et al., determined the educational effect of video movies on the quality of life and the reduction of physical problems among hemodialysis patients in Tehran. Findings indicated the significant reduction of urea, uric acid, phosphor, blood pressure, overweight during sessions, skin irritation, superficial problems in vascular access and elevated calcium and improved life style. No significant change was observed in sodium, potassium, creatinine, and albumin.[29]

Research results were indicator of the positive effect of training program on the reduction of patients' problems and improved lifestyle, which agreed with our research results.

Narimani conducted a research study titled "A study of the effect of self-care training on the hemodialysis patients' quality of life". He studied the effect of self-care training on the quality of life among hemodialysis patients in Maraghe, Iran. Results indicated that training had effect on the quality of life except on pain. The mean scores for the level of knowledge before intervention were 6.53 and after that were 11.59. This shows the positive effect of training on the level of information about self-care.[30] The low score of knowledge before any intervention demonstrates patients' educational needs. Increased knowledge after interventions agreed with our research results.

In Sandlin et al., research titled "The impact of nurse-led education on hemodialysis patients' phosphate binder medication adherence"; results showed a significant rise in scores among patients correctly consumed phosphate binders. This rise reached after intervention to 72% from 44% before intervention. This proved the elevated knowledge and agreed with our study results.[31]

To describe hemodialysis patients' knowledge, patients with low knowledge and the relation between being informed and using vascular access method for hemodialysis patients, Cavanaugh et al., explained that hemodialysis patients had low and average level of information about dialysis and this confirmed our research results. At the beginning, only 26 percent used graft or fistula. After 3 to 6 months, using graft and fistula increased to 41 and 58 percent respectively. It was found out that patients who were more informed of dialysis had more effective interaction with the

health system. No training study was conducted. However, results revealed that well-informed patients interacted better with the health system and this agreed with our findings.[28]

The main limitation of this study refer to doing the research in one single hospital. Thus, results cannot be generated to all centers. Among the strengths is training by nurses who are present every day. This can be done in any dialysis center. Since there is a control group, it is easily understood that results come from interventions and/or other variables.

Conclusion

The results obtained in this study demonstrated that both face to face training and training pamphlet increase patients' knowledge and adherence to treatment and the effect of face to face training method was even stronger. Using training methods for these patients, is very important and results in elevated information and adherence to treatments. Training modifies incorrect habits and replaces correct health customs.

This is an important factor in preserving and improving the patients' health. Adhering to medical prescriptions reduces mortality rate, inabilities and hemodialysis adverse effect and positively affects their quality of life and life expectancy.

Accordingly, to survive these patients, we move toward using training methods, which require planning and having a particular look at issues such as providing consulting services, and educational planning in connection with physical, sentimental, social and life needs. Achieving these goals requires wide cooperation of all supervision and supports systems involving in health system. So we can improve the quality of patients' life only by a comprehensive and précised planning.

Ethical issues

None to be declared.

Conflict of interest

The authors declare no conflict of interest in this study.

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