

# Evaluation of the effect of the follow-up caring model on depression syndrome among the patients treated by hemodialysis in the north of Iran

*Evaluación del efecto del modelo de seguimiento sobre el síndrome de depresión entre los pacientes tratados con hemodiálisis en el norte de Irán*

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## Abstract

**Introduction:** The prevalence of chronic renal failure is increasing worldwide for multiple reasons. Hemodialysis therapy is a method to recover patients with chronic renal failure. This treatment affects people's moods and exposes them to depression due to changing occupational, family, and social situations.

**Objective:** The aim of this study was to determine the effect of continuous care model on depression syndrome in hemodialysis patients.

**Methods:** the sample of this quasi-experimental study was 76 permanent hemodialysis patients in the dialysis ward. In the first phase of the study, the investigation of depressive states was all included sample. From 90 screened patients, 76 met the inclusion criteria of the study. They were divided into interference and control groups. The Beck Short Form Questionnaire was used to determine the impact of follow-up care. Data were entered in 21st version of SPSS software. Descriptive statistics indices and independent t-test, Mann-Whitney U, Wilcoxon and linear regression models were used to analyze the quantitative and qualitative data.

**Findings:** Results showed that before intervention there was no significant difference between the two groups in terms of depression level (mild, moderate, and severe); but pretreatment to post-training depression syndrome was statistically significant ( $P < 0/001$ ).

**Conclusion:** Providing Continuous care model is effective in reducing depression syndrome in hemodialysis patients.

**Keywords:** follow-up caring model, depression, hemodialysis.

## Resumen

**Resumen:** Introducción: la prevalencia de insuficiencia renal crónica está aumentando en todo el mundo por múltiples razones. La terapia de hemodiálisis es un método para recuperar pacientes con insuficiencia renal crónica. Este tratamiento afecta el estado de ánimo de las personas y las expone a la depresión debido a los cambios en las situaciones laborales, familiares y sociales.

**Objetivo:** El objetivo de este estudio fue determinar el efecto del modelo de atención continua sobre el síndrome de depresión en pacientes en hemodiálisis.

**Métodos:** las muestras de este estudio cuasi-experimental fueron 76 pacientes de hemodiálisis permanentes en la sala de diálisis. En la primera fase del estudio, la investigación de los estados depresivos fue todos los casos de muestra. De 90 pacientes seleccionados, 76 cumplieron los criterios de inclusión del estudio. Se dividieron en grupos de interferencia y control. El cuestionario de formulario corto de Beck se utilizó para determinar el impacto de la atención de seguimiento. Los datos se ingresaron en la versión 21 del software SPSS. Se utilizaron índices estadísticos descriptivos y pruebas t independientes, U de Mann-Whitney, Wilcoxon y modelos de regresión lineal para analizar los datos cuantitativos y cualitativos.

**Resultados:** los resultados mostraron que antes de la intervención no había diferencias significativas entre los dos grupos en términos de nivel de depresión (leve, moderada y grave); pero el tratamiento previo al síndrome de depresión post-entrenamiento fue estadísticamente significativo ( $P < 0/001$ ).

**Conclusión:** Proporcionar un modelo de atención continua es eficaz para reducir el síndrome de depresión en pacientes en hemodiálisis.

**Palabras clave:** modelo de atención de seguimiento, depresión, hemodiálisis.

The prevalence of chronic kidney failure is increasing in the world<sup>1</sup>. Nowadays, 3% of people in the world suffer from chronic kidney failure and the number of people who are affected by it is doubling every 7 years. The rate of death caused by this disease per year is 6000 people around the world<sup>2</sup>. Based on the latest statistics released by the Center of Transplantation and Specific Diseases, the number of end-stage kidney failure patients is approximately 25000 in Iran that more than 50% of them are undergoing hemodialysis<sup>3</sup>. Dialysis is considered as one of the alternative treatments for this disease and hemodialysis is the most common method of dialysis<sup>4</sup>. Hemodialysis involves the process of purifying blood from the wastes accumulated in the body. It is a complex treatment that requires a professional health caring<sup>5</sup>. The job, family and social status of these patients undergo great changes as a result of frequent hemodialysis. These changes affect the people's moods and make it difficult for the patients to cope with life challenges<sup>6</sup>. The key symptom of depression is depressed mood and lack of interest or pleasure or low mood<sup>7</sup>. Clinical symptoms of depression include cognitive (decreased ability to concentrate and difficulty in decision making), biological (psychological stimulation, abnormal sleep patterns, apparent sadness, fatigue, weight loss or weight gain, loss of appetite and loss of sexual desire), behavioral (frequent thinking about death, loss of interest or pleasure, feeling guilty and viewing illness as punishment) and social (communication problem and dysfunction) domains<sup>8</sup>.

Based on a number of researchers at the World Health Organization, depression is the most tragic disease, and its early diagnosis is one of the most important health priorities at global level. The World Health Organization (WHO) has considered depression as a crucial issue in adolescents and young people, and has announced addressing this mental disorder as its slogan for World Health Day in 2017<sup>9</sup>. The World Health Organization argues that depression will be the second most common disease in the world by 2020. The prevalence of depression in women is five times higher than that in men. It may be related to hormonal and labor issues<sup>7</sup>. Depression as the fourth leading cause of disability around the world is one of the most common mental disorders in chronic kidney failure patients. Studies have been conducted on the impact of psychological factors on patients with end-stage chronic kidney failure in the past three decades. The results of a study conducted in Africa showed that depression was the most common mental disorder in hemodialysis patients (34.5%). The rate of depression in African Americans was 27% and its prevalence in Sudanese hemodialysis patients was reported to be 72%<sup>10</sup>. The prevalence of depression in the

hemodialysis patients in Pakistan has been reported to be 14 to 83%<sup>11</sup>. In a research conducted in Saudi Arabia, many reasons were reported for the mental disease in patients with end-stage kidney failure, including multiple drugs, disease-related stress and multiple hospitalizations. It was also stated that the depression is the most common mental disease in these patients. This study also revealed that depression is effective in self-care of these patients, and weakens adherence to dialysis. It also referred to another in which the risk of depression in hemodialysis patients was four times higher than that in the general population<sup>12</sup>. The prevalence of depression in dialysis patients in Iran is higher than that in developed countries<sup>6</sup>. The prevalence of depression and anxiety in hemodialysis patients in Iran has been reported to be 50 to 80% and 20 to 60%; respectively<sup>13</sup>. The results of a systematic review article show that 63% of hemodialysis patients in Iran are affected by depression. The highest prevalence of depression has been reported in Sanandaj city (93%), and the lowest has been reported in Tehran (28%)<sup>6</sup>.

Various studies have been carried out to decrease the anxiety and depression in hemodialysis patients. Chemical drugs are one of the conventional treatments that are beyond the responsibility of nurses. In Iran, a continuous care model was designed and evaluated by Ahmadi (2001) with regard to the patients with chronic coronary. The Continuous care model is an Iranian native care model. This model consists of four sections, including familiarization, sensitization, control and evaluation. This model introduces the patient as the agent of continuous and influential care in his or her health process. Continuous care is a regular process for establishing an effective and interactive communication between the patient and the nurse, providing health care to identify the needs and problems and to sensitize the patient to accept continuous health behaviors in order to improve their recovery and enhance their health.

This care is completely in line with the characteristics of the chronic diseases and the dynamics of their problems. The aim of this study is to establish and maintain a continuous and dynamic care relationship to enhance the knowledge and practice of effective care process and consequently to reduce the level of anxiety, stress and depression in dialysis patients and to improve the level of health and quality of care services<sup>36</sup>. Continuous and effective care relationship means establishing an interactive and dynamic relationship between the nurse, the patient and his / her family, in which both the quality of the care and the content, method and nature of the provided services are taken into account<sup>14</sup>. Various studies have evaluated the effect of continuous care model on variables such as the quality of life of the chemotherapy patients, sleep quality and life of hemodialysis patients and depression of these patients. All of these studies have reported the positive effect of applying this model. However, little research has been conducted to evaluate the prevalence of depression and its treatment in he-

modialysis patients by using a continuous care model. Hence, the present study was conducted to evaluate the effect of continuous care model on depression syndrome of patients treated in hemodialysis ward of Taleh Shahid Nourani hospital.

**T**his study is a quasi-experimental intervention-al study. The study population included hemodialysis patients in the hemodialysis ward of Taleh Shahid Nourani Hospital in 2018-2019. The sampling method was in a way that all hemodialysis patients in Hemodialysis ward of Taleh Shahid Nourani Hospital who had dialysis in three work shifts of morning, evening, and night shifts were screened in terms of symptoms of depression by using short form of Beck Depression Inventory. Inclusion criteria of the study included patients with permanent dialysis, patients with a history of more than one year of dialysis, age over 15 years, stabilized vital and physical symptoms or lack of any disease affecting cognitive ability, lack of previous hospitalization in psychiatric ward and having mild, moderate, and severe depressive symptoms.

After screening the study subjects, out of the 90 patients, 76 patients were included in the study. After obtaining written informed consent and verbal justification of these patients based on quadruple randomized blocks, they were randomly assigned to two equal groups intervention and control (each group included 38 patients). Two patients in the intervention group were excluded due to death, and one patient in control group was excluded due to death and one was excluded due to kidney transplantation. Finally, data were analyzed on 36 patients in each of the groups. The subjects were trained for 3 months. Accordingly, the control group received only routine care, but the intervention group received continuous care model in addition to routine care of the ward.

Based on the research objectives, the data collection tools included demographic questionnaire and Beck Depression Inventory. Demographic questionnaire included patient age (year), gender (female, male), marital status (single, marital), education level, job status, economic status and income level, living place (city or village), history of dialysis, history of psychological diseases, number of people supported by the head of family, insurance status, awareness of the disease, interest in obtaining information about the disease, limitations of the disease, education in the field of disease, and promotion of quality of life.

The short form of the Beck Depression Inventory (Ward, Mendelssohn, Muck, & Erba 1961, quoted by Stirr & Beck, 1988) is a 13-item questionnaire used widely to assess the severity of depression in patients with psy-

chiatric diagnosis. It has been used for diagnosis of the disease in normal population. This questionnaire can be used for a population of people aged 13 years and over. In this questionnaire, the depression score is between 0 and 63. Minor depression is represented by a score of 0-13, mild depression is represented by a score of 19-19, moderate depression is represented by a score of 20-28 and severe depression is represented by a score of 29-63. Validation studies conducted on the Beck Depression Inventory have reported good reliability, validity, and factor structure for this questionnaire.

First, after receiving informed consent from the subjects of intervention and control groups, the subjects of control group received only routine care during the three months, but the intervention or intervention group, in addition to routine care, received training in four stages of familiarization, sensitization, control and evaluation by using a continuous care model introduced by Ahmadi in 2006. At the first stage, the familiarization was performed in order to implement the continuous care model. At this stage, the patients in the intervention group were placed in a room or in adjacent beds. This stage was in fact the starting point of the research in a continuous care model that was implemented with the aim of establishing a communication between the patient and the care team. In this section, the researcher held a 60-45 minute session with the patient and his or her family during dialysis. In this session, patients and researchers expressed their expectations.

An agreement was achieved on time of the training sessions, and an emphasis was put on the care-treatment relationship. In the second stage that was the sensitization stage, the patients gained knowledge on the nature of the disease by focusing more on chronic kidney failure, its early and late complications, the care and follow-up required by the patient and family, and their involvement in the care process. This stage was performed over three 60-90 minutes sessions in the intervention group, depending on the days or morning or evening dialysis shifts during the dialysis.

The most important measures taken for dialysis patients at this stage were in the form of care counseling and training and support. They were provided for patients through lectures, counseling, questions and answers and practical implementation of self-care skills, especially fistula care, training the nutrition of dialysis patients nutrition by a hospital nutritionist, providing psychiatric consultation if needed, use of social worker consultations, meeting patients' physical and spiritual needs, encouraging for transplantation, referring to cardiologist, nephrologist, monitoring one-month, three-month, and six-month tests and addressing and following up of patients' problems according to their tests and even following up of them when they are at home and guiding them to resolve their problems, familiarizing dialysis patients with short history of dialysis with patients who have long history of dialysis, and familiarizing dialysis patients with patients who have

had kidney transplantation for several years to motivate and create hope for life in them.

The next stage (Stage 3) was the control stage, aimed at institutionalizing and maintaining health behaviors as a part of health promotion. The measures taken at this stage include indirectly reviewing and evaluating acquired skills, assessing the sustainability of health behaviors, assessing new needs based on the new needs and re-sensitization on problem solving, enhancing health behaviors, and justifying the beneficial effects of the measures based on improvement of tangible indicators, debating about the success or failure of measures and an explanation of the proposed solution with the help of the client and the family. At this stage, to achieve the goals of the continuous care model, continuous care training and counseling and re-sensitization were performed weekly by phone and in person, if needed. The next stage was the evaluation stage. The evaluation stage was considered as the final stage of the model, while it was done at all stages of the study. The aim of this stage was to examine the continuous care model, and the effect of the model implementation. Measures included evaluating the desired indicators by completing a questionnaire or clinical and Para clinical findings, examining client statements on behaviors and their possible continuity, attempting to institutionalize and maintain the behaviors, and control. After collecting the data, they were entered into SPSS 21 software. Descriptive statistics and independent t-test, Mann-Whitney U and Wilcoxon tests were used to analyze the quantitative and qualitative data. Linear regression model was used to control the effect of the previous score on the next score. The significance level of tests was considered at the level of  $P < 0.05$ .

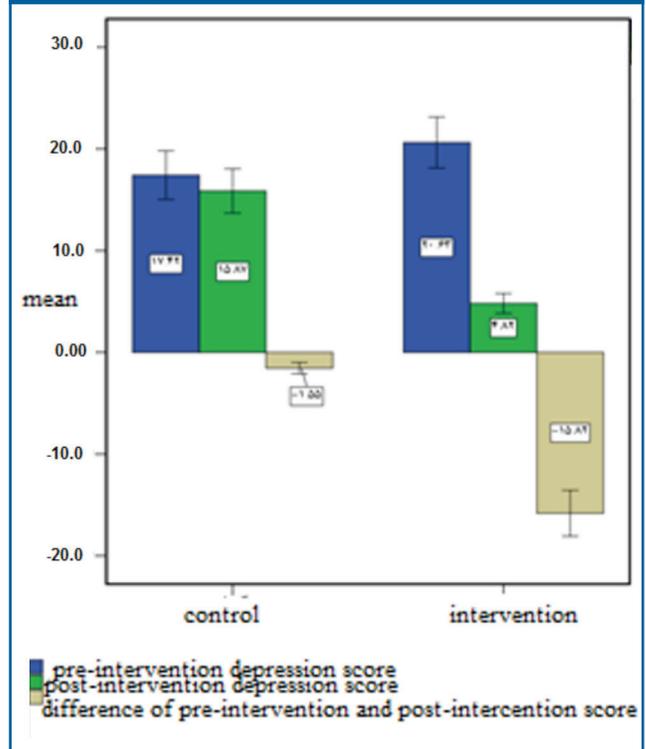
## Results

**R**esearch results revealed that the mean and standard deviation of the age of the samples were  $57.2 \pm 15.2$  and the majority of samples were in the age group of 50-69 years. Majority of the subjects (57.9%) were male, and majority of them (73.7%) were married. In terms of the level of education, majority of them (59.2%) were illiterate. In terms of job status, majority of them (52.6%) were disabled. In terms of monthly income, majority of them (50%) had a monthly income of less than 5000000 Rials, and 65.8% of them were living in the village. In terms of the number of members supported by the head of family, majority of them (42.1%) did not support anyone. The comparison of frequency distribution of socioeconomic variables based on independent t-test, chi-square and Fisher exact tests showed that there was no significant difference between the two studied groups (intervention and control groups) ( $P > 0.05$ ).

The results also showed that 65.8% of the subjects had a history of more than two years of dialysis. In terms of insurance status, majority of them (72.4%) had specific insure acne. Moreover, 77.6% of the subjects expressed that they were interested in obtaining information. Chi-square and Fisher's exact tests showed that there was no significant difference between the two groups in terms of variables related to the disease ( $P > 0.05$ ).

There was no statistically significant difference between the two groups in terms of depression syndrome score based on independent t-test ( $P = 0.064$ ) at all. However, this score in the intervention group showed a greater reduction than the control group after training, and this difference was statistically significant ( $P < 0.001$ ) based on Mann-Whitney U test. In the control group, the mean score decreased by  $1.6 \pm 1.7$  with a median of 1, but this reduction was more in the intervention group with a mean of  $15.8 \pm 6.9$  with a median of 15 (**Chart 1**).

**Chart 1. Comparison of depression syndrome score and its changes in intervention and control groups before and after training**



Changes in severity of depression syndrome before and after training were significantly decreased in both control ( $P = 0.005$ ) and intervention ( $P < 0.001$ ) groups. However, there was no significant difference between control and intervention groups in severity of depression syndrome before training ( $P = 0.222$ ), but after training, the two groups had a significant difference in severity of depression syndrome ( $p < 0.001$ ) (**Table 1**).

Moreover, changes in depression score in intervention group based on age group ( $P = 0.10$ ), gender ( $P = 0.607$ ), marital status ( $P = 0.169$ ), job status ( $P = 0.502$ ), monthly income ( $P = 0.228$ ), living place ( $P = 0.666$ ), number of

people supported by head of family (P=0.687), education level (P=0.301), dialysis history (P=0.324), insurance status (p=0.355), interest in obtaining information (P=0.078), family support (P=0.648), patient restraint tolerance (P=0.433) and promotion of quality of life training (0.199) were not significantly different (**Tables 2 and 3**).

Based on the data shown in (Table 2), the effect of pre-intervention depression syndrome score on the post-intervention depression syndrome score was statistically

significant (P<0.001). Accordingly, after controlling for the effect of the pre-intervention score, the continuous care training reduced the score of depression syndrome compared to the control group (received no intervention) (12.7±0.880). The test power of the study was 0.999 and the effect size was 0.772 based on the squared Eta coefficient. The data of this (Table 3) and (**Table 4**) also indicate that pre-intervention depression syndrome score also affected post-intervention depression syndrome score (P<0.001).

**Table 1. Comparison of depression severity of the samples before and after the intervention in the intervention and control groups**

			control	Intervention	sum	P-Value		
Severity of depression before intervention	minor	%	8	3	11	0.229		
		n	21.05	7.89	14.47			
	mild	%	14	14	28			
		n	36.84	36.84	36.84			
	moderate	%	16	21	37			
		n	42.11	55.26	48.68			
	severe	%	38	38	76			
		%	100.00	100.00	100.00			
Severity of depression after intervention	minor	n	3	28	31	<0.001		
		%	7.89	73.68	40.79			
	mild	n	6	8	14			
		%	15.79	21.05	18.42			
	moderate	n	17	2	19			
		%	44.74	5.26	25.00			
	severe	N	12	0	12			
		%	31.58	00.	15.79			
	sum	N	38	38	76			
		%	100.00	100.00	100.00			
	P-Value			005.0	001.0			

**Table 2. Comparison of pre-intervention and post-intervention depression score changes in intervention group based on individual-economic variables**

		Difference of pre-intervention and post-intervention depression scores in intervention group						P-Value
		n	mean	SD	median	first quartile	third quartile	
Age	Lower than 50 years	12	-15.42-	6.23	15.00-	17.00-	11.00-	0.108
	69-50	14	13.36-	6.01	12.00-	17.00-	9.00-	
	Over 69 years	12	19.08-	7.54	18.50-	24.00-	13.50-	
	sum	38	15.82-	6.85	15.00-	19.00-	10.00-	
gender	female	17	16.65-	7.88	17.00-	22.00-	9.00-	0.607
	male	21	15.14-	6.00	15.00-	17.00-	11.00-	
	sum	38	15.82-	6.85	15.00-	19.00-	10.00-	
Marital status	married	30	14.87-	6.69	14.00-	19.00-	9.00-	0.169
	single	4	17.50-	5.57	16.50-	21.50-	13.50-	
	Divorced	4	21.25-	7.89	21.50-	27.50-	15.00-	
	Sum	38	15.82-	6.85	15.00-	19.00-	10.00-	
job	retired	3	12.67-	3.79	11.00-	17.00-	10.00-	0.502
	pensioner	2	13.50-	2.12	13.50-	15.00-	12.00-	
	housewife	10	14.70-	8.81	12.50-	17.00-	8.00-	
	Disabled	23	16.91-	6.48	16.00-	22.00-	11.00-	
	sum	38	15.82-	6.85	15.00-	19.00-	10.00-	
Level of education	Illiterate	22	16.82-	7.55	17.00-	22.00-	9.00-	0.301
	Under diploma	12	15.50-	6.07	15.00-	17.00-	11.00-	
	diploma	4	11.25-	2.99	11.00-	13.50-	9.00-	
	sum	38	15.82-	6.85	15.00-	19.00-	10.00-	
Monthly income level	Under 5000000 Rials	20	17.90-	7.98	17.50-	25.00-	10.00-	0.228
	5000000-10000000 Rials	9	14.44-	5.13	15.00-	16.00-	10.00-	
	10000000-20000000Rials	5	14.40-	3.65	16.00-	17.00-	11.00-	
	Over 20000000 Rials	4	10.25-	2.87	11.50-	12.00-	8.50-	
	sum	38	15.82-	6.85	15.00-	19.00-	10.00-	
Living place	city	9	12.67-	6.80	10.00-	15.00-	9.00-	0.066
	village	29	16.79-	6.68	16.00-	20.00-	12.00-	
	sum	38	15.82-	6.85	15.00-	19.00-	10.00-	
Number of members supported by head of family	no	19	16.32-	7.51	15.00-	22.00-	9.00-	0.678
	2-1	8	17.25-	7.03	16.50-	22.00-	11.00-	
	3-2	6	12.83-	3.66	13.00-	16.00-	10.00-	
	More than 3	5	15.20-	7.60	12.00-	16.00-	11.00-	
	sum	38	15.82-	6.85	15.00-	19.00-	10.00-	

**Table 3. Comparison of pre-intervention and post-intervention depression syndrome score changes in the intervention group according to disease-related variables**

		Difference in pre-intervention and post-intervention depression syndrome score changes in the intervention group						P-Value
		n	mean	SD	median	25 <sup>th</sup> percentile	75 <sup>th</sup> percentile	
dialysis	2-1	15	17.27	7.83	17.00	23.00	10.00	0.324
	More than 2	23	14.87	6.12	15.00	18.00	9.00	
	sum	38	15.82	6.85	15.00	19.00	10.00	
Insurance status	Yes I have	3	13.67	3.79	12.00	18.00	11.00	0.139
	I have specific insurance	30	16.90	7.09	15.50	22.00	12.00	
	I have specific and complementary insurance	5	10.60	4.04	10.00	11.00	9.00	
	sum	38	15.82	6.85	15.00	19.00	10.00	
Information and knowledge on the disease	no	14	17.14	7.21	16.00	22.00	12.00	0.355
	Limited	24	15.04	6.66	15.00	18.50	9.50	
	sum	38	15.82	6.85	15.00	19.00	10.00	
Interested in obtaining information and knowledge on disease	yes	27	14.19	5.99	13.00	17.00	10.00	0.078
	no	1	17.00	.	17.00	17.00	17.00	
	No ability of obtain	10	20.10	7.78	20.50	25.00	16.00	
Family support	yes	37	15.87	6.94	15.00	19.00	10.00	0.648
	no	1	17.00	.	17.00	17.00	17.00	
	sum	38	15.82	6.85	15.00	19.00	10.00	
Disease limitation tolerance	I have no tolerance anymore	2	17.50	2.12	17.50	19.00	16.00	0.432
	I cope with my disease	36	15.72	7.02	15.00	19.50	10.00	
	sum	38	15.82	6.85	15.00	19.00	10.00	
Promotion of quality of life training	I am interested	25	15.44	6.60	15.00	18.00	11.00	0.199
	I have no literacy	7	19.57	7.72	20.00	25.00	12.00	
	If family is trained, they will help me	6	13.00	6.07	11.00	17.00	9.00	
	sum	38	15.82	6.85	15.00	19.00	10.00	

**Table 4. Results of regression coefficients of intervention effect on the depression syndrome score by controlling the pre-intervention depression syndrome score**

parameter	Regression coefficient	Standard error	Statistic t	Significance level	Confidence interval %95		Effect coefficient	Test power
					Low bound	Upper bound		
Constant value	5.743	1.240	4.632	0.001<	8.215	3.272	0.227	0.995
pre-intervention depression syndrome score	0.512	0.054	9.535	0.001<	0.405	0.619	0.555	0.999
Intervention group	12.696	0.808	-15.716	0.001<	14.306	11.086	0.722	0.999

**T**he impact of continuous care model on depression syndrome in the hemodialysis patients was evaluated in this study. Based on the results of this study, the severity of depression syndrome training at all, but after the training, two groups showed a significant difference in the severity of depression. Additionally, the changes in depression score in the two groups of intervention and control group decreased in all socioeconomic status of the samples after the intervention. In addition, after controlling the effect of pre-intervention depression syndrome score, the effect of continuous training on depression score was statistically significant. The study conducted by Rostami et al

(2019) to evaluate the impact of continuous care model on depression in hemodialysis patients showed that the implementation of continuous care model caused a significant difference in the level of depression in hemodialysis patients, so that implementation of this care model was associated with improved depression in hemodialysis patients<sup>16</sup>. In this regard, the results of the study conducted by Ahmadi et al (2001) to evaluate the impact of continuous care model in controlling chronic coronary artery disease showed that using this model during three months was effective on several indices, especially quality of life of these patients ( $P < 0.001$ )<sup>14</sup>. The results of a study conducted by Hojjat et al in 2015 to evaluate the

effect of continuous care model on sleep quality and dialysis adequacy of Iranian hemodialysis patients in Jahrom showed that the implementation of continuous care model improved the sleep quality of dialysis patients but, it did not affect their dialysis adequacy. Sleep quality score before intervention ( $9.96 \pm 1.87$ ) was significantly higher than that after the intervention ( $9.07 \pm 2.19$ ) ( $P = 0.002$ )<sup>15</sup>.

According to the researcher, the reduction of depression syndrome can be due to examining of comprehensive problems of patients' follow up and involvement of patients and their family in the patient care. Ineffectiveness of continuous care model can be due to the lack of completely adhering to model applicability criteria. In order to use this model, three aspects of research, educational and management must be considered. The results of a study conducted by Saei with the aim of evaluating the effect of continuing care model on dialysis adequacy of hemodialysis patients showed that after implementation of continuous care model, dialysis adequacy significantly increased ( $P=0.001$ )<sup>17</sup>. According to Hakim et al, applying continuous care model on parental knowledge and control of symptoms and recurrence of disease in children with Nephrotic Syndrome showed a significant difference in mean systolic blood pressure in two case and control groups after the intervention ( $P<0.011$ ).

Moreover, a significant difference was seen in the level of parental knowledge level after the intervention in both groups ( $P=0.001$ ). However, there was no significant difference between the case and control groups in terms of recurrence of the disease ( $P=0.787$ )<sup>18</sup>. The results of a study conducted by Ismaeil zadeh et al in 2016 with the aim of applying continuous care model for type 2 diabetic patients revealed that there was a significant difference between the case and control groups after the intervention and providing training for the group with regard to doing blood glucose self-monitoring caused significant difference and score of training group was higher than that of control group<sup>19</sup>.

In this regard, the results of a study conducted by Kerman Saravi et al in 2019-2018 with the aim of evaluating the effectiveness of Continuous Care Model on self-care behaviors of patients with myocardial infarction showed that the comparison of total pre-intervention score of self-care behaviors in patients with myocardial infarction in two groups revealed no significant difference. However, there was a significant difference between the two groups immediately after the intervention ( $P<0.001$ ), meaning that the changes in the scores of self-care behaviors were not the same in the two groups, and the difference in the scores of the intervention group was higher than that in the control group. The results also revealed that the mean difference between the second and third stages and the pre-test was statistically significant in the intervention group ( $P<0.001$ ), but the score of self-care behaviors in this group decreased compared to the second one in the third stage. Statistical analysis of this

difference was also significant ( $P<0.001$ ). In the control group, the changes in the score of self-care behaviors showed a statistically significant difference in the second stage (end of the sensitization stage) ( $P=0.02$ )<sup>20</sup>.

## Conclusions

**P**roviding care as a continuous care model (with a cooperation of patients and their family) can lead to the home care by the patients' family, due to the increasing prevalence of chronic diseases and prolonged hospitalizations of these patients in the public and special wards. It finally results in cut in care costs, increased ability of the patient and his or her family, and promoted health and improved quality of life of patients with chronic diseases. Nursing managers can use the results of this study to cut the hospital costs and prevent depression in patients with chronic diseases, caused by prolonged hospitalizations by using nursing care as a continuous care model (interaction among nurse, patient and his or her family). They can also provide nursing educational classes for the nurses to explain the effect of continuous care model on the process of treatment and promotion of health and quality of life of patients with chronic diseases. Moreover, recruitment of nurse staff to educate and monitor the performance of patients and their families will also play a major role in this regard. Clear and specific rules can be applied to assess the level of involvement of the patient and his or her family in the patient's care through a cooperation of managers and those instructing the guidelines of providing the services in hemodialysis and rehabilitation centers, specialty ICU, with the aim of increasing the continuous care by involving the patient and his or her family in care.

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