Interdisciplinary Journal of Acute Care
Volume 1, July/December 2020, Issue 2, pp. 43-50
Journal homepage: www.ijac.lums.ac.ir

The Effect of Telenursing on Adherence to Diet in Patients Underling Hemodialysis

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ABSTRACT

A serious problem in patients undergoing hemodialysis is non-adherence to treatment that can be met by educating these patients. But finding the most effective cutting edge educational methods are necessary. This study aimed to evaluate the impact of telenursing follow-up on dietary adherence in patients on hemodialysis. In this quasi-experimental study, 44 hemodialysis patients were selected using census sampling from the patients admitted to Imam Jafar Sadeqh hospital in Aligudarz in 2013. All the participants received a three-day training about their self-care. Then participants were randomly divided into two groups of case and control group. Telephone intervention was conducted in experiment group for 12 weeks. Data collection instruments were questionnaires and physiological measurement instruments to which were used before and after the study. In the case group, there were significant differences between the mean dietary adherence before and after the intervention in all dimensions included low-fat diet ($t=15.96$, $df=21$, means difference=4.55, $p<0.05$), protein containing diet ($t = -4.16$, $df=21$, mean difference= 3.86, $p<0.05$) and controlled water and electrolytes diet ($t = -12.26$, $df =21$, mean difference=13.32, $p<0.05$). These findings confirmed the positive effect of telenursing intervention on the improvement of adherence to diet in patients on hemodialysis.

Keywords: Telenursing, Hemodialysis, Diet adherence, treatment adherence

Introduction:

Chronic disease is a multidimensional experience which requires the patients to synchronize themselves with the stresses and consequences of that [2.1]. The presence of a chronic disease, or even symptoms and physiological or psychological defects caused by that, can threaten the physical and mental health of the patients and increase their vulnerability, and if the disease is diagnosed in the final advanced stages, the feeling of sudden death and the loss of future can be devastating [3]. Also, patients with chronic illness often experience various problems and stresses including pain, uncertainty feeling, and change in body image [4]. Chronic kidney disease as a life-threatening condition, has a high prevalence. So that in the United States, it affects about 27 million adults resulting in increased mortality and health care costs [5]. In

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DOI: https://doi.org/10.22087/ijac.2020.125371

Iran, the prevalence of kidney failure increased from 49.9 in 2000 to 63.8 people per million in 2006, which shows 28% of growth over six years [6]. Meanwhile, hemodialysis is one of the most common renal replacement therapies for chronic renal failure [7]. Currently, more than 7000 patients are undergoing hemodialysis treatment in Iran. Also, in Lorestan province, the number of patients under hemodialysis by the year 2013 is announced as 500, of which 48 patients are in Aligudarz city [8]. However, the use of dialysis in end-stage renal disease patients is a costly therapeutic intervention and is one of the main causes of resource consumption [9].

Although the number of patients on hemodialysis has increased due to their life span, the disease affects their life and, in advanced stages, results in disorders of the individual functional status, and changes in their quality of life [10]. Patients on hemodialysis are exposed to some problems and complications [11] such as risk factors of cardiovascular disorders [hypertension, atherosclerosis, and lipid disorders] that increase mortality rate [12].

Adherence to treatment is an essential part of the process which guarantees the clinical outcomes of patients on hemodialysis [13], and is directly related to their health [14]. Additionally, adherence to treatment influences various aspects of these patients' lives including quality of life, response to treatment, complications, costs, and finally life expectancy and life span [15]. Nevertheless, a serious problem in patients undergoing hemodialysis is non-adherence to treatment [15, 16]. Various studies about the adherence to treatment in hemodialysis patients have shown weakness of that [15] or, in the best state, the moderate degree of adherence is shown in them [14]. Also, despite this fact that dieting can play a significant role in improving these patients' health, failure to observe the diet is one of the biggest problems in them [10, 17]. So that, the rate of non- adherence to diet in patients on hemodialysis is estimated to be close to 50% [18]. In Mellon et al. study, 62% of patients had non-adherence to treatment at least in one aspect of therapeutic regimen [19]. The important issue is that deviation from the diet can lead to dangerous consequences [17]. Adherence to diet and fluid constraints in patients on hemodialysis is a multifactorial concept [19]. Studies show that it is related to factors such as age, education [14], personal beliefs, cultural and social characteristics [10], gender, dialysis sufficiency, hemodialysis duration, knowledge about the disease and its treatment [17,16], perceived social support and self-efficacy [16,14,13], attitude and also psychological state [anxiety and especially depression] [16]. The findings and suggestions of studies on adherence to treatment in patients on hemodialysis are in line with the necessity to raise their knowledge by providing education [13, 15, 16, 20]. In this regard, it has been revealed that training has a basic role in the improvement of clinical resultant of patients on hemodialysis [17]. So that in Sharaf's study (2016) about performing a follow-up training program aimed at enhancing knowledge, improving the patients' performance and attitude to adherence to diet showed controlling the weight gain between hemodialysis sessions, correction of behaviors, capacity increasing, consciousness, and vigilance of patients under hemodialysis [20].

Nowadays, one of the continuous control methods of chronic diseases is the emphasis on strengthening self-care behaviors and the use of new technologies related to these patients [21]. One of these technologies is the use of telenursing in patient education. Telenursing [distance nursing] is a tool for providing continuous care in patients with chronic conditions [22]. The electronic management of chronic diseases has several potential benefits compared with traditional methods. Saving time and money, and the constant availability of health care providers are among these benefits [23]. Meanwhile, using a telephone in nursing care is not only effective in reducing costs and facilitating access to patients, but also improves the relationship between patient and care providers, as well as removing time and place barriers [24]. In addition, telenursing is an effective way of informing rural people and poor members of society due to its cost-effectiveness [25]. It is also a good way to

educate patients with chronic diseases about belief in the disease, blood pressure control, diet, weight control and other information about self-care, especially in cases where access to health care facilities is not possible [26]. But life conditions and cultural and social contexts can influence the effectiveness of educational methods in chronic diseases. Therefore, due to the lack of studies on educating patients on hemodialysis by using new technologies in social and cultural context of Aligudarz city, with a high surface area in the country and having more than 400 villages with long distances from the city and special access conditions, the present study was done aiming at "investigate the effect of telenursing on adherence to diet in patients on hemodialysis".

.Materials and Methods

In this quasi-experimental study, the study population consisted of 44 patients on hemodialysis referring to Imam Jafar Sadegh Hospital in Aligudarz city. The inclusion criteria were; living in Aligudarz, having a telephone line at home, having no psychological diseases or advanced forms of vital organs dysfunctions, and having no hearing and speech disorders. The whole study population were eligible, and entered the research by census sampling method. The subjects were excluded from the study if the intended tests were not performed, if they received transplantation, if they died or were unwilling to continue to participate in the study. Of course, no participant excluded the study. Providing enough explanation about the research goals to the subjects, they were asked to enter the study with an informed consent. They were informed about the confidentiality of their information as well as possibility to leave the study at any time they wished. In this research, the following tools were used to collect data:

In order to assess dietary adherence in patients, a researcher-made questionnaire was used. The questionnaire was set based on the information in the books, articles and journals and with the help of specialists. The first part contains the patient's demographic information including age, gender, height, weight, the Body Mass Index (BMI), marital status, occupation, and educational level. The second part consists of 23 items that measures adherence to dietary habits with emphasis of various food categories such as carbohydrates, fat, protein, liquids, and salt with a three-point Likert scale including never, sometimes, and always. To validate the questionnaire, the content validity method has been used. The prepared questionnaire was given to 10 faculty members. Then, their point of views were discussed in the research group and necessary amendments were made. Also, the reliability of the questionnaire was determined using Cronbach's alpha resulting in 0.83.

The organized form of telephone conversations was another designed tool for recording telephone tracking data (including contact hours, findings of adherence to the diet, and educational items to the patients based on the assessment) during the intervention period in the case group.

Initially, the questionnaire of dietary adherence was completed by face-to-face interview with all subjects. In the following, the whole subjects (44 patients) received three sessions instruction about self-care by focusing on diet especially about limitation in consuming liquid and maintaining the balance of electrolytes, taking low fat diet and utilizing appropriate regimen of protein. After completing the educational sessions, the participants were randomly divided into two groups of case and control. In addition, for maintaining the equality of samples in two groups, block randomization was used. Then, the telephone intervention was conducted for 3 months in the case group. Phone calls for follow-up of the dietary adherence were done twice a week in the first month, once a week in the second month, and once every two weeks in the third month in the case group. The time of the phone calls was determined based on opinion of the participants, from 8 am to 8 pm on non-holiday days. The duration of each conversation was considered as an average of 20 minutes. The content of telephone

conversations included assessing the dietary adherence of the participants and, in the cases of non-adherence, the situation was analyzed by them to find the problem, and finally a solution was offered to them and also answering their questions. No intervention was conducted in the control group. After completing the intervention period, the questionnaire of dietary adherence was completed again by interviewing with all participants in both case and control groups.

The collected data were analyzed using descriptive statistics such as mean, Standard Deviation(SD) and relative frequency, and also by analytical tests such as paired t-test and independent t-test at a significant level of 0.05.

Results

Most of the participants in the case and control group (55.65%) were women and over 54 years old (34.1%). The weight of the most of them was between 51 and 60 kg (29.5%) and their height was in the range of 150-160 cm (54%), and their BMI was between 20-25 kg/m2 (61.35%).

Marital status was the same in two groups of control and case, and most respondents (95.5%) were married in both groups. Most of the participants in two groups were self-employed (28%) with elementary educational level (54.5%).

In line with the effect of telephone follow-up on adherence to diet, which is the main objective of the study, dietary adherence was assessed based on the body's nutritional requirements including three categories of low-fat diet, diet containing protein, and controlled water and electrolytes diet. The description for this section is presented in Tables 1-3.

Regarding the adherence to low fat diet, before the study, 81.8% of participants in the case group occasionally adhere a low-fat diet. But after study, it was shown that 95.5% of them always adhere the low-fat diet, which means that telenursing intervention persuaded the case group to adhere the low-fat diet (Table 1) The findings also showed that in the case group, the mean score of the adherence to the low-fat diet increased from 6.45 ± 1.47 before the intervention to 11 ± 0.97 after the study, while in the control group it reached from 6.68 ± 1.55 to 6.90 ± 1.46. In the control group, there wasn't any significant difference between the mean adherence to low-fat diet before and after the study based on the paired T-test. But in the case group, a significant difference was observed between the mean adherence to low-fat diet before and after the intervention ($t=15.96$, $df=21$, means difference=4.55, $p <o.o5$). These findings also confirm the positive effect of telenursing intervention on the improvement of adherence to low-fat diet in patients on hemodialysis.

Regarding the adherence to the protein containing diet in the case group, before the study just 4.5% of them always adhere this diet, but after study this rate increased and its frequency reached to 100%. This means that telenursing intervention persuaded the case group to adhere the protein containing diet (Table 2).

The results showed that in the case group,.the mean score of adherence to the controlled water and electrolytes diet increased from 20.31 ± 5.80 before the intervention to 33.63 ± 2.26 after the intervention, while in the control group it reached 17.3 ± 45.84 from 17.25 ± 2.68. In the control group, there wasn't any significant difference between the mean adherence to the controlled water and electrolytes diet before and after the study based on the paired T-test. But in the case group, there was a significant difference between the mean adherence to the controlled water and electrolytes diet before and after the intervention ($t = -12.26$, $df =21$, mean difference=13.32, $p <0.05$). These findings also confirmed the positive effect of telenursing on improving the adherence to the controlled water and electrolytes diet in patients on hemodialysis.

Table 1. The frequency distribution of adherence to the low-fat diet

The group	The case group				The control group				Total	
	Before		After		Before		After			
	n	%	n	%	n	%	n	%	n	%
Never	4	18.2	0	0.0	5	22.7	3	13.6	12	10.2
Sometimes	18	81.8	1	4.5	17	77.3	19	86.4	55	62.0
Always	0	0.0	21	95.5	0	0.0	0	0.0	21	23.8

Table 2. Table 2- The frequency distribution of adherence to the protein containing diet

The group	The case group				The control group				Total	
	Before		After		Before		After			
	n	%	n	%	n	%	nr	%	n	%
Never	6	27.3	0	0.0	8	18.2	6	13.6	20	22.7
Sometimes	15	68.2	0	0.0	14	31.6	16	36.3	45	51.0
Always	1	4.5	22	100	0	0.0	0	0.0	23	26.0

Table 3- The frequency distribution of adherence to the controlled water and electrolytes diet

The group	The case group				The control group				Total	
	Before		After		Before		After			
	n	%	n	%	n	%	nr	%	n	%
Never	7	31.8	0	0.0	12	54.5	6	27.3	25	49.9
Sometimes	14	63.6	1	4.5	10	45.5	16	72.7	41	46.5
Always	1	4.5	21	95.5	0	0.0	0	0.0	22	26.2

Discussion

The findings of the study showed that adherence to the diet, as a part of the treatment regimen was low in patients on hemodialysis group. In details, it can be explained that before the study in two case and control groups, most of the participants just sometimes adhered to the low-fat diet, which is indicative of undesirable adherence to this diet. About the adherence to the protein containing diet, before the study in two case and control group, most of the subjects just sometimes adhered to this diet, which is indicative of undesirable adherence too. Also, about the adherence to the controlled water and electrolytes diet, before the study most of the participants in case group just sometimes and in control group never adhered to that diet which is indicative of undesirable adherence to this diet.

These findings are consistent with various studies aimed at determining the adherence to diet in patients on hemodialysis. In line with that, in the study of Borji et al., the overall average adherence to treatment was reported 67.55% as a medium percent, and also the adherence to diet was reported 65%, and the adherence to fluid diet was announced as 62.5% [15]. Moreover, in the study of Rafiei Vardanjani et al., the treatment adherence in patients on hemodialysis was as average level with various adherence in four dimensions

included drug (56.3%), food [78.9%), fluid (70.4%), and dialysis program (78.9%) which has been related to the chronic nature of disease and knowledge of the patients [27]. In Mellon et al. study in Ireland that examined the factors affecting the adherence to treatment in patients on hemodialysis, the findings showed that 62% of patients did not have dietary adherence at least in one dimension. So that, the most common non- adherence was in the fluid consumption which showed up as 62% weight gain between two dialyses sessions. 34% did not have adherence to the restricted potassium diet, and 28% did not comply with the restricted phosphorus diet. Also, young people had weaker adherence [19]. In a cross-sectional study done by Naalweh et al., it was found that 24% of patients had adherence to diet, and 31% had adherence to restricted fluid diet. Also adherence to the hemodialysis sessions and with the drug diet was reported as 52%, and 81%, respectively. In addition, 55.5% of subjects had good adherence, 25.5% had moderate adherence, and 20% had poor adherence meaning the adherence was lower than desirable level [28].

Adherence to the diet in patients undergoing hemodialysis is a multifactor concept, which means that several factors affect it. In this regard, the findings of Mellon et al. study showed that higher levels of anxiety were correlated with better adherence, which may be due to the motivation and knowledge of patients to show up treatment adherence behaviors [19]. Also, in Rahimi study, it was found that a significant relationship existed between perceived social support and adherence to diet, drugs and restricted fluid diet. So, proper nurse-patient communication could support the patient and improve his adherence [29]. In the study of Naalweh et al., it was also shown that a significant relationship exists between perceived social support and self-efficacy and dietary adherence in patients on hemodialysis [28]. On the other hand, in the study of Hadian et al., the most important reasons for not to consider to treatment adherence in patients on hemodialysis were mental and psychological factors, especially depression, lack of knowledge and attitude, and lack of social support [16]. Most of the mentioned studies addressed education as an intervention, because one of the important factors behind the non- adherence to treatment was the lack of knowlwdge. However, limited studies are performed on the effectiveness of training on adherence in patients undergoing hemodialysis that they've used traditional educational methods. In line with this, the findings of the Sharaf's study [2016] in Egypt showed that teaching by lecture method and presentation of the booklet, increased the knowledge and treatment adherence to in different dimensions one month after the intervention, compared with baseline. Also, the mean of weight gain and systolic blood pressure decreased. A significant relationship was seen between knowledge and treatment adherence too [20]. The findings of this study are in line with the present study, but the lecture method requires physical presence, which limits the training sessions, as well as the transportation costs for the patient. Therefore, traditional teaching methods have their own limitations, while the effectiveness of some methods using modern teaching methods confirmed in improving dietary adherence. So that in Som et al. study, patients with low adherence to hemodialysis sessions were informed by SMS, which improved their adherence [30]. So, the effectiveness of using tele-education on improving the treatment adherence has been approved which does not have the disadvantages and limitations of the traditional methods.

Conclusion

The findings of this study showed that after 12 weeks of telenursing, the dietary adherence in patients on hemodialysis was significantly improved. The main goal in controlling chronic diseases is focusing on empowering and engaging the patient in decision making. In patients on hemodialysis, although the care team provides the treatment plan, it is the patient who needs to implement accept and adhere the treatment regimen. Therefore, educating to the patient and his family is a major factor in hemodialysis treatment and has

the same importance of other components of the treatment regimen [7]. On the other hand, because of the chronic nature of hemodialysis, patients need time to adapt to illness and learn to change their lifestyles, and their self-care abilities should be monitored constantly. Self-controlling in patients on hemodialysis is the responsibility of the patient and his family, but they should be strengthened to accept that. Therefore, in addition to training, following-up is necessary aiming to establish a continuous and dynamic care relationship to increase knowledge and enhance effective care that improves the quality of life of patients, decreases the complications of the disease, increases the satisfaction of the patients and promotes the level of health and quality of care services. And also it can be performed by means of remote tracking such as telephone.

It is suggested that more studies be conducted nationally addressing the cost-effectiveness of remote follow-up procedures for people with various chronic diseases that are one of the problems of this century. In addition, according to the findings of the current study, it is necessary that health policy makers provide the infrastructure for training and following up in this method for patients with chronic diseases.

Ethical considerations

Ethical considerations have been regarded carefully all of research's stages. The present study was proved by the Research council affiliated with Islamic Azad University, Isfahan [Khorasgan] Branch. The written informed consents signed by participants to enter the study. They were ascertained about confidentiality of the information and anonymity, and they could leave the study at any stage

Conflict of interests

The authors have no financial interest related to this article.

Acknowledgment

This study has been master thesis of the first author. It approved by the Research council affiliated with Islamic Azad University, Isfahan (Khorasgan] Branch without financial support.

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