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The Impact of Multidisciplinary Rehabilitation on Depressive Symptoms in Hemodialysis Patients

Shirin Mohammadi-Kalaveh[1], Tahereh Toulabi[1], Shirin Hasanvand[1], Mohammad Gholami[1], and Fatemeh Ghasemi[1]

Abstract

Depressive symptom is the most frequent psychological problem reported among chronic kidney disease (CKD) patients being treated by hemodialysis. This article evaluates the effectiveness of multidisciplinary rehabilitation on depressive symptoms in hemodialysis patients and clarifies the role of nurses. This quasi-experimental study was done on 30 patients in the hemodialysis center (educational hospital) in 2013. Eight rehabilitation plans were conducted by nurses. Beck Depression Inventory (BDI) was used before and after intervention. Our data were analyzed using descriptive and inferential statistics. Result of this study shows that there was a significant difference between mean depressive symptom score before (36.4 ± 10.9) and after (10.5 ± 3.1) rehabilitation ($p < .001$). It is recommended that rehabilitation program be implemented in all hemodialysis centers with the participation of specialists in different fields.

Keywords

multidisciplinary rehabilitation, depression symptoms, hemodialysis, nursing, chronic kidney disease, physiotherapy, psychotherapy

[1]Lorestan University of Medical Sciences, Khorramabad, Iran

Corresponding Author:
Tahereh Toulabi, Social Determinants of Health Research Center, Department of Nursing, School of Nursing and Midwifery, Lorestan University of Medical Sciences, Khorramabad, Iran, zip code: 6816933989.
Email: tolabi.t@lums.ac.ir

Advanced chronic renal failure (CRF) is the consequence of damage to more than 75% of nephrons, making the affected patients unable to maintain the metabolism and balance of water and electrolytes (Moeller, Fuglsang, & Fenton, 2016). The high prevalence of chronic kidney disease (CKD) among individuals, aged 20 years and above, in an urban population in Iran is 14.9% (Tabrizi et al., 2016), 13.1% in the United States (Ali, Mwendwa, Sims, Ricks, & Sumner, 2016), 11.2% in Australia (Hoy et al., 2016), and 10.1% in Singapore and Southeast Asia (Lee et al., 2016).

Some of the treatment options for patients with CRF include hemodialysis, peritoneal dialysis, and kidney transplant (O'Lone et al., 2016). Hemodialysis is considered the most common treatment modality. It has been estimated that more than 70% of the patients with CRF will be residents of developing countries by 2030 (Barsoum, 2006).

Hemodialysis causes some limitations and stress in daily life. In addition to various physiological changes, hemodialysis patients are faced with various types of psychological stress, and each one can potentially cause mental and personality disorders in this group (Toulabi, Mohammadi-Kalaveh, Ghasemi, & Anbari, 2015). Most of these patients cannot cope with difficulties and stresses; thus, they may develop behavioral disorders such as anxiety, depressive symptom, isolation, delusion, and hallucination. Other psychiatric disorders have also been observed in hemodialysis patients. Depressive symptoms may cause long-term consequences and increase resistance to treatment. The stressors associated with end-stage renal disease (ESRD) include biochemical imbalances, physiological changes, cognitive and neurological anorexia, and sexual dysfunction, all of which can play a role in depressive symptoms (Finnegan-John & Thomas, 2013). It is the duty of the American Dietetic Association that nutrition intervention, including nutritional counseling, should be enacted by a registered dietitian. This is a crucial requirement of the team treatment of patients with bulimia nervosa, anorexia nervosa, and other eating disorders during treatment and assessment across the continuum of care (American Dietetic Association, 2006).

Group therapy is a psychological rehabilitation service in which the therapist corrects patients' interactions and thoughts based on regular effective instructions. Data from several studies suggest that cognitive behavioral group therapy significantly reduces anxiety and depressive symptoms (Ahmadvand, Saei, Sepehrmanesh, & Ghanbari, 2012), and increases self-care, self-efficacy, quality of life, and quality of sleep in hemodialysis patients (Chen, Chiang, Wang, Hung, & Lee, 2008).

Potential difficulties related to joint and problems of the muscle also trigger depressive symptoms. Muscular and movement defects were diagnosed, and planning for the sessions, as well as using the appropriate equipment for

physiotherapy were done (Toulabi, Khosh Niyat Nikoo, Amini, Nazari, & Mardani, 2012). Some studies have showed that exercise could ameliorate anemia and reduce the level of low density lipoprotein (LDL) in hemodialysis patients. Exercise has also been confirmed to ameliorate neuromuscular symptoms and fatigue (Dubach, Sixt, & Myers, 2001). Kouidi et al. (2010) in a pilot trial showed that aerobic exercise ameliorated depressive symptom, whereas a randomized trial of 96 patients on hemodialysis therapy revealed that there was no significant importance of exercise training (ET) on depressive symptom scores after 1 year (Van Vilsteren, de Greef, & Huisman, 2005).

Treatments for depressive symptom in patients with ESRD include antidepressants and cognitive behavioral therapy (Atalay et al., 2010; Koo et al., 2005; Wuerth, Finkelstein, Kliger, & Finkelstein, 2003). Ahmadvand et al. (2012) and Chen et al. (2008) demonstrated that cognitive behavioral group therapy has proved to be effective in increasing self-care, self-efficacy, quality of life, and quality of sleep in hemodialysis patients.

Given the foregoing statements, it appears that the execution of a coherent group rehabilitation program can decrease the anxiety and depressive symptoms, and develop consistency, satisfaction, and increased quality of life (Byrne & Murphy, 2010).

Purpose

This article evaluates the effectiveness of multidisciplinary rehabilitation on depressive symptoms in hemodialysis patients and clarifies the role of nurses.

Method

In this quasi-experimental study, 30 patients were recruited at the hemodialysis center. Initially, 31 patients were sampled, of which one refused to participate. Out of the 30 patients left, none drop out of the intervention rehabilitation.

Inclusion Criteria

Criteria for selecting the participants were as follows: undergoing at least one dialysis for 3 to 4 hr in a week; at least 6 months passed from starting hemodialysis; having good physical conditions; willingness to participate in educational programs; no previous training; no simultaneous participation in training programs during the study; having no cognitive, hearing, or visual impairments; not suffering from any severe mental disorder (confirmed by clinical psychologist); and no history of consuming psychiatric drugs.

The nutrition training program was applied to define nutritional therapy goals, to determine the causes and treatment of anorexia, and to moderate daily fluid intake. The Dietary Approaches to Stop Hypertension (DASH; diet) trial showed that diet containing fruits, vegetables, and low-fat dairy products, including poultry, fish, whole grains and nuts, sweets, small amounts of red meat, and sugar-containing beverages, and those containing decreased amounts of total saturated fat and cholesterol, lowers blood pressure substantially both in people with hypertension and without hypertension, as compared with a typical diet (Appel et al., 1997).

Exclusion Criteria

Exclusion criteria for the hemodialysis participants were migration, changing therapeutic plan to peritoneal dialysis or transplant, failure to cooperate in providing the required data, incomplete rehabilitation program, and serious family or social crisis (e.g., loss of immediate family member or job, divorce, and dropout).

Intervention and Procedures

The experimental group received eight sessions of physiotherapy, eight sessions of psychotherapy, and eight sessions of nutritional education and self-care (one session per hour per week). Intervention programs were delivered on three topics per 3-hr visit, every week, for a total of 24 visits in 8 weeks, as the minimum sufficient period for this study (Table 1). All interventions were carried out a day after dialysis, because, on the day hemodialysis was given to the patients, they were so fatigued and have insufficient energy to continue the intervention program. Visits were conducted face to face (Toulabi et al., 2015).

This study was conducted by a licensed nurse with extensive specialized training in psychotherapy. The patients attended sessions when they were off hemodialysis. The sessions lasted 24 hr and were organized on the basis of a manualized methodology proposed by Lewinsohn et al., 2001.

Physiotherapy plan. In each session, 1 hr of exercise therapy includes muscle recovery by shoulder wheel (with the exception of the fistula), stationary bike, cervical and lumbar traction, and chair quadriceps by physiotherapist in a private physiotherapy clinic in the evenings after hemodialysis. In the first session chiropractor, each patient on an individual basis in terms of restrictions on movement and mobility problems using special tests and measurements evaluates the results of the review examination, then the mobility and

Table 1. Absolute and Relative Frequencies of Demographic Variables and Duration of Dialysis in Patients at a Dialysis Center in 2013.

Variable	Absolute Frequency	Relative Frequency
Age (years)		
20-39	3	10.0
40-59	14	46.7
≥60	13	43.3
Gender		
Male	18	60
Female	12	40
Marital status		
Unmarried	2	6.7
Married	28	93.3
Education		
Uneducated	21	70.0
Elementary and lower	5	16.7
Secondary and diploma	3	10.0
University	1	3.3
Employment		
Employed	5	16.7
Unemployed	25	83.3
Duration of dialysis (years)		
≤1	9	30
1-5	15	50
≥5	6	20

muscular defects were detected. Planning and selection means for physiotherapy sessions were carried out by the patients during a 1-hr session per week, for 8 weeks using physical and mechanical physiotherapy, under the supervision of a physiotherapist but separately from cognitive therapy due to the loss of energy resulting from the later. At the end of each of the three sessions, patients evaluated physiotherapy on an educational pamphlet.

Mental health plan. Mental health plan for group therapy sessions of cognitive therapy, and the educational package was performed. To improve the depressive symptom, mixed sessions in groups of seven to eight people, men and women, for a period of eight sessions in 2 months, 1-hr weekly, were conducted by an expert in clinical psychology in the era of hemodialysis following days in a private clinic. Topics discussed include a review of the

thoughts and beliefs of patients, identification of thoughts, teaching the do's and don'ts, familiarizing them with logical thoughts, and generalizing the acquired skills to all life situations based on the educational package. At the end of each training session, we debated and dialogued with the patient collectively. At the first meeting, we discussed with patients about the family interactions and try to be familiar with their thoughts, and in the second meeting, negative thoughts, how to identify them and their effect on life were discussed. At the start of the third session, negative thoughts and appropriate ways of dealing with it were discussed, and then, each patient was asked to think and identify some negative effects. In the fourth session, reviewing the materials prior to meetings, the do's and don'ts, and insisting in emotion expression were discussed. In the fifth session, introduction to cognitive errors and how to use the word better, or Gods' willing, in the face of these ideas were taught. The sixth session discussed the ideas of equality and education in the present world; there is no such thing as being equal, patients were the examples in this regard, and this relationship is presented. In the seventh session, issues relevant to teaching cognitive errors, exaggerated generalization, and questions and answers on how to deal with these thoughts were presented. In the eighth session, previous sessions and review of the need to extend their life were emphasized.

Therapeutic feeding program and self-care. Topics of interest in the therapeutic feeding program curative purposes include causes and treatment of anorexia; causes and effects of malnourishment; how to diet; limiting salt intake, potassium, and phosphorus; adjusting daily fluid intake; consumption of alternative foods; controlling hyperlipidemia affecting the use of vitamin; and protein intake. Self-care program topics include how to comply with the prescribed medication regimen, setting the time for using drugs, how to be physically active, fistulas and central catheter care, sleep disorders, and skin care. All the above aspects in the training package were based on scientific and nursing books approved by the Ministry of Health's Office of Special Diseases and Transplantation. Mixed training and classes for seven to eight groups of male and female were prepared. Questions and brainstorming were interacted by the researcher (especially nurses) in the section and during hemodialysis. In the training sessions, educational facilities for simple, understandable, and without the use of specialized medical terminology were presented. At the end of each session, the patients were asked to learn the principles that are applied at home. In the same way, educational materials were presented to the patients at the end of each session formally in the form of educational pamphlet. Based on the educational package, in first session issues relevant to nutritional restrictions of hemodialysis patients, lack of

balance in material, food and malnutrition complications and discussion in relation to limit the protein intake information about variety of desirable and undesirable proteins and allowed amount of protein, and how to care for vascular access had been educated. In the second session, to limit sodium intake, understanding food with high sodium levels and the introduction of alternative food with flavor were offered. Patients were asked at the end, of the accumulation of water and salts in the body, symptoms and complications, and how to articulate skin care. At the third meeting, some information about the potassium diet and its limitation in diet had been presented and vegetables were divided into three levels: low potassium and foreign fruit-hodder, average potassium, and high potassium. Different ways of cooking vegetables and legumes to reduce potassium levels and sexual problems caused by hemodialysis were explained to the patients. In the fourth session, the patients familiarize with phosphorus in the body and the expression of foods with high phosphorus. In the fifth meeting, patients trained to measure fluid intake, ways to reduce thirst and drugs instructions, and finally the patients were asked to express their allowance overweight between the two dialysis sessions. In the sixth and seventh sessions, types of fats and vitamins, lot of dosage, and side effects were explained. In the eighth session, the causes of sleep disorders and depressive symptom in hemodialysis patients, and solutions to mitigate these problems were discussed.

Procedures. Psychotherapy program was carried out as cognitive group therapy based on Beck's theory of cognitive theory, using an educational package. To improve depressive symptoms, eight sessions were held by a Master of Clinical Psychology within groups of seven to eight individuals for a period of 2 months.

The sessions were offered in the afternoon of the day following hemodialysis at the private psychological clinic, 1-hr session per week. The issues under discussion include identification of patients' thoughts and beliefs, teaching them do's and don'ts, familiarizing them with logical thoughts, and generalizing the acquired skills to all life situations based on the educational package. At the end of each training session, there was also a group discussion with the patients.

Physiotherapy exercises were taken by a specialist for an hour in each session at the private clinic, the afternoon of the day following hemodialysis. The treatment program included rehabilitation of muscle by rotating the shoulders (except for the fistula equipment), stationary bike, neck and back traction as well as seated quadriceps stretch.

In the first session, the nurse examined each patient individually with regard to movement limitations and problems using special experiments,

measurements, and evaluation of the results. Therefore, movement and muscular defects were diagnosed; planning for the sessions, as well as selecting the appropriate equipment for physiotherapy, was carried out by the physiotherapist. Then, the patients received physiotherapy using physical and mechanical equipment for a 1-hr session per week for 2 months. At the end of each session, the patients' achievement was assessed, and three sports exercises, together with their repetition period and intensity, were offered to them as an educational pamphlet.

Therapeutic nutrition program and self-care were conducted by a researcher as 1 hr group sessions in the hospital during hemodialysis according to the program. The aim of the nutrition training program was to define the nutrition therapy goals, determine causes and treatment, and adjust daily fluid intake. Finally, the scale was again filled by the research assistant.

Prior to undertaking the investigation, ethical clearance was obtained from the ethical committee for approval. Research objectives were explained to the patients, and their informed written consents were obtained.

The first step in this process was to complete the personal information sheet (including age, gender, marital status, employment status, education, and history of hemodialysis), and Beck Depression Inventory (BDI) was filled by a research assistant during the interview.

Measures

BDI contains 21 multiple-choice questions, and the scoring is defined between 0 and 3 for each question, and the total score ranges from 0 to 63. The scores that range from 0 to 13 indicate the lowest degree of depressive symptom, 14 to 19 mild depressive symptom, 20 to 28 moderate depressive symptom, and 29 to 63 major depressive symptom. Beck et al. (1996) have assessed the test–retest reliability coefficient within a week as .93. Several other studies have also been conducted in Iran to evaluate the psychometric properties of this instrument. Among these studies, BDI reliability was .78, and varied from .70 to .90 in other studies (Bakhtiari & Abedi, 2012).

Analyses

Statistical analysis was performed using SPSS software. Descriptive statistical analysis was performed to calculate mean, standard deviation, and frequency; Wilcoxon's test was used to compare depressive symptom scores before and after implementing the rehabilitation program. A p value $<.05$ was considered significant.

Results

Thirty-one patients were analyzed and, after verifying the inclusion and exclusion criteria, 30 patients were left to participate in the study.

The mean age of the patients was 55.8 ± 14.3 years. Most of the patients were male (60%), and 93.3% were married ($p = .001$). Based on their educational level, 70% of the patients were uneducated, and only 3.3% had a university degree. Most of them (83.3%) were unemployed. The average duration of hemodialysis was 3 ± 2.4 years (Table 1).

Our results also showed that there was no significant difference between the mean rates of depressive symptoms based on age, gender, marital status, education, and duration of hemodialysis.

The comparison between depressive symptom rates before and after intervention showed that the patients' mean score was 10.5 after intervention, which indicates a significant decrease compared with the patients' mean score before intervention (36.4). This result showed a better condition for the patients' depressive symptom status after implementing multidisciplinary rehabilitation interventions ($p < .001$).

The comparative analysis of depressive symptom scores in hemodialysis patients (Table 2) using Wilcoxon's test showed that the mean depressive symptom score in different age groups before and after intervention was statistically significant and indicated the reduction of depressive symptom after rehabilitation. In unmarried patients, differences in depressive symptom scores before and after rehabilitation were not statistically significant. However, in married patients, the reduction of depressive symptom score was significant after intervention. Finally, the comparison between depressive symptom scores in employed and unemployed patients showed that both groups had statistically significant reduction in scores of depressive symptoms after the rehabilitation program.

Discussion

The present study was designed to determine the effect of multidisciplinary rehabilitation on depressive symptoms in hemodialysis patients; we found that the patients' mean scores of depressive symptoms after intervention have significantly decreased compared with the mean score before intervention (Van Loon et al., 2016). Our result shows the patients' better conditions regarding depressive symptom after applying rehabilitation interventions. This finding indicated that rehabilitation can be effective in reducing psychological symptoms in hemodialysis patients which is consistent with Baines, Joseph, and Jindal (2004) who studied the effects of psychological interventions on the improvement of patients' conditions.

Table 2. Mean Depression Scores in Patients Before and After Rehabilitation.

Variable	Depression Score Before Rehabilitation, *M* ± *SD*	Depression Score After Rehabilitation, *M* ± *SD*	*Z*	*p* Value
Gender				
Male	36.0 ± 12.1	9.7 ± 3.2	−3.72	<.001
Female	37.1 ± 9.5	11.8 ± 2.8	−3.06	.020
Age groups (years)				
25-44	40.5 ± 7.8	11.2 ± 3.4	−2.63	.018
45-64	34.5 ± 12.1	10.2 ± 3.3	−3.5	<.001
≥65	36.7 ± 11.4	10.7 ± 2.9	−2.3	.018
Marital status				
Unmarried	38.0 ± 8.4	11.5 ± 2.1	−1.34	.180
Married	36.3 ± 11.3	10.5 ± 3.2	−4.6	<.001
Employment				
Employed	33.8 ± 11.58	7.8 ± 1.5	−2.02	.043
Unemployed	36.9 ± 11.1	11.1 ± 3.1	−4.37	<.001

Recently, Duarte, Miyazaki, Blay, and Sesso (2009) carried out a 12-week randomized trial using group cognitive behavioral therapy for major depressive symptom in patients with hemodialysis therapy. Patients receiving cognitive behavioral therapy had significant improvements in BDI and sleep, burden of kidney disease, and overall health scores as measured by the Kidney Disease Quality of Life Short Form compared with control (Duarte et al., 2009).

Afshar, Shegarfy, Shavandi, and Sanavi (2010) showed that the depressive symptom score of 120 hemodialysis patients in educational hospitals was reported as 26.7 based on BDI, which does not correlate with any of the variables like age, gender, duration of hemodialysis, as well as marital and employment statuses. In the Ahmadvand and colleagues (2012) study on 36 hemodialysis patients, the depressive symptom score of hemodialysis patients after intervention in the cognitive behavioral group therapy reduced from 35 to 22. In a similar study by Afkandi, Nourozi Tabrizi, Fallahi Khoshknab, and Reza Soltani (2012) on 70 cognitive behavioral therapies on dialysis patients, psychosocial rehabilitation was performed in a multidimensional model of care for 3 months, and the depressive symptom score decreased from 30 to 24. In a quasi-experimental study (Rahimi, Ahamadi, & Gholiaf, 2006) on 85 patients, depressive symptom was decreased from 14 to 12 after intervention. However, in this present study, the mean depressive symptom score showed a larger decrease (36.4 to 10.5).

However, Yeh et al. (2004) showed that there was no correlation between depressive symptom, age, and gender, but depressive symptom is less frequent among married people. The mean depressive symptom score significantly reduced after intervention. This indicated a better condition for depressed patients after rehabilitation. Thus, rehabilitation program can be effective in reducing psychological symptoms in hemodialysis patients. The overall reduction in depressive symptom scores after intervention suggests that group therapy can positively affect the patients' mood, by improving the psychological and cognitive conditions of the patient.

Carney, Wetzel, Hagberg, and Goldberg (1986) discovered a positive relationship between depressive symptom and hemodialysis patients' aerobic capacity. The result of their study showed that the reduction in BDI and Hospital Anxiety and Depression Scale (HADS) scores after ET may affect the autonomic nervous system. Thus, our findings give evidence for the efficacy of ET in the reduction of the level of sympathetic response to mental stress in patients with hemodialysis.

Furthermore, Blumenfield et al. (1997) proposed that 16 weeks of aerobic exercise and stress management training boost cardiac autonomic and endothelial function, via improvement in the psychosocial adjustment in coronary heart disease patients. Other studies showed that exercise could improve anemia and decrease LDL level in hemodialysis patients. In addition, fatigue and neuromuscular symptoms were improved. A similar merit of ET on sympathoadrenal response to mental stress in healthy people was described by Blumenthal et al. (1990) in earlier study. These studies raise suggestion that antidepressant clinical interventions can be efficient in decreasing traditional cardiovascular risk factors. In contrast to the above study, Sothmann, Hart, and Horn (1992) did not support the hypothesis that short-term ET affects the sympathetic nervous system activity and behavioral measures in middle-aged men exposed to an acute psychological challenge.

The findings of this research showed that there were no significant differences in the mean score of depressive symptom based on age, gender, marital status, education, and duration of hemodialysis in the recruited patients, which is consistent with the findings of other studies.

In all the studies focusing on depressive symptom and methods of reducing and treating it, in hemodialysis patients, more attention has been attached to its prevalence and group therapy interventions. However, without considering other factors such as the impact of lifestyle, physical activity, and food and nutritional habits, the patients' problems including depressive symptom cannot be decreased. The results of this study indicate that, through rehabilitation implementation, contributions of other subspecialties, and execution of an interdisciplinary care program, depressive symptom will be reduced in hemodialysis patients and their psychological status will be improved.

Single group pre–post design was the important limitation to this study, as the number of sample with the inclusion criteria was little. The intervention program has different dimensions, such as physiotherapy, and education about their diet and self-care; merging these two groups was difficult for confounding variables. So the best method was single group pre–post design. However, for more reliable results, studies with larger sample size and randomized clinical trial in two experimental and control groups are suggested.

One of the limitations of this study was the time allotted to assess the depressive symptoms (8 weeks). It would have been better if it was performed over a longer period of time. The possibility of receiving education through media during the study was out of control for the researchers, and the small number of samples was another limitation in this research.

In conclusion, considering the effect of rehabilitation on depressive symptom in hemodialysis patients, it is recommended that rehabilitation program be implemented with the participation of specialists from different fields in all hemodialysis centers. It is also suggested that future studies focus on effectiveness of rehabilitation programs on the frequency of hemodialysis, blood parameters, hemodynamic status, and patient satisfaction.

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