

## Effectiveness of patient education based on Professional Collaboration of Care Centered Model (PCCC) on self-care in patients on Hemodialysis

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### Abstract

**Introduction:** Dialysis patients experience difficulties such as physical performance deterioration and challenging with self-care. The purpose of this study was to evaluate effectiveness of patient education based on Professional Collaboration of Care Centered Model (PCCC) on self-care.

**Materials & Methods:** A quasi-experimental study was carried out to determine the effects of the Professional collaboration Care Centered Model on self-care in patients on hemodialysis. This was carried out on the dialysis outpatients who referred to dialysis center of Golestan Hospital in Ahvaz in 2013. Based on a 3-month average serum phosphorus >6.0 mg/dL in long-term, 30 patients were randomly selected to complete the study (after education being named in the experimental group and before that in the control group). All patients were given a before-and-after knowledge test. They had monthly blood samples drawn to evaluate their performance on self-care.

**Results:** At baseline, there were no significant differences noted in any of the laboratory values, but the knowledge level of the experimental group was greater ( $p < 0.05$ ) After 6 months, knowledge gain was significantly higher in the intervention group, and the serum phosphorus and calcium/phosphorus product levels were significantly lower ( $p < 0.01$ ) than in the control group.

**Conclusion:** Based on this research, patients who underwent PCCC model showed positive changes, which may be beneficial in reducing complications of Hemodialysis.

**Keywords :** Hemodialysis, Self-care, Professional Collaboration Care Centered Model, Dialysis patient, Patient education.

### Introduction

Chronic disease will continue to be an issue requiring significant medical interventions by healthcare providers, placing added stress on an already compromised healthcare system, and thus, affecting care costs and resources (1). It is imperative to include patients in their care and encourage them to take some responsibility for their self-care to help control chronic disease and the healthcare costs associated with it. Studies indicate that patients involved in self-management of

disease processes often have better outcomes (2-4). Chronic kidney disease is a major public health problem across the world. Due to the progressive increase in both the incidence and prevalence of Patients with end stage renal disease (ESRD), and the high mortality rate and rising costs of providing care(5) patients with ESRD undergo a complex treatment regime that involves not only dialysis but also a wide range of multiple and radical lifestyle changes that affect the individual's social and

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psychological functioning and present a challenge for the hospital team. As treatment is a long-term process, patients have to use strategies to manage their illness(6). Hemodialysis is the most common method of kidney replacement treatment in Iran. The number of permanent dialysis patients is increasing every year(7). More than 15000 dialysis patients are dialyzed 3 times a week and according to the statistics in December 2008, 16600 hemodialysis patients are dialyzed in 355 chronic hemodialysis units. In spite of this, many people are not informed of their acute renal disease. Scientific statistics of the Health Ministry show a 20% annual growth of such patients in the country and 100 patients being added to this monthly. Therefore, with serious concerns over this growth, a remedy to prevent and decrease the number of the patients should be sought immediately(8).

The objectives for patients on hemodialysis include providing sufficient dialysis, ensuring adequate nutrition, maintaining vascular access, correcting hormonal deficiencies, minimizing hospitalization, and prolonging lifespan while enhancing its quality. For this group, there has been an increasing interest in assessing self-care factors in patients treated for ESRD over the past three decades (3-9). According to Orem's theory, individuals whose needs for self-care outweigh their ability to engage in self-care are said to be in a self-care deficit(10). People in or at risk of self-care deficit are those in need of nursing intervention strategies to assist them in becoming self-sufficient in managing their disease processes. Such patients include those who require nursing care and incapable of self-care, individuals who may require partial

nursing care as recovering from an illness or injury, and those who are self-care (2-10). Patient must acquire abilities of self-care but one of the most important concerns should be acquiring skills and attitude toward the special care, but still many are not educated and trained enough for this (11). There is a large body of literature indicating that higher RN staffing, and hence lower patient to RN ratios, are associated with superior patient outcomes and fewer adverse patient events (12). The aim of this study was to examine the effectiveness of a patient education programs based on Professional Collaboration of Care Centered Model (PCCC) on self-care of dialysis patients.

### Materials & Methods

This quasi-experimental study was conducted as a pilot study. One-group design with measurements taken beforehand after an educational intervention. The study was carried out in the dialysis unit of a major teaching hospital in Golestan affiliated to Ahvaz Jundishapur medical surgical university. The unit consisted of 15 hemodialysis (HD) active stations in an open area. On average, there were 30–40 HD patients dialyzed each day. [Working in a three-shift system: morning, afternoon and night).

At the time of study there were enrolled 67 patients receiving HD treatment at the center containing outpatient and Hospitalized patients registered in the long-term, maintenance HD programmed. Based on a 3-month average serum phosphorus >6.0 mg/dL, 30 patients who continually referred (patients and their families) were randomly selected and completed the study (after

education being named in the experimental group and before that in the control group) The intervention was a collaboration educational program which included educational films, brochures and booklets which were supplied by the research group (nursing staff and trainee) on the subjects of study. They participated together based on the job duties and in all stages as educational program was designed for each patient, and they were all implemented and finally they were evaluated. Two type of questionnaires were used as pre-test and post-test to investigate the effect of the intervention. First questionnaire was the current condition of patient education (Taklam 1991) which was used by Zammanzade et al., ( $r=0.90$ ) (13). The questionnaire had two parts: the first one consisted of patients' demographic information and included four questions pertaining to their socioeconomic status. The second part of the questionnaire included 34 items evaluating the condition of patient education. The four dimensions of scale included evaluation of the educational needs (including data collection about the patient, self-care, patient attitudes toward health and illness diagnosis and treatment), planning (including defining objectives and learning outcomes for the patient, selection suitable content to teach the patient to marked educational activities), implementation (including self-care education hospitalization, discharge, and outreach and education as part of nursing care and the evaluation of patient education (including formative assessment, written exam, oral test and summative evaluation).

The number of correct answers to each question determined the knowledge status of

HD. Their Knowledge was categorized into three levels of low, moderate and high. Subjects with a knowledge score of 1.33-2 were considered as low, 2.34-3.66 was as moderate, and 3.67-5 was as high. Queries were encoded and fulfilled a day before, and after the education. The Likert scale (never, rarely, sometimes, often, always) was used to measure items.

The Second questionnaire was the checklists of self-care assessment. It was reviewed and revised to evaluate the checklist's validity ( $r \leq 70$ ) (14). The instrument to measure clinical parameters (degree of swelling, shortness of breath, Blood pressure, weight gain between dialysis sessions, itching, sexual inclination, fatigue, depression, etc.) and laboratory parameters (Blood Urea Nitrogen, Creatinine, Hemoglobin, Hematocrit and P, Ca) were used to evaluate the knowledge of diseases, symptoms, treatments and self-care strategies based on PCCC.

Stage one: introduction

At this stage the practitioner workshops were conducted for students and staff on the importance of patient education, and they were taught how to teach dialysis patients. The programmer of patient education was based on PCCC.

It included following steps.

First step: Familiarize

At this step, clinical staff and internships were familiarized with the goal of research and were selected for their duties. Researcher organized workshop on patient education (one-day) to enhance their knowledge and skills. Before implementation, laboratory parameters and clinical sings were evaluated by the research tools.

**Second step: Collaborative role**

The curriculum (self-care of dialysis) was developed by staff and internships in two weeks duration (every other day) 30-40 minutes before, during and after dialysis for all the patients and their families. They conducted the patient education program according to their duties. The program was completed, one on one, clustered face to face.

**Third step: Evaluation empowerment**

Teachers (staff and internships) assessed the knowledge and performance of patients and their families. They indicated the weaknesses of self-care on patients and took the training again.

The patients' knowledge and performance on self-care was evaluated for two weeks and one month after the program. Based on this model, evaluation was carried out through self-evaluation (trainers' attitude) and peer-evaluation (assessment of patients' clinical parameters)

In this study, data analysis through descriptive statistics (frequency, percentage and mean) and inferential statistics (paired t-test to compare quantitative and qualitative data using McNamara test) before and after intervention was used. Data were analyzed using SPSS version 19.

**Ethical considerations**

Ethical considerations were respected according to Helsinki laws. This study was part of the extensive study referred to the center Chronic Disease Research Jundishapur University of Medical Sciences.

**Results**

In this study, 7 nurses (4 registered, two contracted and a head) and 15 internships (semester 8) participated. All of them taught and passed patient education courses. 86.6% of staff and 83.2% of the internships believed that patient education is the main task of a nurse. The majority of samples (31.4%) in the age group of 60-41 and the lowest number of samples (2.9%) were in the age group of 18-12. Minimum ages of samples were 16 years old and maximum ages of samples were 74. 81.4% patients were married, 18.6% single, 52.9% were in low socioeconomic status, 45.7% moderate and only 1.4% were in good condition. 47.1% were unemployed, 5.7% retired, 8/6% worker, 3.4% employee, 3.4% had non-state job and 30% were housewives. 67.7% of the patients were in primary education, 19.7% at the secondary level, and 8.4% had an academic degree. 6.58% of the patients had dialysis three times a week, 40% had two times a week and 1.4% of them were on dialysis once a week. At the treatment period, 63% suffered from dialysis for 1-12 months, 15.7% for 13-24 months, 11.5% for 25-36 months, 4.3% for 37-48 months and over 14% for 72 months.

In general, 40% of the patients had hypertension, 15.7% diabetes, 28.3% conditions due to chronic glomerulonephritis, chronic pyelonephritis and nephritic syndrome and 17% were due to an unknown illness (Table 1).

**Table1: Demographic of participants in the study**

	Mean±SD	Median	Range
Age (Year)	37.2	35.8	12-63
Women	41.2	36.2	17-57
Men	34.8	32.1	12-63
Times on dialysis Treatment (Week)	2±1	2	1-3
Duration of dialysis (Month)	32 8	28	3-≤72

**Table 2: The mean clinical and Para-clinical testing of samples before and after the training**

Indicator	$\bar{X}$	s	n	$\bar{X}$	s	n	$\bar{d}$	sd	p	t
Urea Nitrogen	85	35	23.49	21.75	78.41	35	6.58	22.82	< 0.02	2.41
Creatinine	8.44	35	3.37	2.88	7.69	35	0.75	3.2	<0.05	1.96
Hemoglobin	8.25	1.55	35	8.36	1.44	35	-0.1	1.41	0.52	0.64
Hematocrit	1.25	4.84	35	25.37	4.75	35	-0.27	4.89	-0.64	0.46
Phosphorus	10	2.08	35	10.11	1.96	35	-0.1	1.75	-0.61	0.5
Calcium	9.71	1.38	35	9.21	1.52	35	0.49	1.48	<0.01	2.79
SBP	160.5	24.11	35	139.7	21.5	35	20.78	22.8	<0.001	7.63
DBP	89.42	12.95	35	79.14	12.12	35	10.28	14.54	<0.001	5.92
Weight inter Dialysis	3	1.43	35	2	0.93	35	0.89	1.3	<0.001	5.71

**Table3: Comparison mean after and before intervention**

Patients' training dimensions	Before invention	After invention	p
Indicated need educati	3.28	4.82	0.003
Planning	3.92	4.02	0.06
Implementation	5.14	4.96	0.06
Evaluation	2.12	4.24	0.004
Others dimensions	2.81	7.44	0.001

According to the results of the study 55.7% of patients had poor of knowledge on self-care before and after the intervention.

Clinical parameters indicate that the performance of the patients such as BP 46.8, causes swelling 23.6, itching 19.3, dyspnea 22.8 and sexual problems 9.7, fatigue 19%, diet 24.4, symptoms 15.9, and familiarity with the test results 12.9 had moderate to good condition. Table 2 shows the performance of self-care in patients with clinical parameters such as systolic and diastolic blood pressure, weight gain between dialysis sessions before and after interventions (patient education) calculated by using independent t-tests. The results indicate that the performance of the patients affected by blood pressure and diastolic pressure and dialysis weight control ( $p < 0.001$ ). It showed significant differences between the performance of patients before

and after intervention. The functional status of patients assessed before and after self-care program (patient education) with Para-clinic parameters such as (N, Creatinine, Phosphorus, Calcium, Hemoglobin, etc.). The results show that, except in the case of urea nitrogen ( $p < 0.02$ ) and creatinine ( $p < 0.05$ ) others parameters indicated a statistically significant difference in the patients' conditions before and after training. The findings of the qualitative indicators, such as shortness of breath, swelling, itching, and sexual problems, vascular problems, as well as clinical performance indicator are concerned with the principles of self-care.

Comparing the results of the qualitative parameters of the patients before and after training using the McNamara test and evaluation results showed that there was a difference in the incidence of protein

( $p=0.09$ ), edema ( $p\leq 0.2$ ), the incidence of sexual problems ( $p=1$ ) before and after the intervention, but there was no statistically significant difference in dyspnea status ( $p<0.02$ ), fatigue ( $p=0.004$ ) and vascular problems ( $p\leq 0.04$ ).

One of the other goals was "to assess effectiveness of PCCC model on patient education therefore we evaluated attitude of educators before and after intervention on patient education. Using McNamara test, findings showed that trainers' attitude was significantly different on all the dimensions of patient education (Table 3).

### Discussion

The objectives for patients on hemodialysis include providing sufficient dialysis, ensuring adequate nutrition, maintaining vascular access, correcting hormonal deficiencies, minimizing hospitalization, and prolonging lifespan while enhancing its quality (15). This study shows that a multifaceted patient-oriented intervention consisting of dialysis information booklets, a video, and a small group education session can increase the proportion of patients with PCCC model planning to hemodialysis with self-care dialysis. In this study, the majority of samples were male and middle aged. They had low literacy and low income. The result of other researches such Asadizaker et al., (16) and Rahimi et al (17) showed a similarity between the patients on hem dialysis in this study. They also showed that the patients were more vulnerable compared with the other patients. Thus, while training these patients, specific techniques should be applied. Bastable writes: "In education of adults attention must be focused on the demand and needs of their education." (18). Credible sources stress that the mean length of hem dialysis treatment is 3.5 hours and three times a week (19-20). The results of this study showed a similar mean length of hem dialysis. The conditions caused the patients to recover but

they and their families wasted plenty of time on the wards. On the other hand, they depended too much on the nurses and health professionals.

One of the goals of this study was to evaluate the impact of education on the principles of self-care of patients. For this purpose, we assessed results of Para clinical indicators such as Ca, P, Na... and clinical symptoms such as weight amount between two sessions, edema, etc. The results obtained in the study suggested a positive effect of education on such factors.. In other words, patients' education Professional Collaboration Care Centered Model increased patients' awareness and improved performance of self-care. Results of studies in this area show a conflict. For example, Ghamarizare et al., concluded that patient education does not affect recovery in nitrogen and creatinine of patient on hem dialysis and the results did not show a statistically significant difference (21). But Baraz et al. mentioned that often face to face and non-attendance teaching methods are effectiveness on improvement of the indicators (22). Also Rahimi et al. Found that the use of local models can improve patients on hem dialysis performance (17). Researchers believe that patient education increase knowledge and understanding of patients on clinical information such as illness and treatment, that it can change and reform their health behaviors and encourages the promotion of healthy behaviors (6-12). Although researchers have emphasized on the importance of patient education and its positive impact on patients health improvement, patient education status is not at satisfactory level at the moment (23). This can be due to the high workload and staff shortage (24). The results of this study showed that the use of Professional Collaboration Care Centered Model not only increases confidence and participation level among training and clinic staff but also systematically improves patient education performances. Also based on this model, patients and their families are able to perform self-care

methods. The significant difference between the mean scores before and after teaching using Professional Collaboration Care Centered Model reflects an improvement in the patient education conditions. Also Rahim et al. founded participant education can improve patient's condition (17). Therefore these results are confirmed due the previously reported study.

### **Conclusion**

This model was designed based on the culture and facilities in our hospitals. Therefore actual training needs of the patients could be diagnosed. In light of the findings of the present study, which indicated that the application of applying Professional Collaboration Care Centered Model can bring about a significant difference in the level of knowledge among patients on hem

dialysis , and that the application of the model in other clients and patients with chronic diseases may have a positive effect on their health as well. In order for patients on hemodialysis to manage their problem successfully, to improve their self-care abilities, nurses should provide physical, social and emotional support.

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