

Effects of Appropriate Nutrition Training in Small Groups on Laboratory Parameters in Hemodialysis Patients from Iran

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ABSTRACT

Introduction: Adherence to appropriate nutrition and fluid intake is one of the essential parts of chronic renal failure treatment for achieving the desirable results among the patients with hemodialysis. Among various training methods, the “small groups’ method”, as an advanced method, can be performed by nurses in achieving desirable therapeutic results. The present study was aimed to investigate the effect of appropriate nutrition training in small groups on laboratory parameters in hemodialysis patients.

Material & methods: In this clinical trial, 64 patients who met the inclusion criteria were randomly selected and divided into an intervention group and a control group. Subsequently, an appropriate nutritional training program, including lectures along with appropriate nutrition pamphlets in three one hour question and answer sessions were performed. Thirty two patients in each group were assigned to intervention groups of five. Then, the laboratory indicators for each patient were measured in each group one month after training. Thereafter, data analysis was performed using descriptive and analytical statistics (statistical tests including independent t-test, paired t-test, repeated measures, and ANOVA) in SPSS V.16 software.

Results: The mean age of the patients was 50.1 ± 13.1 years; 47.5% of them had undergone dialysis due to hypertension and 55.7% had a history of 1-5 years of hemodialysis. There was a significant difference in post-intervention levels of urea, creatinine, sodium, potassium, calcium, and phosphorus between the two groups.

Conclusion: Appropriate nutrition training via small-group method for patients on hemodialysis can impose positive effects on laboratory parameters.

Keywords: nutrition training, small groups, laboratory parameters, hemodialysis.

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INTRODUCTION

Chronic renal failure is the progressive and irreversible loss of renal function, which often leads to end-stage renal disease (1). This complication includes five stages based on the level of glomerular filtration rate. Patients in the latest stage would require dialysis (2).

Prevalence of end-stage renal failure disease has an upward trend in the world, so that its annual incidence rate over the past decade has reached 100-336 new cases *per million* people (3, 4). The incidence of this disease in Iran is 680 cases *per million*, which is above the global average rate. According to the most recent statistics, the number of patients on hemodialysis in Iran is about 26000, and in Zanjan about 300 cases *per million* (4-6).

Success in hemodialysis depends on four factors: fluid restriction, compliance to proper nutritional diets, drug prescription, and participation in hemodialysis training sessions. The prescribed therapeutic diet is a definitive factor for achieving desirable treatment results, reduced dialysis complications and better outcomes for decreasing the prevalence and mortality among patients on hemodialysis (7). A nutritional diet is considered to be an important treatment option due to its cost-effectiveness compared to other therapeutic interventions (8).

In addition to patient history and physical examinations, laboratory data are extremely useful for the diagnosis, management, and assessment of renal functioning (8). Patients should have better knowledge on the causes of limited potassium intake and increased calcium intake, since increased potassium and decreased calcium can lead to lethal heart rate abnormalities (9, 10). Also, lack of adherence to nutritional and pharmaceutical diets can result in a chronic increase in the phosphate level, which plays an important role in the development of secondary hyperparathyroidism, renal osteodystrophy, cardiovascular diseases and increased risk of death (1, 7).

Since the two effective strategies for recovery from the diseases are healthy behavior and patient's participation in the treatment process through training and continuous follow-up, nurses' training role is noteworthy. The importance of two types of nursing faults, "imbalanced nutri-

tional care" and "shortage of knowledge" have been rigorously implicated by numerous studies such as Nanda *et al's*, and other authors' reports regarding the care offered to renal patients (11-13). On the other hand, nurses who take care of patients with chronic renal failure have serious responsibilities, given the complexities of care (14). The considerable number of patients, the complex nature of their therapeutic diets and the huge amount of information required by such persons makes it difficult to provide effective training services for these patients (15, 16). Moreover, information on self-care and diets offered by health staff to patients with chronic renal disease is very general, as there are so many patients referred to medical centers. In addition, there is no support system for taking care of these patients, while chronic renal patients require support in order to change their behaviors (17).

The small-group training method enables patients to modify their behaviors and to increase their capabilities, knowledge, and awareness (18). Undoubtedly, learning through participation in a small group is a much more active process than lecturing. Active learning ensures a deeper understanding and is more stable over time (19-21). Also, in order to achieve practical goals, change the attitudes, motivate continuous learning and achieve positive features such as active participation, face-to-face contact, and purposeful activities, the small group method was used in this intervention (22, 23). □

MATERIALS AND METHODS

In this clinical trial, sixty-four patients referred to the hemodialysis department of Vali-e-a Medical and Educational Center affiliated to Zanjan University of Medical Sciences were randomly selected and then assigned to control and intervention groups.

Before starting the training program, data related to the first section including demographic variables (age, sex, marital status, training, etc.), nutrition training requirements, and to the second section including clinical information of all patients were collected using interviews through appropriate questionnaires conducted by the researcher. In our study, the levels of laboratory indicators were extracted from each patient's records by the researcher one month before training. Afterwards, a proper nutrition training

including three one hour sessions of lecturing in four weeks on even days was performed for the small groups (five-member groups) in accordance with patients' educational background using a proper nutritional diet booklet under the supervision of a nephrologist and a nutritionist. The control group received routine care. Subsequently to training, the laboratory indicators were re-extracted from the patients' records one month after training.

The effect of training was measured by determining and comparing the statistical differences between one-month average of each of the above variables before and after training within both intervention and control groups. Finally, the collected data were analyzed by a SPSS v.16 software. □

RESULTS

Results showed that the mean age of the patients was 50.1 ± 13.1 years, males and females accounting for 50.8% and 49.2% of the study population, respectively. In terms of educational level, 82% were illiterate or undereducated; 75.4% were married; 47.5% of all subjects had undergone dialysis due to hypertension and

55.7% had a history of 1-5 years of hemodialysis. Also, 93.4% of patients were referred to the hemodialysis department three times a week.

Based on the level of education there was no significant difference between the two groups, which had equally matched subjects. Also based on the aforementioned demographic and baseline properties, there were no significant differences between them. In both groups, most patients were covered by insurance, with no significant difference between groups, and were cared for by their spouse and children at home.

During the intervention period, for each patient in each group, four measurements for each laboratory parameter were done at four different times. Results based on BUN, Cr, Na, K, Ca and phosphorous according to ANOVA test showed a significant difference between groups. Also, the average level of laboratory indicators one month before and one month after the training period was compared among hemodialysis patients in the control and intervention groups with the paired test. Results for each group were summarised in Table 1.

Table 2 shows a comparison between the mean difference of laboratory indicators one

Group		Control		Intervention	
		Preintervention	Postintervention	Preintervention	Postintervention
Laboratory values		IMean±SD n=31		IMean±SD n=30	
Pair 1	Urea (mg/dL)	57.9±17.9 P=.134	54.6±8.6	54.9±13.7 P=.000	43.06±6.7
Pair 2	Creat (mg/dL)	8.2±2.7 P= .918	8.1±2.3	8.7±2.6 P=.000	7.9±2.1
Pair 3	Na (mg/dL)	141.06±2.8 P= .067	139.9±3.1	141.2±2.5 P=.000	137.5±2.4
Pair 4	K (mEq/dL)	5.2±.837 P= .015	5.6±.850	5.5±.610 P= .097	5.3±.515
Pair 5	Ca (mg/dL)	9.3±1.1 P= .191	8.9±1.3	9.7±1.1 P=.012	9.03±.494
Pair 6	Ph (mg/dL)	5.4±1.6	6.1±1.6	5.3±1.4 P=.462	5.2±1.06

TABLE 1. Average level of laboratory indicators one month before and after the training among patients undergoing treatment with hemodialysis in control and intervention groups

month before and one month after training in both control and intervention groups among patients undergoing treatment with hemodialysis. Results of the present study showed a significant difference between the two groups in urea, creatinine, sodium, potassium, calcium and phosphorus levels. □

DISCUSSION

The findings of our study showed that the appropriate nutrition training in small groups could lead to improvement in laboratory parameters in hemodialysis patients. Morante *et al.* (2014) believed that nutrition training would result in the promotion of nutritional knowledge, leading to improvement in laboratory parameters such as albumin, triglycerides, ferritin, iron, cholesterol, creatinine, and urea two months after the study (24). On the other hand, Garagaza *et al.* (2015) stated that nutritional counseling improved laboratory indexes such as calcium, phosphorus, albumin, and potassium a month after their study (25), which is in accordance with the results obtained in the current study.

Findings of the present study demonstrated that urea, creatinine, sodium and serum calcium levels exhibited a statistically significant difference after training. Results on the average potassium level after training indicated that, although this level was close to the maximum normal level (5 mEq/dL), it was not statistically significant. Oshvandi *et al.* (2010) and Molzahn (2016) reported that the primary nursing interventions did not affect serum potassium level among hemodialysis patients (26, 27), which was consistent with our results. Since most foods contain potassium and patients have to follow a potassium-restricted diet, the situation would gradually become difficult.

Regarding the phosphorus ion, our results indicated a reduction in the phosphorus level after training, but it was not statistically significant. According to Kalantar-Zadeh's study (2013), doing the primary training using food labels with bright colors and performing motivational interview techniques helped subjects to memorize the phosphorus content of foods (28).

A study conducted by Cupisti *et al.* (2012) showed that nutritional knowledge of patients on hemodialysis about reducing protein, sodium, potassium and phosphorus consumption should

Group	Control	Intervention	P value
Laboratory parameters	Mean±SD n=31	Mean±SD n=30	0.591
Diff Urea (mg/dL)	3.3±12.1	11.8±12.2	.008
Diff Creat (mg/dl)	.026±1.4	.802±1.08	.020
Diff Na (mg/dL)	1.1±3.3	3.6±2.9	.004
Diff K (mEq/dL)	-.438±.945	.213±.680	.003
Diff Ca (mg/dL)	-.340±1.4	.685±1.3	.006
Diff Ph (mg/dL)	-.714±1.5	.141±1.03	.015

* Independent sample t-test

TABLE 2. Comparing the mean difference of the laboratory indicators one month before and after the training in both control and intervention groups among patients undergoing treatment with hemodialysis

be higher than that of normal people (29). According to the study of Karavetian *et al.* (2014), the strategies for identifying the effective changes in nutritional behaviors should include individual consultations by nutritionists prior to dialysis sessions as well as continuous and periodical training interventions (30). The findings from the above mentioned studies have confirmed the results of the current study. □

CONCLUSION

In conclusion, the results of the present study indicated favorable effects of proper nutrition training in small groups on most of the laboratory indicators among the study population. However, continuation of the diet by patients require more follow-ups and interventions such as modifying and adjusting individual lifestyle, encouraging motivational techniques and surveillance through continuous and long-term use of small group training, since such measures can exhibit more significant and prominent effects on laboratory indicators. Further research is needed to enlighten the relationship between Appropriate Nutrition Training in Small Groups on laboratory parameters in hemodialysis patients. □

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