The Open Public Health Journal

Content list available at: https://openpublichealthjournal.com

RESEARCH ARTICLE

Investigating the Effectiveness of a Virtual Family-centered Support Intervention on the Mental Health of Hemodialysis Patients and their Family Caregivers During the COVID-19 Pandemic

Marjan Moradi[1], Mahdi Amiri[2], Salman Daneshi[3], Seyyedeh Mona Taghdisi Heydarian[4], Sam Saghari[5] and Rasoul Raesi[6,7,*]

[1]*Psychiatry and Behavioral Sciences Research Center, Mashhad University of Medical Sciences, Mashhad, Iran*
[2]*Assistant Professor of Clinical Psychology, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran*
[3]*Assistant Professor of Public Health, School of Health, Jiroft University of Medical Sciences, Jiroft, Iran*
[4]*Psychiatry and Behavioral Sciences Research Center, Mashhad University of Medical Sciences, Mashhad, Iran*
[5]*Department of Health Services Management, Tehran Medical Sciences, Islamic Azad University, Tehran, Iran*
[6]*Department of Health Services Management, Mashhad University of Medical Sciences, Mashhad, Iran*
[7]*Department of Nursing, Torbat Jam Faculty of Medical Sciences, Torbat Jam, Iran*

Abstract:

Aim:

This study aimed to assess the effectiveness of a family-centered support intervention utilizing virtual education on the mental health of hemodialysis patients and their family caregivers amidst the COVID-19 pandemic.

Background:

Patients undergoing hemodialysis and their family caregivers may experience mental health disruptions.

Methods:

In this quasi-experimental study, 30 family caregivers of hemodialysis patients who visited the hemodialysis center of the 22nd-Bahman Hospital of Khaf in 2022 were selected using convenience sampling. All patients and family caregivers completed a demographic characteristics form and a mental health scale over the phone at baseline. The experimental group received targeted mental health education content for four weeks on the Eitaa social media platform. At this time, the mental health questionnaire was completed once more over the phone for all patients and their family caregivers. Independent t-tests and paired t-tests were used to analyze the data in SPSS-22. The significance level was set to $p < 0.05$.

Results:

The mean age values of the patients and family caregivers were 47.63±8.36 and 33.53±4.86 years, respectively. Prior to the intervention, there was no significant difference ($p < 0.05$) in the mean scores of mental health and its components between the experimental and control groups. Following the intervention, statistically significant reductions were observed in the scores of both the patients and caregivers of the experimental group compared to the controls ($p < 0.001$).

Conclusion:

The virtual family-centered support intervention could positively impact the mental health of hemodialysis patients and their family caregivers. Thus, the present intervention is suggested as a viable program to enhance the mental health of this group of patients and their respective caregivers.

Keywords: Family-centered support intervention, Virtual education, Mental health, patient, Hemodialysis, Family caregivers, Pandemic, COVID-19.

Article History	Received: July 12, 2022	Revised: September 22, 2023	Accepted: October 04, 2023

1. INTRODUCTION

In December 2019, a novel coronavirus-induced respiratory disease (COVID-19) emerged in China and subsequently disseminated globally [1]. The novel respiratory disease is distinguished by its swift human-to-human transmission and its propensity for causing widespread global epidemics [2]. The occurrence of crises such as the global pandemic of COVID-19 elicits a diverse array of responses in individuals, with impacts on their physical and mental health [3]. This disease poses not only a threat to public health but also causes a variety of psychological conditions, such as anxiety, fear, depression, stigma, avoidance behaviors, irritability, sleep disorders, and post-traumatic stress disorder [4]. The COVID-19 pandemic has caused mental health problems worldwide [5]. In a recent investigation conducted in response to the outbreak of COVID-19 in China, a notable proportion of individuals reported experiencing mental health problems, including stress (8.1%), anxiety (28.8%), and depression (16.5%) [6]. COVID-19 disproportionately affects older adults and individuals with comorbid conditions [5].

The prevalence of mental health issues among hemodialysis patients is a widely recognized phenomenon. Studies conducted in the United States and Europe have estimated that between 23-42% of this population exhibit symptoms of depression [7, 8]. The prevalence of depression among 1,812 individuals undergoing hemodialysis treatment between 1999 and 2013 was 63% [9], according to a review of 19 articles published in Iran. Research findings indicate that COVID-19, due to its widespread prevalence, has the potential to cause a notable psychological impact on all individuals, particularly those with chronic diseases such as hemodialysis.

The prevalence of non-communicable chronic diseases has significantly increased due to the rise in life expectancy and the shift in individuals' lifestyles [10, 11]. Chronic kidney failure is a prevalent non-communicable disease characterized by a gradual decline in the number and function of nephrons during pathological progression [12]. The incidence of kidney failure is rising due to the growing elderly demographic, as well as the escalating prevalence of diabetes and hypertension [13]. Chronic kidney failure has the potential to lead the patient to the brink of end-stage renal disease, characterized by a loss of 90% of kidney function [12].

Chronic kidney failure is currently a prevalent issue and is recognized as a significant contributor to reduced quality of life and disability [14, 15]. The estimated global prevalence of the disease ranges from 8% to 16%, with a higher incidence observed in developed and developing countries [16]. Hemodialysis is a widely utilized medical treatment, with a global user base of approximately 10 million individuals, according to the World Health Organization. As per the statistical data released by the United States of America, a population of 400,000 individuals suffers from end-stage renal disease, out of which 300,000 individuals require permanent hemodialysis [17, 18]. Based on the data collected in 2015 and 2016, the number of dialysis patients in Iran increased from 24,000 to 29,500, indicating a growth rate of approximately 23% [19].

Hemodialysis is the primary intervention utilized in patients with kidney failure to counteract the decline in normal renal function [20]. The provision of hemodialysis treatment is aimed at increasing life expectancy, mitigating complications, and enhancing the quality of life. Nevertheless, hemodialysis does not exhibit any significant improvement in renal function and does not appear to have any therapeutic implications in treating underlying kidney disease [21, 22]. Although hemodialysis treatment has been shown to improve patients' life expectancy and quality of life, it has also been associated with a decline in physical, psychological, social, and emotional functions among these individuals. The persistence of hemodialysis treatment may give rise to various psychological issues, including but not limited to anxiety, depression, despair, denial, and non-adherence to treatment. These concerns pose a significant risk to the mental health of patients undergoing hemodialysis [22 - 24].

The term mental health pertains to an individual's psychological development and their ability to achieve optimal levels of productivity and contentment through interpersonal and societal exchanges. This encompasses favorable emotions and responses towards oneself and others. With good mental health, a person is able to utilize their reasoning and skills, function appropriately in society, and meet the requirements of daily life [25].

Hemodialysis causes a variety of daily stresses in individuals, which, in turn, diminishes their mental health and hopes for continued treatment and life [26]. Compared to individuals with other chronic diseases, such as diabetes and hypertension, patients undergoing hemodialysis are more likely to experience psychological symptom complaints [27]. They exhibit a higher prevalence of mental health issues, which can, in turn, significantly impact the mental health of their respective family caregivers [28].

The impact of chronic diseases is not limited to patients alone, as caregivers are also affected [29, 30]. Caregivers play an important role in providing care and support to patients during their illness and treatment. They are primarily responsible for assisting patients in adapting to and managing their disease. Previous research has suggested that care provision for individuals with chronic conditions poses a significant risk to the physical and mental health of family caregivers [31, 32].

Educating patients and their families is a potential strategy for mitigating negative and enhancing positive emotions, which may lead to improved physical and mental health outcomes for caregivers. In light of the global prevalence of COVID-19 and the imperative to adhere to health guidelines, family-centered support interventions with a virtual education approach are recognized as an important means of promoting and sustaining health for both patients and their family caregivers [33]. The implementation of family-centered care in medical sciences aims to empower patients and family caregivers, typically through educational means [34]. This approach acknowledges

* Address correspondence to this author at the Department of Health Services Management, Mashhad University of Medical Sciences, Mashhad, Iran;
E-mail: Raesi.br881@gmail.com

and values the crucial and fundamental function of the family in fostering the growth and development of the members, as well as their accomplishments and setbacks throughout their lifespan [35]. Thus, the family's health needs are considered, and their favored approach is facilitated while assisting them in developing beneficial behavioral patterns and effective responses to the recognized needs [36]. Respect, provision of information, participation in care, and involvement in decision-making are the primary components of family-centered care [37].

There are two primary approaches to delivering family-centered support interventions:

1. Interventions may aim at supporting family caregivers as autonomous individuals seeking help. Such interventions directly alleviate their stress and tension and have a positive impact on their overall well-being and health. They prioritize providing services to family caregivers, with the patient deriving benefits in a secondary capacity.

2. Interventions may be developed to assist family caregivers in delivering safe and efficient patient care. Such interventions may indirectly alleviate tensions and foster a sense of confidence and control within these families. This can be achieved by increasing awareness and developing skills [35].

Recent meta-analytic findings suggest that family-centered interventions, such as face-to-face counseling sessions, support with automated answering systems, home visits, and multiple individual and group interventions, have demonstrated a significant impact in managing tensions, stress, and disease burden among family caregivers [38].

The present study adopts the first approach to family-centered support interventions. Given the impossibility of eliminating psychological tensions and stressful factors from the lives of family caregivers, the study aims to implement interventions that effectively address these tensions and moderate their negative effects. The researcher anticipates that these educational interventions will enhance the quality of life of family caregivers and improve the physical and mental health of hemodialysis patients.

The significance of mental health in the context of the COVID-19 pandemic cannot be overstated, particularly with respect to its impact on the quality of treatment, adherence to treatment, and the quality of life of hemodialysis patients. Despite the potential benefits of family-centered support interventions that rely on virtual education, there remain uncertainties regarding their efficacy in improving the mental health status of hemodialysis patients and their family caregivers. This study aims to investigate the impact of a family-centered support intervention that utilizes virtual education on the mental health of hemodialysis patients and their family caregivers referring to 22nd-Bahman Hospital in Khaf amidst the COVID-19 pandemic.

2. METHODS AND MATERIALS

This research employed a pre-posttest, two-group, quasi-experimental design. All family caregivers of chronic kidney failure patients at the hemodialysis center of 22nd-Bahman Hospital in Khaf constituted the study population. This is the only hemodialysis department in the city of Khaf, and it was selected as the research environment thanks to the availability of samples, the cooperation of the department's officials and personnel, and the ease with which the research objectives could be advanced. The sample size was estimated using Altman's nomogram to be n=30, given a test power of 0.8, a standard deviation of 14.25 from Asgarpour's (2014) study, and a 90% confidence limit. Fifteen participants were randomly allocated to the experimental group, while another 15 were assigned to the control group.

Initially, a list of patients' names was compiled and assigned a numerical rating ranging from 1 to 60. Subsequently, the researcher examined the samples in the sequence of the assigned numerical values. Patients and their families were recruited for the study after being informed of the research objectives and providing consent. Those who declined participation were excluded from the study and replaced with the next eligible patient on the list.

A randomized allocation method was employed in this study through drawing lots to ensure balance in the number of participants assigned to each group. A container contained a block of cards equal to the total sample size, with each card bearing a unique number from 1 to 30. The cards were randomly drawn from the container, and the first 15 numbers selected were assigned to the experimental group, while the subsequent 15 numbers were assigned to the control group. This randomization method is considered effective in minimizing selection bias and ensuring a representative sample.

Patients were considered for inclusion if they met the following criteria: six months or more of hemodialysis history; hemodialysis performed at least twice weekly; permanent record of hemodialysis in the hemodialysis department; willingness to participate in the study; no history of diagnosis; absence of definite neurological and mental illness; and absence of psychiatric drugs. Caregiver eligibility requirements included being the primary caregiver for the patient, literacy, access to a smartphone and the Eitaa social media platform, non-participation in other online medical or psychological support groups, and a willingness to participate in the study. The study's exclusion criteria comprised two factors: non-response to messages sent during the intervention period for one week and patient mortality.

Following approval from the ethics and research committee of Mashhad University of Medical Sciences, a letter of introduction was obtained from the university's Vice-chancellor for Research to initiate the study. This letter was subsequently presented to the officials of the 22nd-Bahman Hospital of Khaf. Before the commencement of the intervention, the participants were given comprehensive instructions on the research procedures, and their consent for participation was duly obtained. The study adhered to ethical principles for human subjects, and informed consent was obtained from participants, who could withdraw from the study at any time.

Upon elaboration on the research objectives, safeguarding

of personal data confidentiality, elucidation of the intervention, acquisition of informed consent, and collection of contact information from primary family caregivers, a group was established on the Eitaa social media platform for the experimental group.

Prior to the intervention, a pre-test was administered. This involved completing demographic profile questionnaires, which included variables such as age, gender, marital status, occupation, level of education, and economic status, as well as the mental health scale. These instruments were completed on the phone for both patients and their family caregivers.

Over four weeks, the experimental group received educational content pertaining to mental health, which was directed toward family caregivers. The content's reliability and formal validity were assessed by gathering the opinions of five faculty members with expertise in the relevant topic. The present investigation involved implementing a four-week mental health education program, which consisted of the daily dissemination of tailored messages. Periodically throughout the day, family caregivers received messages in the form of written texts, photographs, and educational video clips pertaining to mental health. Prior to the introduction of each topic, a list of topics was presented to the participants. At the beginning of each week, a list of educational materials pertaining to that specific week was disseminated to the audience. Additionally, two days per week were allocated to addressing inquiries and providing responses to the submitted materials. Family caregivers posed questions, and the responses were posted to the virtual group. Fridays were allocated to consolidating and recapping the information covered throughout the week. Throughout the study, the control and experimental groups did not have any interaction with one another.

Following the four-week intervention, the mental health questionnaire was administered *via* telephone to all patients and family caregivers. After the training and follow-up period for the experimental group had concluded, the control group's family caregivers also received the educational materials in order to meet ethical requirements.

The present study utilized a two-part data collection tool comprising a demographics form and a mental health scale, specifically the Symptom Checklist-90, to collect data. The first section of the survey inquired about the demographic characteristics of patients and their respective family caregivers. These characteristics included age, gender, marital status, occupation, level of education, and economic status. The second section covered the 90-item scale of mental health known as SCL-90-R. Derogatis and Cleary originally introduced this revised form of the scale in 1977 [39]. It comprises nine distinct dimensions, namely somatization, obsessive-compulsive disorder, hypochondriasis, interpersonal sensitivity, anxiety, hostility, phobia anxiety, paranoid ideation, and psychoticism [25]. The test includes a series of questions, each of which is evaluated on a five-point scale, ranging from zero (indicating no discomfort) to four (indicating severe discomfort). As a result, the total score for the test can range from 0 to 360, with 0 representing the minimum score and 360 representing the maximum score. A higher score denotes a more inappropriate mental state. Multiple studies [40 - 42] have confirmed the validity and reliability of this tool. A study conducted on 2,069 people from the general population of Ukraine to test the validity and reliability of this tool revealed that the factor analysis confirmed the existence of the nine dimensions and that the developed model fit well. The study confirmed the reliability of its subscales, as evidenced by Cronbach's alpha coefficients ranging from 0.82 to 0.93 [40].

The statistical analysis of the data was conducted using SPSS-22 software. The normality of the data was assessed by conducting a Kolmogorov-Smirnov test. The statistical analysis employed in this study involved the utilization of independent t-tests for comparing the mean values of variables between two groups and paired t-tests for comparing the mean values of variables before and after the intervention within each group. These tests were employed thanks to the normal distribution of the data. The significance level was set to $p < 0.05$.

3. RESULTS

The present study investigated a sample of 30 family caregivers of hemodialysis patients who were randomly assigned to either an experimental group (n=15) or a control group (n=15). The mean age of patients was 47.63±8.36 years, with a range of 33 to 68 years. The mean age of family caregivers was 33.53±4.86 years, ranging from 24 to 40 years. The majority of the patients studied were male (63,3%), married (73,3%), illiterate (33,3%), self-employed (46,7%), and had a low economic status (50%). The majority of family caregivers were female (60%), married (53,3%), had a university education (56,7%), were housewives (43,3%), and had a low economic status (36,7%) (Table **1**).

Table 1. Demographic characteristics of patients and their family caregivers.

Variables		Patients		Caregivers	
		Frequency	Percent	Frequency	Percent
Gender	Male	19	63.3	12	40
	Female	11	36.7	18	60
Marital status	Single	8	26.7	14	46.7
	Married	22	73.3	16	53.3
Education level	Illiterate	10	33.3	0	0
	Primary/Secondary	2	6.7	1	3.3
	High school	9	30	12	40
	Tertiary	9	30	17	56.7

Variables		Patients		Caregivers	
		Frequency	Percent	Frequency	Percent
Occupation	Homemaker	9	30	13	43.3
	Employee	4	13.3	12	40
	Self-employed	14	46.7	5	16.7
	Retiree	3	10		
Economic status	Poor	15	50	11	36.7
	Medium	9	30	10	33.3
	Good	6	20	9	30

Before the intervention, the mean scores of mental health in general and its components did not differ significantly between the experimental and control groups ($p > 0.05$). However, after the intervention, the experimental group's score was significantly lower than that of the control group ($p < 0.001$). The study found that the experimental group experienced a significant decrease in the mean score of overall mental health and its components after the intervention ($p < 0.001$). However, the control group did not demonstrate a significant difference in the overall mean score of mental health and its components (except for depression, psychoticism, and obsessive-compulsive disorder) before and after the intervention ($p > 0.05$). Additionally, the mean scores of depression, psychoticism, and obsessive-compulsive disorder in the control group patients increased significantly after the intervention compared to baseline ($p < 0.05$). The study's findings indicate that the mean scores of mental health and its components exhibited significant changes over time in the experimental group patients compared to the controls ($p < 0.001$). Indeed, a significant decrease occurred in the mean scores of mental health and its components following the intervention in the experimental group patients compared to the control group (Table **2**).

Table 2. Comparison of the mean scores of mental health in general and its components before and after the intervention in experimental and control patients and separately in each group

Variables	Time point Group	Before intervention	After intervention	P-value Paired t-test	Mean changes
		Mean ± SD	Mean ± SD		Mean ± SD
Depression	Experimental	3.62±0.15	1.97±0.19	<0.001	-1.65±0.21
	Control	3.75±0.25	3.89±0.27	<0.001	0.14 ± 0.12
P-value related to independent t-test		0.10	<0.001	-	<0.001
Anxiety	Experimental	3.59±0.15	2.27±0.46	<0.001	-1.32±0.48
	Control	3.62±0.23	3.55±0.28	0.17	-0.07±0.20
P-value related to independent t-test		0.61	<0.001	-	<0.001
Hypochondriasis	Experimental	3.60±0.14	2.05±0.23	<0.001	-1.55±0.31
	Control	3.64±0.12	3.76±0.18	0.04	0.12±0.20
P-value related to independent t-test		0.37	<0.001	-	<0.001
Obsessive-compulsive disorder	Experimental	3.99±0.76	2.23±0.25	<0.001	-1.75±0.86
	Control	3.58±0.16	3.82±0.14	0.001	0.24±0.23
P-value related to independent t-test		0.06	<0.001	-	<0.001
Interpersonal sensitivity	Experimental	3.79±0.16	2.20±0.41	<0.001	-1.59±0.49
	Control	3.67±0.23	3.63±0.36	0.53	-0.04±0.22
P-value related to independent t-test		0.09	<0.001	-	<0.001
Hostility	Experimental	3.84±0.30	2.62±0.45	<0.001	-1.22±0.61
	Control	3.67±0.31	3.67±0.38	1.00	0.00±0.26
P-value related to independent t-test		0.12	<0.001	-	<0.001
Paranoid ideation	Experimental	3.60±0.27	2.48±0.44	<0.001	-1.12±0.53
	Control	3.69±0.33	3.52±0.34	0.08	-0.17±0.34
P-value related to independent t-test		0.43	<0.001	-	<0.001
Phobia	Experimental	3.75±0.23	2.21±0.40	<0.001	-1.54±0.52
	Control	3.76±0.18	3.70±0.23	0.21	-0.06±0.17
P-value related to independent t-test		0.90	<0.001	-	<0.001
Psychoticism	Experimental	3.63±0.28	2.61±0.52	<0.001	-1.02±0.65
	Control	3.59±0.32	3.56±0.39	0.64	-0.02±0.20
P-value related to independent t-test		0.71	<0.001	-	<0.001
Overall mental health	Experimental	3.71±0.11	2.29±0.24	<0.001	-1.42±0.28
	Control	3.67±0.15	3.70±0.14	0.14	0.03 ± 0.07

Variables	Time point Group	Before intervention	After intervention	P-value Paired t-test	Mean changes
		Mean ± SD	Mean ± SD		Mean ± SD
P-value related to independent t-test		0.50	<0.001	-	<0.001

There was no significant difference ($p < 0.05$) in the mean scores of mental health and its components between the family caregivers of the experimental and control groups prior to the intervention. However, following the intervention, the mean score of mental health was significantly lower ($p < 0.001$) in the family caregivers of the experimental group as compared to the control group. The experimental group experienced a significant decrease in the mean scores of overall mental health and its components after the intervention, as compared to the baseline ($p < 0.001$). However, the control group did not exhibit any significant differences in the overall mean scores of mental health and its components (except for anxiety, obsessive-compulsive disorder, interpersonal sensitivity, and phobia) before and after the intervention ($p > 0.05$). The study findings indicate a statistically significant rise in the mean scores of anxiety, obsessive-compulsive disorder, interpersonal sensitivity, and phobia among the family caregivers of the control group following the intervention ($p < 0.05$). Significant differences existed in the mean score changes of mental health and its components between the experimental and control groups. Specifically, the mean score changes of mental health and its components were significantly greater in the family caregivers of the experimental group than those of the control caregivers ($p < 0.001$). Indeed, their mean scores exhibited a statistically significant decrease following the intervention compared to those of the control caregivers (Table **3**).

The results showed that the average score of mental health overall and its components (except for aggression and paranoia) before the intervention, as well as the average score of mental health overall and its components of anxiety, aggression, paranoia, and psychosis after the intervention, were significantly higher in the experimental group compared to the control group ($p<0.05$). In the control group, the average score of mental health overall and its components (except for depression) before the intervention, as well as the average score of mental health overall and its components of hypochondria, obsession, aggression, and phobia after the intervention, were significantly higher in patients compared to family caregivers ($p<0.05$). (Table 4)

Table 3. Comparison of the mean scores of mental health in general and its components before and after the intervention in family caregivers of experimental and control caregivers and separately in each group.

Variables	Time point Group	Before intervention	After intervention	P-value Paired t-test	Mean changes
		Mean ± SD	Mean ± SD		Mean ± SD
Depression	Experimental	3.45±0.18	1.87±0.20	<0.001	-1.57±0.26
	Control	3.61±0.50	3.56±0.39	0.70	-0.05±0.45
P-value related to independent t-test		0.24	<0.001	-	<0.001
Anxiety	Experimental	3.43±0.21	1.98±0.32	<0.001	-1.45±0.39
	Control	3.32±0.35	3.38±0.33	0.006	0.06±0.07
P-value related to independent t-test		0.30	<0.001	-	<0.001
Hypochondriasis	Experimental	3.42±0.18	1.90±0.30	<0.001	-1.52±0.26
	Control	3.45±0.28	3.47±0.25	0.27	0.02±0.06
P-value related to independent t-test		0.75	<0.001	-	<0.001
Obsessive-compulsive disorder	Experimental	3.54±0.22	2.09±0.28	<0.001	-1.45±0.22
	Control	3.40±0.26	3.43±0.27	0.04	0.03 ± 0.05
P-value related to independent t-test		0.13	<0.001	-	<0.001
Interpersonal Sensitivity	Experimental	3.53±0.20	2.10±0.52	<0.001	-1.43±0.59
	Control	3.36±0.30	3.41±0.29	0.03	0.04 ± 0.07
P-value related to independent t-test		0.08	<0.001	-	<0.001
Hostility	Experimental	3.59±0.41	2.24±0.45	<0.001	-1.34±0.59
	Control	3.29±0.35	3.33±0.38	0.16	0.04±0.12
P-value related to independent t-test		0.04	<0.001	-	<0.001
Paranoid ideation	Experimental	3.47±0.32	2.01±0.39	<0.001	-1.46±0.53
	Control	3.47±0.19	3.50±0.19	0.19	0.03 ± 0.09
P-value related to independent t-test		1.00	<0.001	-	<0.001
Phobia	Experimental	3.47±0.33	2.11±0.34	<0.001	-1.35±0.32
	Control	3.37±0.30	3.44±0.24	0.03	0.07±0.11
P-value related to independent t-test		0.41	<0.001	-	<0.001
Psychoticism	Experimental	3.32±0.23	2.13±0.45	<0.001	-1.19±0.54
	Control	3.24±0.29	3.35±0.39	0.17	0.11±0.29
P-value related to independent t-test		0.42	<0.001	-	<0.001

Variables	Time point Group	Before intervention	After intervention	P-value Paired t-test	Mean changes
		Mean ± SD	Mean ± SD		Mean ± SD
Overall mental health	Experimental	3.45±0.12	2.04±0.22	<0.001	-1.41±0.24
	Control	3.40±0.19	3.44±0.16	0.17	0.03 ± 0.09
P-value related to independent t-test		0.39	<0.001	-	<0.001

Table 4. Comparison of the average mental health score in general and the pre-and post-intervention components in patients and family caregivers of the experimental and control groups.

Variables	Group	Experimental		Control	
	Time point	Before intervention	After intervention	Before intervention	After intervention
		Mean±SD	Mean±SD	Mean±SD	Mean±SD
Depression	patients	0.15±3.62	0.19±1.97	0.25±3.75	0.27±3.89
	family caregivers	0.18±3.45	0.20±1.87	0.50±3.61	0.39±3.56
P-value related to independent t-test		0.008	0.18	0.35	0.01
Anxiety	patients	0.15±3.59	0.46±2.27	0.23±3.62	0.28±3.55
	family caregivers	0.21±3.43	0.32±1.98	0.35±3.32	0.33±3.38
P-value related to independent t-test		0.03	0.05	0.009	0.14
Hypochondriasis	patients	0.14±3.60	0.23±2.05	0.12±3.64	0.18±3.76
	family caregivers	0.18±3.42	0.30±1.90	0.28±3.45	0.25±3.47
P-value related to independent t-test		0.005	0.14	0.02	0.001
Obsessive-compulsive disorder	patients	0.76±3.99	0.25±2.23	0.16±3.58	0.14±3.82
	family caregivers	0.22±3.54	0.28±2.09	0.26±3.40	0.27±3.43
P-value related to independent t-test		0.04	0.16	0.03	001. <0
Interpersonal Sensitivity	patients	0.16±3.79	0.41±2.20	0.23±3.67	0.36±3.63
	family caregivers	0.20±3.53	0.52±2.10	0.30±3.36	0.29±3.41
P-value related to independent t-test		001. <0	0.58	0.004	0.07
Hostility	patients	0.30±3.84	0.45±2.62	0.31±3.67	0.38±3.67
	family caregivers	0.41±3.59	0.45±2.24	0.35±3.29	0.38±3.33
P-value related to independent t-test		0.06	0.03	0.004	0.02
Paranoid ideation	patients	0.27±3.60	0.44±2.48	0.33±3.69	0.34±3.52
	family caregivers	0.32±3.47	0.39±2.01	0.19±3.47	0.19±3.50
P-value related to independent t-test		0.23	0.004	0.03	0.83
Phobia	patients	0.23±3.75	0.40±2.21	0.18±3.76	0.23±3.70
	family caregivers	0.33±3.47	0.34±2.11	0.30±3.37	0.24±3.44
P-value related to independent t-test		0.009	0.49	001. <0	0.005
Psychoticism	patients	0.28±3.63	0.52±2.61	0.32±3.59	0.39±3.56
	family caregivers	0.23±3.32	0.45±2.13	0.29±3.24	0.39±3.35
P-value related to independent t-test		0.003	0.01	0.005	0.15
Overall mental health	patients	0.11±3.71	0.24±2.29	0.15±3.67	0.14±3.70
	family caregivers	0.12±3.45	0.22±2.04	0.19±3.40	0.16±3.44
P-value related to independent t-test		001. <0	008. <0	001. <0	001. <0

4. DISCUSSION

The current investigation assessed the impact of a virtual family-centered support intervention on the mental health of individuals undergoing hemodialysis and their family caregivers. The results indicate that the application of the family-centered intervention for four weeks positively impacted the mental health of individuals receiving hemodialysis treatment. Depression and anxiety are recognized as significant factors in the mental health of individuals undergoing hemodialysis. The study conducted by Mollahadi *et al.* investigated the prevalence of anxiety and depression among patients undergoing hemodialysis and kidney transplants. They noted that a significant proportion of these patients experienced high levels of anxiety and depression [43]. Sadoughi and Hasampour explored the correlation between depression, anxiety, perceived social support, and the quality of life of hemodialysis patients. Their findings suggest that the mean anxiety score among these patients was elevated [44].

The findings of the current investigation indicate that the application of the family-centered support intervention significantly improved the mental health scores of hemodialysis patients. More specifically, the intervention resulted in a reduction of various mental health parameters, including depression, anxiety, and obsessive-compulsive

thoughts. These findings suggest that the intervention may effectively improve mental health outcomes.

Previous research findings support the present study's results. The study conducted by Narimani observed a significant improvement in the quality of life of hemodialysis patients in terms of general health and physical performance following an educational intervention [45]. The research conducted by Ghavidel *et al.* investigated the impact of self-care training on patients' quality of life, with a focus on general health and physical performance. The study utilized the collaborative care model and found that this approach significantly improved these areas [46]. The study conducted by Baraz-Pardenjani *et al.* demonstrated a significant rise in the mean quality of life score among hemodialysis patients with regard to physical performance following the implementation of an educational intervention [47]. The research conducted by Eghtedar *et al.* aimed to investigate the impact of training health-promoting behaviors on the psychological well-being of hemodialysis patients. The study's results indicate that six sessions of health behavior training based on Pender's model positively impacted the psychological well-being of hemodialysis patients [48].

The experience of chronic illness alongside dialysis is known to elicit a multifaceted response that encompasses emotional, physical, and psychological reactions. This phenomenon elicits mental tension, prompting individuals to endeavor towards controlling, handling, or reconciling with the emerging condition [49]. Hemodialysis can be a source of stress for patients, who may employ various adaptive mechanisms to manage this challenge. The correction and enhancement of adaptive reactions in patients require the active involvement of healthcare professionals, including nurses and other treatment team members, as well as the patient's family. Through adequate education and heightened awareness, these stakeholders can facilitate the adaptation of patients to their current problems and difficulties [50]. The study conducted by Healy and McKay demonstrated that the implementation of coping strategies could effectively maintain the job satisfaction of individuals afflicted with hemodialysis disease [51]. According to Sultan's research findings, individuals requiring hemodialysis exhibit an improved ability to cope with their condition when taught stress-coping techniques [52].

The current investigation employed a family-based approach to examine hemodialysis patients. The phenomenon of interactive communication is known to account for the potential impact of an individual's actions on the larger family system. Hence, it is a plausible hypothesis that empowering a single family member may positively affect the empowerment of the family system as a whole in achieving health-related goals.

The findings from research with individuals undergoing hemodialysis suggest that educational interventions may be necessary to enhance patient knowledge and motivation, which may, in turn facilitate improved self-management, behavioral modification, and coping with associated challenges [53, 54]. Research findings have demonstrated the beneficial impact of education on enhancing an individual's capacity for self-care. As a result, certain health policies have been formulated to enhance patient comprehension and self-management of their conditions. Alongside this, various factors have been examined as potential predictors of patient self-care behaviors, including but not limited to self-efficacy, individual beliefs, social norms, and self-confidence [53].

Recurrent hemodialysis sessions on a weekly basis and the arduous nature of this therapeutic procedure, coupled with a multitude of physical, psychological, social, and economic challenges, result in a diminished sense of well-being and self-efficacy among these patients [55]. Better outcomes from self-management and enhanced mental health are associated with higher patient self-efficacy [56]. Furthermore, educating and supporting patients toward self-centeredness can enhance disease management and decrease healthcare expenses [57, 58].

The findings of the current investigation indicate a significant difference in the mental health scores of patients whose caregivers took part in the educational-support program (experimental group) compared to those whose caregivers did not attend the sessions (control group). So that, the mean scores of the components of anxiety, obsession, interpersonal sensitivity and phobia in the family caregivers of the control group increased significantly after the intervention compared to before. Based on the scoring method of the questionnaire used in the present study, a higher score indicates a more unfavorable mental state. Therefore, the increase in the mean scores of the components of anxiety, obsession, interpersonal sensitivity and phobia in the family caregivers of the control group after the intervention compared to before indicates the deterioration of the mental health of the family caregivers of hemodialysis patients who did not undergo the training intervention. The involvement of caregivers in the educational and supportive program has resulted in an elevation of their comfort levels. Caregivers who are susceptible and require special attention due to their unique living conditions and persistent physical and mental stressors experienced an improvement in the quality of communication with patients. The caregivers' tolerance level exhibited an increase, resulting in an improvement in the patient's mental health. A decrease in the levels of anxiety, depression, and other related mental health parameters evidences this improvement. This study's results concur with those of Cameron *et al.* [59], Au *et al.* [60], and Chan *et al.* [61].

The results suggest that caregivers are a highly vulnerable population who experience significant physical and emotional stress. Although some of these individuals are satisfied with their roles, they are perpetually affected by sadness, anger, resentment, and even guilt on certain occasions. Indeed, caregivers are often regarded as hidden patients [62].

Financial stressors, uncertain medical conditions, unexpected daily tasks, abrupt mood fluctuations in patients, and the presence of pain and mobility issues can lead to various discomforts for caregivers. Research findings validate the presence of depression in 50% of caregivers in general and 61% of the family members who are engaged in intensive care (caregiving for a minimum of 21 hours per week) [63]. As a result of the covert manifestation of emotional stressors among patient caregivers, it is crucial to identify these issues and

implement suitable therapeutic measures. According to research findings, the involvement of caregivers in educational and supportive programs can decrease emotional stress, enhance confidence, facilitate problem-solving, promote healthy communication, and decrease patients' levels of mental distress.

The involvement of families in educational support groups aids in their recognition and appropriate expression of emotions, as well as learning coping mechanisms for stress and anxiety. This can help prevent psychological tension and anxiety. Patients learn self-management skills through participation in these programs, which also enhance families' understanding of the disease and patients' needs. This leads to adopting more effective methods for providing appropriate patient support. Moreover, through imparting efficient communication abilities, caregivers acquire knowledge on managing possible behavioral irregularities exhibited by their patients. As per the research conducted on the issues faced by caregivers of patients, one of the frequently encountered problems is insufficient or inadequate knowledge among caregivers [64]. In the interpretation of the findings, it may be noted that when caregivers and families are grouped based on their shared pain, a sense of cohesion and continuity arises among them. This fosters a heightened sense of responsibility and passion for each other's issues and problems. As such, individuals exhibit empathy and take proactive measures to mitigate their patients' concerns. This can result in the development of a constructive self-image and a sense of joy, vitality, and self-satisfaction, which enhances resilience against stressors.

Overall, it can be stated that involving families in educational and supportive programs is a highly advantageous process for enhancing the improvement and fortification of mental health and social support in patients. This can aid in resolving communication conflicts between patients and their families and strengthen the well-being of the vulnerable caregivers requiring special support and attention due to the unique circumstances of long-term patient care.

The participation of caregivers in therapy groups elicits positive emotions by allowing them to express their emotions, thoughts, viewpoints, and challenges and receive compassionate responses from the group members and the group leader. These interactions foster a sense of understanding and acceptance among the group members, who become companions and supporters of one another. Consequently, the reduction of loneliness and helplessness may lead to an improvement in their overall health and promote a sense of tranquility. Additionally, the involvement of caregivers of patients in group counseling sessions enhances their comprehension of the affective requirements of their patients. It amplifies their endurance and forbearance in the presence of potential behavioral challenges from patients, ultimately augmenting the mental health of caregivers.

This study encountered constraints in the course of its execution. The study's overlap with the COVID-19 pandemic was among its limitations. Thus, it is advisable to conduct analogous investigations during a period other than the COVID-19 outbreak by eliminating this anxiety-inducing element. In addition, since many changes in the health-promoting behaviors of patients occur over time, and the present study did not include a follow-up period, it is recommended to conduct similar studies with longer follow-up periods.

CONCLUSION AND RECOMMENDATIONS

The results of this study suggest that the implementation of family-centered support therapy may improve the mental health of patients and their caregivers. Therefore, healthcare providers need to acknowledge the significance of this matter in the context of hemodialysis patients and provide adequate support to enhance mental health outcomes in primary and secondary care settings. In caring for these patients, it is pertinent for medical personnel to consider dimensions beyond the physiological aspect. By administering suitable training and psychological support, the medical staff can effectively contribute to the mental health and overall quality of life of patients.

LIMITATIONS OF THE STUDY

The current research has limitations, including the following.

1. This study had limited comparative analysis with other relevant research. This limitation is attributed to inadequate resources and limited similar research.

2. This study utilized a telephone-based survey to collect data, which may have resulted in a potential reluctance of participants to provide untruthful answers.

3. The study's findings are applicable to family caregivers and hemodialysis patients at 22nd-Bahman Hospital in Khaf. The current research findings have limited generalizability; thus, caution is advised when attempting to generalize the results.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

In terms of ethical considerations, the present study was ethical in two respects: first, all the participants volunteered to participate in the study, and secondly, Keeping in mind the principles of confidentiality and secrecy, participants were assured that all information would remain confidential and that the results would be reported in a general manner. All procedures performed in the study involving human participants were in accordance with the ethical standards of the institutional and national research committee and with the 1975 Helsinki Declaration and its later amendments or comparable ethical standards. This article reports the results of a research project approved by Mashhad University of Medical Sciences with the code of ethics (IR.MUMS.REC.1401.148).

HUMAN AND ANIMAL RIGHTS

No animals were used for studies that are the basis of this research. All human procedures followed were per the guidelines of the Helsinki Declaration of 1975.

CONSENT FOR PUBLICATION

In order to comply with ethical considerations in this research, the information of the participants was kept confidential, and other people were not able to access this information. The names and surnames of the participants were not used for data collection, and data collection was done after obtaining the code of ethics from Mashhad University of Medical Sciences.

AVAILABILITY OF DATA AND MATERIALS

The data that support the findings of this study are available from the corresponding author upon reasonable request.

STANDARDS OF REPORTING

TREND guideline has been followed.

FUNDING

This research was done with the financial support of Mashhad University of Medical Sciences.

CONFLICT OF INTERESTS

The authors declare no conflict of interest, financial or otherwise.

ACKNOWLEDGEMENTS

We would like to express our sincere gratitude to the honorable Vice-chancellery for Research of Mashhad University of Medical Sciences, the honorable officials of 22nd-Bahman Hospital in Khaf, the participants, and all the people who helped us in conducting this research.

REFERENCES

[1] Pereira MR, Mohan S, Cohen DJ, *et al.* COVID-19 in solid organ transplant recipients: Initial report from the US epicenter. Am J Transplant 2020; 20(7): 1800-8. [http://dx.doi.org/10.1111/ajt.15941] [PMID: 32330343]

[2] Asokan I, Rabadia SV, Yang EH. The COVID-19 pandemic and its impact on the cardio-oncology population. Curr Oncol Rep 2020; 22: 1-13.

[3] Shahyad S, Mohammadi MT. Psychological impacts of Covid-19 outbreak on mental health status of society individuals: A narrative review. J Military Med 2020; 22(2): 184-92.

[4] Chen N, Zhou M, Dong X, *et al.* Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: A descriptive study. Lancet 2020; 395(10223): 507-13. [http://dx.doi.org/10.1016/S0140-6736(20)30211-7] [PMID: 32007143]

[5] Wang C, Pan R, Wan X, *et al.* A longitudinal study on the mental health of general population during the COVID-19 epidemic in China. Brain Behav Immun 2020; 87: 40-8. [http://dx.doi.org/10.1016/j.bbi.2020.04.028] [PMID: 32298802]

[6] Liang W, Guan W, Chen R, *et al.* Cancer patients in SARS-CoV-2 infection: A nationwide analysis in China. Lancet Oncol 2020; 21(3): 335-7. [http://dx.doi.org/10.1016/S1470-2045(20)30096-6] [PMID: 32066541]

[7] Palmer S, Vecchio M, Craig JC, *et al.* Prevalence of depression in chronic kidney disease: Systematic review and meta-analysis of observational studies. Kidney Int 2013; 84(1): 179-91. [http://dx.doi.org/10.1038/ki.2013.77] [PMID: 23486521]

[8] Riezebos RK, Nauta KJ, Honig A, Dekker FW, Siegert CEH. The association of depressive symptoms with survival in a Dutch cohort of patients with end-stage renal disease. Nephrol Dial Transplant 2010; 25(1): 231-6. [http://dx.doi.org/10.1093/ndt/gfp383] [PMID: 19654227]

[9] Mirzaei M, Akbari Z. Prevalence of depression in dialysis patients in Iran (1998-2013): A systematic review and meta-analysis. J Mazandaran Univ Med Sci 2015; 24(121): 317-25.

[10] Nugent R, Bertram MY, Jan S, *et al.* Investing in non-communicable disease prevention and management to advance the Sustainable Development Goals. Lancet 2018; 391(10134): 2029-35. [http://dx.doi.org/10.1016/S0140-6736(18)30667-6] [PMID: 29627167]

[11] Min J, Zhao Y, Slivka L, Wang Y. Double burden of diseases worldwide: Coexistence of undernutrition and overnutrition□related non□communicable chronic diseases. Obes Rev 2018; 19(1): 49-61. [http://dx.doi.org/10.1111/obr.12605] [PMID: 28940822]

[12] Winnicki E, McCulloch CE, Mitsnefes MM, Furth SL, Warady BA, Ku E. Use of the kidney failure risk equation to determine the risk of progression to end-stage renal disease in children with chronic kidney disease. JAMA Pediatr 2018; 172(2): 174-80. [http://dx.doi.org/10.1001/jamapediatrics.2017.4083] [PMID: 29255845]

[13] Liyanage T, Ninomiya T, Jha V, *et al.* Worldwide access to treatment for end-stage kidney disease: A systematic review. Lancet 2015; 385(9981): 1975-82. [http://dx.doi.org/10.1016/S0140-6736(14)61601-9] [PMID: 25777665]

[14] Heo EH, Kim S, Park HJ, Kil SY. The effects of a simulated laughter programme on mood, cortisol levels, and health-related quality of life among haemodialysis patients. Complement Ther Clin Pract 2016; 25: 1-7. [http://dx.doi.org/10.1016/j.ctcp.2016.07.001] [PMID: 27863598]

[15] Calia R, Lai C, Aceto P, *et al.* Attachment style predict compliance, quality of life and renal function in adult patients after kidney transplant: Preliminary results. Ren Fail 2015; 37(4): 678-80. [http://dx.doi.org/10.3109/0886022X.2015.1010989] [PMID: 25687387]

[16] Cho MK, Shin G. Gender-based experiences on the survival of chronic renal failure patients under hemodialysis for more than 20 years. Appl Nurs Res 2016; 32: 262-8. [http://dx.doi.org/10.1016/j.apnr.2016.08.008] [PMID: 27969040]

[17] Garg AX, Suri RS, Eggers P, *et al.* Patients receiving frequent hemodialysis have better health-related quality of life compared to patients receiving conventional hemodialysis. Kidney Int 2017; 91(3): 746-54. [http://dx.doi.org/10.1016/j.kint.2016.10.033] [PMID: 28094031]

[18] Go AS, Chertow GM, Fan D, McCulloch CE, Hsu C. Chronic kidney disease and the risks of death, cardiovascular events, and hospitalization. N Engl J Med 2004; 351(13): 1296-305. [http://dx.doi.org/10.1056/NEJMoa041031] [PMID: 15385656]

[19] Malek-Hoseini S-A, Ganji M, Nafar M, Eghtesad B, Ahmadpoor P, Bahador A, *et al.* 3rd International Congress of Organ Transplantation & 16th International Congress of Nephrology, Dialysis, and Transplantation.

[20] Gupta A, Dhiman RK, Kumari S, *et al.* Role of small intestinal bacterial overgrowth and delayed gastrointestinal transit time in cirrhotic patients with minimal hepatic encephalopathy. J Hepatol 2010; 53(5): 849-55. [http://dx.doi.org/10.1016/j.jhep.2010.05.017] [PMID: 20675008]

[21] Rayner HC, Zepel L, Fuller DS, *et al.* Recovery time, quality of life, and mortality in hemodialysis patients: The Dialysis Outcomes and Practice Patterns Study (DOPPS). Am J Kidney Dis 2014; 64(1): 86-94. [http://dx.doi.org/10.1053/j.ajkd.2014.01.014] [PMID: 24529994]

[22] Sirich TL, Fong K, Larive B, *et al.* Limited reduction in uremic solute concentrations with increased dialysis frequency and time in the Frequent Hemodialysis Network Daily Trial. Kidney Int 2017; 91(5): 1186-92. [http://dx.doi.org/10.1016/j.kint.2016.11.002] [PMID: 28089366]

[23] Hauw JJ, Daniel SE, Dickson D, *et al.* Preliminary NINDS neuropathologic criteria for steele□richardson□olszewski syndrome (progressive supranuclear palsy). Neurology 1994; 44(11): 2015-9. [http://dx.doi.org/10.1212/WNL.44.11.2015] [PMID: 7969952]

[24] Elliott JO, Ortman C, Almaani S, Lee YH, Jordan K. Understanding the associations between modifying factors, individual health beliefs, and hemodialysis patients' adherence to a low-phosphorus diet. J Ren Nutr 2015; 25(2): 111-20. [http://dx.doi.org/10.1053/j.jrn.2014.08.006] [PMID: 25282006]

[25] Ardakani A, Seghatoleslam T, Habil H, *et al.* Construct validity of

symptom checklist-90-revised (SCL-90-R) and general health questionnaire-28 (GHQ-28) in patients with drug addiction and diabetes, and normal population. Iran J Public Health 2016; 45(4): 451-9.
[PMID: 27252914]

[26] Freburger JK, Ellis AR, Wang L, *et al.* Comparative effectiveness of iron and erythropoiesis-stimulating agent dosing on health-related quality of life in patients receiving hemodialysis. Am J Kidney Dis 2016; 67(2): 271-82.
[http://dx.doi.org/10.1053/j.ajkd.2015.09.011] [PMID: 26508682]

[27] Wachterman MW, McCarthy EP, Marcantonio ER, Ersek M, Eds. Mistrust, misperceptions, and miscommunication: A qualitative study of preferences about kidney transplantation among African Americans. Transplantation proceedings. Elsevier 2015.

[28] Macaron G, Fahed M, Matar D, *et al.* Anxiety, depression and suicidal ideation in Lebanese patients undergoing hemodialysis. Community Ment Health J 2014; 50(2): 235-8.
[http://dx.doi.org/10.1007/s10597-013-9669-4] [PMID: 24337520]

[29] Arnout BA, Al-Dabbagh ZS, Al Eid NA, Al Eid MA, Al-Musaibeh SS, Al-Miqtiq MN, *et al.* The effects of corona virus (COVID-19) outbreak on the individuals' mental health and on the decision makers: A comparative epidemiological study. Health Sci 2020; 9(3): 26-47.

[30] Poorshadan S, Fallahi M, Abdi A, Mahdavikian S, Miri J, Azami H. Quality of life and its predictors in hospitalized patients with heart failure at hospitals affiliated to Kermanshah-Iran University of medical Sciences. J Cardiovasc Dis Res 2019; 10(1): 16-9.
[http://dx.doi.org/10.5530/jcdr.2019.1.3]

[31] Valizadeh L, Joonbakhsh F, Pashaee S. Determinants of care giving burden in parents of child with cancer at Tabriz children medical and training center. J Clin Nurs Midwifery 2014; 3(2): 13-20.

[32] Mirzaei A, Raesi R, Saghari S, Raei M. Evaluation of family caregiver burden among COVID-19 Patients. Open Public Health J 2020; 13(1): 808-14.
[http://dx.doi.org/10.2174/1874944502013010808]

[33] Kistler KD, Brunt EM, Clark JM, Diehl AM, Sallis JF, Schwimmer JB. Physical activity recommendations, exercise intensity, and histological severity of nonalcoholic fatty liver disease. Am J Gastroenterol 2011; 106(3): 460-8.
[http://dx.doi.org/10.1038/ajg.2010.488] [PMID: 21206486]

[34] Nouhi E, Karbalaizadeh M, Abazari F. The effect of mothers' participation and the family-centered care on mother's anxiety with children suffering from gastrointestinal infections: A randomized clinical trial. J Clin Nurs Midwi 2015; 3

[35] Friedman MM, Bowden VR, Jones E. Family nursing: Research, theory & practice. Prentice Hall Upper Saddle River 2003.

[36] Amador DD, Marques FRB, Duarte AM, Balbino FS, Balieiro MMFG, Mandetta MA. Uso da narrativa como estratégia de sensibilização para o modelo do cuidado centrado na família. Rev Gaúcha Enferm 2015; 36(1): 98-103.
[http://dx.doi.org/10.1590/1983-1447.2015.01.46346] [PMID: 26098809]

[37] Wang WL, Feng JY, Wang CJ, Chen JH. The Chinese family-centered care survey for adult intensive care unit: A psychometric study. Appl Nurs Res 2016; 29: 125-30.
[http://dx.doi.org/10.1016/j.apnr.2015.04.003] [PMID: 26856502]

[38] Reinhard SC, Given B, Petlick NH, Bemis A. Supporting family caregivers in providing care. In: Patient safety and quality: An evidence-based handbook for nurses. Rockville (MD): Agency for Healthcare Research and Quality 2008.

[39] Derogatis LR. SCL-90-R: Administration, scoring & procedures manual-II for the (revised) version and other instruments of the psychopathology rating scale series. Clin Psychome Res 1992; 1-16.

[40] Sereda Y, Dembitskyi S. Validity assessment of the symptom checklist SCL-90-R and shortened versions for the general population in Ukraine. BMC Psychiatry 2016; 16(1): 300.
[http://dx.doi.org/10.1186/s12888-016-1014-3] [PMID: 27561313]

[41] Ransom D, Ashton K, Windover A, Heinberg L. Internal consistency and validity assessment of SCL-90-R for bariatric surgery candidates. Surg Obes Relat Dis 2010; 6(6): 622-7.
[http://dx.doi.org/10.1016/j.soard.2010.02.039] [PMID: 20627709]

[42] Zalai D, Szeifert L, Novak M, Eds. Psychological distress and depression in patients with chronic kidney disease Seminars in dialysis. Wiley Online Library 2012.

[43] Mollahadi M, Tayyebi A, Ebadi A, Daneshmandi M. Comparison between anxiety, depression and stress in hemodialysis and kidney transplantation patients. Iran J Crit Care Nurs 2010; 2(4): 153-6.

[44] Sadoughi M, Hesampour F. The relationship between anxiety, depression and perceived social support and quality of life among hemodialysis patients. J Clin Nurs Midwifery 2017; 6(3): 56-71.

[45] Narimani K. A study of the effect of self-care training on the hemodialysis patientsâ quality of life. Daneshvar Med 2009; 15(6): 63-70.

[46] Ghavidel F, Mohammadzadeh S, Pirasteh H, Alavi Majd H. Effect assessment of applying the partnership care model on quality of life in hemodialysis patients reffering to Be'sat Hospital of IRI Air Force. Ebnesina 2009; 12(2): 22-7.

[47] Baraz-Pardenjani S, Mohammadi E, Boroumand B. The effect of self–care teaching by video tape on physical problems and quality of life in dialysis patients. Iran J Nurs 2008; 21(54): 121-33.

[48] Eghtedar S, Chalak Z, Parizad N, Alinezhad V. Training health-promoting behaviors based on pender's model on psychological well-being to hemodialysis patients. Nurs Midwifery J 2022; 20(4): 344-58.
[http://dx.doi.org/10.52547/unmf.20.4.344]

[49] Lindeman CA, McAthie M. Fundamentals of contemporary nursing practice. WB Saunders Company 1999.

[50] Narimani M. A survey of relationship between coping styles and mental health in patients undergoing hemodialytic treatment. J Fundament Mental Health 2008; 10(38): 117-22.

[51] Healy CM, McKay MF. Nursing stress: The effects of coping strategies and job satisfaction in a sample of Australian nurses. J Adv Nurs 2000; 31(3): 681-8.
[http://dx.doi.org/10.1046/j.1365-2648.2000.01323.x] [PMID: 10718888]

[52] Soltan N, Piyal B, Önder Ö, Acuner A, Yilmazcan N, Eds. Identifying the organizational stress factors of the Ankara education and research hospital's staff. National Health Administration Congress Ankara. Turkey. 2007.

[53] Griva K, Mooppil N, Seet P, Krishnan DSP, James H, Newman SP. The NKF-NUS hemodialysis trial protocol - a randomized controlled trial to determine the effectiveness of a self management intervention for hemodialysis patients. BMC Nephrol 2011; 12(1): 4.
[http://dx.doi.org/10.1186/1471-2369-12-4] [PMID: 21272382]

[54] Clarke AL, Jhamb M, Bennett PN, Eds. Barriers and facilitators for engagement and implementation of exercise in end□stage kidney disease: Future theory□based interventions using the behavior change wheel Seminars in dialysis. Wiley Online Library 2019.

[55] Habibzade H, Davarpanah M, Khalkhali H. The study of the effect of orem self care model on self efficacy in hemodialysis patients in urmia medical science hospitals during 2011. J Urmia Nurs Midwifery Faculty 2012; 10(2)

[56] Ramezani T, Sharifirad G, Rajati F, Rajati M, Mohebi S. Effect of educational intervention on promoting self-care in hemodialysis patients: Applying the self-efficacy theory. J Educ Health Promot 2019; 8: 65.
[PMID: 31008132]

[57] Soodmand M, Ghasemzadeh G, Mirzaee S, Mohammadi M, Amoozadeh Lichaei N, Monfared A. Self-care agency and its influential factors in hemodialysis patients. Iran J Nurs 2019; 32(118): 86-95.
[http://dx.doi.org/10.29252/ijn.32.118.86]

[58] Shad FS, Rahnama M, Abdollahimohammad A, Sima SAD. An investigation into the impact of orem's self-care program on life satisfaction in hemodialysis patients: A clinical trial study. Med-Surg Nurs J 2018; 7(4)

[59] Cameron JI, Shin JL, Williams D, Stewart DE. A brief problem-solving intervention for family caregivers to individuals with advanced cancer. J Psychosom Res 2004; 57(2): 137-43.
[http://dx.doi.org/10.1016/S0022-3999(03)00609-3] [PMID: 15465067]

[60] Au A, Li S, Lee K, *et al.* The coping with caregiving group program for Chinese caregivers of patients with Alzheimer's disease in Hong Kong. Patient Educ Couns 2010; 78(2): 256-60.
[http://dx.doi.org/10.1016/j.pec.2009.06.005] [PMID: 19619974]

[61] Chan SW, Yip B, Tso S, Cheng B, Tam W. Evaluation of a psychoeducation program for Chinese clients with schizophrenia and their family caregivers. Patient Educ Couns 2009; 75(1): 67-76.
[http://dx.doi.org/10.1016/j.pec.2008.08.028] [PMID: 18963721]

[62] Andolsek KM, Clapp-Channing NE, Gehlbach SH, *et al.* Caregivers and elderly relatives. The prevalence of caregiving in a family practice. Arch Intern Med 1988; 148(10): 2177-80.
[http://dx.doi.org/10.1001/archinte.1988.00380100059013] [PMID: 3178375]

[63] Pochard F, Azoulay E, Chevret S, *et al.* Symptoms of anxiety and depression in family members of intensive care unit patients: Ethical

hypothesis regarding decision-making capacity. Crit Care Med 2001; 29(10): 1893-7. [http://dx.doi.org/10.1097/00003246-200110000-00007] [PMID: 11588447]

[64] Buhse M. Assessment of caregiver burden in families of persons with multiple sclerosis. J Neurosci Nurs 2008; 40(1): 25-31. [http://dx.doi.org/10.1097/01376517-200802000-00005] [PMID: 18330407]