Critical Care Nursing

Iran J Crit Care Nurs. 2015;7(4):215-220

Journal home page: www.inhc.ir

Examining the effect of continuous care model on adherence to dietary regimen among patients receiving hemodialysis

Saeid Hashemi[1], Ali Tayebi[2*], Abolfazl Rahimi[2], Behzad Einollahi[1]

1. Nephrology and Urology Resereach Center, Baqiyatallah University of Medical Sciences, Tehran, Iran

**2. Faculty of Nursing, Baqiyatallah University of Medical Sciences, Tehran, Iran*

ARTICLE INFO

Article type:
Original article

Article history:
Received: 1 Jul 2014
Revised: 14 Oct 2014
Accepted: 22 Dec 2014

Key words:
Continuous Care Model
Dietary adherence
Hemodialysis

ABSTRACT

Aims: Adherence to dietary regimens is essential to the success of hemodialysis whose absence is associated with significant health problems and complications for patients receiving hemodialysis. Besides educations, hemodialysis patients need a continuous care plan that improves their adherence knowledge, practice, and attitude. This study aimed at examining the effect of Continuous Care Model on hemodialysis patients' dietary adherence.

Methods: This randomized controlled trial was conducted on 98 patients who received hemodialysis in Baqiyatallah and Chamran hospitals, Tehran, Iran, in 2013. Subjects were recruited by using the purposive sampling technique and were randomly allocated to either the treatment or the control groups. Written and verbal educational materials about hemodialysis and dietary adherence were provided to patients in the treatment group. Then, the four-step continuous care plan was implemented. The steps included orientation, sensitization, control, and evaluation. Study participants were invited to fill the Dietary Adherence Questionnaire at four time points including before the intervention (T1) as well as one, two, and three months afterward (T2–T4). The Chi-square and the repeated measures analysis of variance test were performed by using the SPSS v. 18.0.

Results: Most participants had poor dietary adherence. The Continuous Care Model significantly improved their dietary adherence scores—from 148.95±6.04 (T1) to 156.25±4.85 (T2), 177.08±3.63 (T3), and 184.37±3.38 (T4). There was a significant relationship between Continuous Care Model and dietary adherence (p value = 0.0001).

Conclusions: Educations and counseling services that are provided through the Continuous Care Model can improve hemodialysis patients' dietary adherence. Using this model for enhancing hemodialysis patients' dietary adherence and preventing non-adherence-related complications is recommended.

Please cite this paper as:
Hashemi S, Tayebi A, Rahimi A, Einollahi B. Examining the effect of continuous care model on adherence to dietary regimen among patients receiving hemodialysis. Iran J Crit Care Nurs. 2015;7(4):215-220.

1. Introduction

Chronic Renal Failure (CRF) is among the most debilitating diseases and is associated with many systemic problems [1]. The incidence and the prevalence of CRF are progressively increasing-by 8%-worldwide, particularly in developing countries [2 and 3]. The prevalence

* Correspondence Author: Ali Tayebi. Faculty of Nursing, Baqiyatallah University of Medical Sciences, Tehran, Iran.
Tel: +989121058516
Email: tayybi.ali@gmail.com

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of CRF in our country, Iran, has also increased and reached from 25000 [4] to 33000 cases from which, 54% are treated with hemodialysis while the remaining 46% are referred to kidney transplantation services [5]. However, both hemodialysis and kidney transplantation are associated with different problems and complications [6].

Hemodialysis improves patients' recovery, survival [7], and longevity [8]; however, it neither reverses the course of CRF nor completely supersedes the kidneys [7]. Chronic hemodialysis causes many complications which dramatically affect patients' quality of life [9]. Accordingly, besides hemodialysis, certain dietary and drug regimens as well as limited fluid intake are prescribed for managing CRF and its complications [10].

Adherence to dietary regimens decreases kidney workload and helps prevent renal complications and uremia [11]. Patients who have kidney diseases are required to receive a low-protein diet in order to decrease kidney workload and the serum level of nitrogen. On the other hand, patients who receive hemodialysis (henceforth briefly referred to as hemodialysis patients) are at risk for losing essential amines and hence, they are encouraged to have a high-protein diet which in turn, is associated with increased serum level of urea [12].

Despite the potential effectiveness of dietary regimens in managing uremic signs and symptoms and preventing long-term complications of CRF, many patients do not adhere to them [13 and 16]. Kim et al. (2010) reported that the rate of dietary non-adherence among hemodialysis patients is 1.2–82.4% [14]. Using an unhealthy dietary regimen while receiving hemodialysis is associated with poor quality of life and increased morbidity and mortality [15].

Patients' themselves are responsible for developing healthy dietary habit; consequently, patient education regarding dietary regimens is among healthcare providers most basic tasks. However, despite the implementation of different patient education programs, hemodialysis patients still have misconceptions about CRF and hence, fail to manage it. Therefore, besides implementing patient education programs, administrating follow-up programs for enhancing patients' knowledge, promoting their practice, and fostering their attitude toward dietary adherence seems absolutely crucial [20].

Black and Hawks (2009) noted that patients who receive followed-up care are more inclined to change their unhealthy behaviors [21]. Accordingly, implementing an appropriate follow-up program for enhancing hemodialysis patients' adherence to dietary regimen is essential.

In Iran, a follow-up care model entitled the 'Continuous Care Model (CCM)' was developed and tested by Ahmadi (2001) for providing care to patients with chronic coronary problems. This model consists of four steps including orientation, sensitization, control, and evaluation. It considers patients as continuous care agents who can affect their own health. The care that is provided through using the CCM is congruent with the characteristics of chronic illnesses [22].

This study was conducted to examine the effect of the CCM on hemodialysis patients' adherence to dietary regimens.

2. Methods

This randomized controlled trial was conducted on 98 patients who received hemodialysis in Baqiyatallah and Chamran hospitals, Tehran, Iran, in 2013. Patients who had at least a three-month history of hemodialysis and were able to read and write Persian were recruited by using the purposive sampling technique and were randomly allocated to either the treatment or the control groups. The sample size was calculated by using the Altman's nomogram. With a standard deviation of 15.93, an alpha of 0.05, a confidence interval of 0.95, and an attrition rate of 10%, the Altman's nomogram showed that 100 subjects were necessary for the study-50 subjects for each group [21].

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Two patients from the treatment group chose to withdraw from the study and hence, 98 patients, in total, completed it. Study participants were informed about the aim of the study and they were asked to complete the informed consent form.

A demographic questionnaire and the eight-item Diet domain of the End-Stage Renal Disease Adherence Questionnaire (ESRDAQ) were used for data collection [14]. Kim et al. (2010) reported a satisfactory validity and a reliability of 0.83 for the questionnaire [14]. Eslami et al. (2011) translated the ESRDAQ into Persian and reported a Coronbach's alpha of 0.75 for the Persian version [22].

Patients in the treatment group received a three-month continuous care intervention which had been developed based on the CCM. In the orientation step, patients and their families were invited to participate in a 45-minute orientation session.

The aims of the session were to identify patients' problems, motivate them, and help them understand the necessity of dietary adherence and follow-up care. In the next step, we provided patients and their families with group and individual counseling as well as written and verbal information and educations in order to sensitize them to the importance of dietary adherence.

Face-to-face and telephone contacts were also made for answering patients' questions and clarifying their misunderstandings. The provided educations and information were mainly about self-care activities and skills, hemodialysis- and CRF-associated problems, as well as the importance of adherence and the consequences of non-adherence to dietary regimens. Thereafter, patients were followed-up and controlled weekly—through making both face-to-face and telephone contacts with them—for three months.

The aims of the follow-up care were to identify patients' new health problems and educational needs and also to help them reduce their problems and needs.

Evaluations were performed both at the end of each step and at the end of the study. For instance, at the end of the sensitization step, we evaluated and monitored the effectiveness of the provided educations in resolving participants' problems or fulfilling their needs. Finally, summative evaluations were performed at the end of the first, second, and third months (T2–T4) by using the study instrument.

Study data were entered in and analyzed by the SPSS $_{18}$. Initially, the Kolmogrov-Smirnov test was performed to identify whether the study variables had normal distribution. Then, the Chi-square, the independent-samples t, and the repeated measures analysis of variance (RM ANOVA) tests were used for between-groups and within-group comparisons.

3. Results

The minimum, the maximum, and the mean of patients' age in the treatment group were 23, 84, and 62.33±14.22, respectively. In the control group, these values were respectively equal to 20, 90, and 59.50±16.14. The independent-samples t test revealed that the study groups did not significantly differ regarding age and hemodialysis duration ($p>0.05$; Table 1). Moreover, 26 patients in the treatment group (51%) and 25 ones in the control group (50%) were male. The Chi-square test showed that there was no statistically significant difference between the groups in terms of gender ($p=0.68$; Table 1).

The RM ANOVA test indicated that there was no significant difference in patients' dietary adherence across the four measurement points in the control group. However, this difference in the treatment group was statistically significant (Table 2).

The Bonferroni's test for pairwise comparisons also revealed that in the treatment group, all differences between the measurement time-points except for the difference between T3 and T4 were statistically significant. Moreover, the results of the RM ANOVA test for between-groups comparison showed that there was a significant difference between the two groups

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regarding dietary adherence across the four measurement time-points (p=0.001; Table 2).

4. Discussion

Study findings showed that before the study, participants' dietary adherence scores were low. Previous studies also reported the same finding [14, 16, and 22–24]. Kugler et al. (2005) also found that more than half of their participants had problems with using and adhering to the prescribed dietary regimens [25]. However, Esmaeili et al. (2013) reported that hemodialysis patients had close adherence to the dietary regimens [26]. This conflicting

Table 1: Study participants' demographic characteristics

Variables		Treatment group N (%)	Control group N (%)	Statistics
Gender	Male	51 (26)	(49) 25	df=1
	Female	46.8 (22)	(53.2 (25)	p=0.68
Marital status	Married	47.9 (45)	59.1 (49)	p=0.485
	Single	(50) 1	(50) 1	df=2
	Dead spouse	(100) 2	(0) 0	
Educational status	Primary	(51.1 (24)	(48.9) 23	
	Secondary	(33.3) 4	66.7 (8)	p=0.461
	High school diplom	(40) 6	(60) 9	df=3
	University	(58.3) 14	(41.7) 10	
Income	Poor	(48) 12	(52) 13	
	Moderate	(48.4) 30	(51.6) 32	p=0.926
	High	(54.5) 6	(45.5) 5	df=2
Age (Year) Mean (standard deviation)		62.33±14.22	59.50±16.14	t = 0.92 df =96 p=0.49
Dialysis duration (Month) Mean (standard deviation)		33.65±33.13	31.50±30.22	t=0.335 df =96 p=0.27

Table 2. Study participants' dietary adherence at four measurement time-points

Step	Pretest (T1)		Posttest 1 (T2)		Posttest 2 (T3)		Posttest 3 (T4)	
Group	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Treatment	148.95	6.04	156.25	4.85	177.08	3.63	184.37	3.38
Control	127	6.09	117	6.64	116	6.76	125	6.58
The results of the Repeated measures ANOVA	Between-groups comparison	Treatment	Wilks' lambda		p=0.0001			
		Control	Wilks' lambda		p=0.031			
	Within-group comparison	Treatment	Mauchly df = 0.43 p=0.9 Greenhouse Geisser F= 14.85 p=0.0001					
		Control	Mauchly df = 0.67 p=0.002 Greenhouse Geisser F= 1.95 p=0.13					

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finding can be attributed to the difference in the instruments of the studies. Some scholars noted that patients' knowledge significantly contributes to their perceptions of the benefits of dietary adherence as well as the negative consequences of non-adherence [26]. Ahmadi (2001) conducted a study to examine the effects of the CCM on the management of chronic coronary problems and reported that a three-month continuous care plan significantly affected most of patient outcomes [27]. Rahimi et al. (2006) also found that the CCM was effective in boosting hemodialysis patients' self-esteem [28]. We also found that in the treatment group, patients' dietary adherence scores were significantly improved at T2–T4. This finding can be attributed to the internalization of the received educations due to continuous care and regular follow-up.

One of the limitations of the study was that we conducted the study in only two health centers located in Tehran, Iran. Further studies in different settings and areas are necessary for enhancing the generalizability of the finding. Moreover, we examined patients' dietary adherence by doing subjective assessment. Conducting same studies by using other criteria that are both subjective and objective is recommended.

5. Conclusions

Study findings suggest that most hemodialysis patients do not strictly adhere to their dietary regimens. Healthcare providers can enhance hemodialysis patients' dietary adherence and prevent potential complications of non-adherence through using the CCM and promoting their awareness of the importance of adhering to dietary regimens and restrictions.

6. Acknowledgments

This article was extracted from a Master's thesis in Critical Care Nursing which was funded by Baqiyatallah University of Medical Sciences, Tehran, Iran. Authors would like to show their sincere gratitude towards the Research Council of Baqiyatallah Faculty of Nursing, the study participants, and the personnel of the hemodialysis care units of Baghiyatallh and Chamran hospitals.

References

1. Naw Bahar M, Vafaee AS, Davatchi F. Effects of iron administration (oral, parenteral) and erythropoietin on hematocrit and transferrin saturation in hemodialysis patients. Razi J Med Sci**.** 2004;11(39):151-8. [Persian]
2. Emami-Naeini A, Moradi M, Mortazavi M, Shirani F, Gholamrezayee AS. Carnitine effects on dyslipidemia, and anemia in hemodialysis patients. J Isfahan Med School. 2011;29(139):596-605. [Persian]
3. Heidarzadeh M, Atashpeikar S, Jalilazar T. Relationship between quality of life and self-care ability in patients receiving hemodialysis. Iran J Nurs Midwifery Res. 2010;15(2):71-6. [Persian]
4. GhodsA,SavarySH.Iranian model of paid regulated living_un related kidney donation. Clin Asoc Ephrol. 2006;1:1136-45. [Persian]
5. Collins AJ, Foley RN, Herzog C. Excerpt from the United State Renal Data System 2009 Annual Data Report. Am J Kidney Dis. 2010; 5(1):374- 82.
6. Raeeisi Far A. Effect of applying continuous care model on quality of life course seeks to renal transplant patients in selected hospitals in Tehran. Nursing master's thesis. Tehran Univ of Med Sci Baqiyatalla. 2010;3. [Persian]
7. Farzaneh H, Somayeh Sh, HosseinKarimi M, Saeed E. A Comparison of Face to Face and Video-based Education on Attitude Related to Diet and Fluids Adherence in Hemodialysis Patients. Ofogh-e-Danesh. GMUHS J. 2011;17(4):34-35. [Persian]
8. Letchmi S, Das S, Halim H, Zakariah F.A, Hassan H, Mat S, Packiavathy R. Fatigue experienced by patient receiving maintenance dialysis in hemodialysis units. Nursing & Health Science. 2011;13:60-64.
9. Khazaei M, Drakhshan AS. Effect of L - carnitine oral administration in children undergoing chronic hemodialysis patients with hyperlipidemia. Med J Mashhad Univ Med Sci. 2006;49(91):49-56.[Persian]
10. Cupisti A, D'Alessandro C, Morelli E, Rizza GM, Galetta F, Franzoni F, et al. Nutritional status and dietary manipulation in predialysis chronic renal failure patients. J Ren Nutr. 2004;14(3):127-33.
11. Mayers JD. Dietary restrictions in maintenance hemodialysis: experiences of English Speaking West Indian Adults. Nephrol Nurs J. 2000;27(3):315-9.
12. Salehi Sh. Evaluate the effectiveness of training diet of laboratory parameters and weight gain between dialysis sessions in hospitals and medical sciences. MA thesis in nursing. Iran-Medical. Nursing & Midwifery. 2002. [Persian]

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13. Smeltezer SC, Bare BG. Brunner and suddarth textbook of medical surgical nursing. 21th ed. Philadlphia: Lippincot Comoany. 2004;1326-34.
14. Kim Y, Evangelista Lorraine S, Phillips Linda R, Pavlish C, Kopple Joel D. The End-Stage Renal Disease Adherence Questionnaire (ESRDAQ):Testing The Psychometric Properties in Patients ReceivingIn-Center Hemodialysis. Published in final edited form as: Nephrol Nurs J. 2010;37(4): 377-93.
15. Brothers S, Mohammad A., B. Memorial. The effect of diet education on the laboratory parameters and weight gain between dialysis sessions in patients treated with Hmvdyalyzng·h holder. Univ Med Sci. 2007;8(1):20-7.
16. Durose CL, Holdsworth M, Watson V, Przygrodzka F. Knowledge of dietary restrictions and the medical consequences of noncompliance by patients on hemodialysis are not predictive of dietary compliance. J Am Diet Assoc. 2004;104(1):35-42.
17. Zakeri M. Moghadam, S. Bassam M. S, Ragab A, Faghih Zadeh S, Nisar M. Effect of telephone follow-up by a nurse (Tele Nrsyng) on diet adherence in patients with type II diabetes. Journal of Nursing and Midwifery, Tehran University of Medical Sciences (live). 2008;14 (2):71-63. [Persian]
18. Black JM, Hawks JH. Medical-Surgical Nursing: Clinical Management for Positive Outcomes, 8th edition. Missouri: Saunders Elsevier. 2009;1233-4.
19. Rahimi A, Ahmadi F, M Ghlyaf. Effect of continuous care model on patients' self-esteem hemo dialysis 2005;13(53):16-21. [Persian]
20. Eslami A, Khalili F, G Farajzadegan, Hasan b. Investigated the relationship between psychological factors - social behavior adherence in Isfahan hemodialysis patients: a conceptual framework based on cognitive theory – Social. Health System Res J. 2011;7(3):280-2. [Persian]
21. Boraz SH, Mohamadi E, Bromand B.Comparison of two attended and non attended of educational Self Care Program on Problems and quality of lifes hemodialysis patients. Journal of Faculty of Nursing and Midwifery, Tehran university of Medical Sciences. HAYAT J. 200511(24,25);51-62. [Persian]
22. Mayers JD. Dietary restrictions in manintenance hemodialysis: experiences of english speaking west lndian adult. Nephrol Nurse J. 2000; 27(3):315-9.
23. Liang Xue, Wang Wei, LI Han. Water and sodium restriction on cardiovascular disease in young chronic hemodialysis patients. Chinese Med J. 2013;126(9):1667-72.
24. Ahrari SH, Karimi H, Heidari A. The relationship between social support and adherence to dietary restrictions and fluid in hemodialysis patients. Proceedings of the 10th Conference of the National Research Committee. 2009;2(2):4-6. [Persian]
25. Kugler C, Vlaminck H, Haverich A, Maes B. Nonadherence with diet and fluid restrictions among adults having hemodialysis. J Nurs Scholarsh. 2005; 37(1): 9-25.
26. Esmaeili R, Ahmadi H.R, Jannati Y, Khalilian A.R. The relationship between perceived social support and self- efficacy with diet adherence among hemodialysis patient. Scientific J Hamadan Nurs & Midwifery Faculty. 2013;21(3):59-66. [Persian]
27. Ahmadi Fzlollah. Design and evaluation of continuous care model in the management of patients with coronary artery disease. PhD thesis. Tehran University of Medical Sciences. Tarbiat Modarres Univ. 2001;200-1. [Persian]
28. Rahimi A, Ahmadi F, Gholyaf M. Effects of Applying Continuous Care Model on Quality of Life in Hemodialysis Patients. Tehran Univ Med Sci. 2006;13(52):123-33. [Persian]

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