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The effect of the eye movement desensitization and reprocessing intervention on anxiety and depression among patients undergoing hemodialysis: A randomized controlled trial

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Abstract

Purpose: This study examined the effect of the eye movement desensitization and reprocessing intervention on depression and anxiety in patients undergoing hemodialysis.

Design and Methods: In this randomized controlled trial, 90 patients were enrolled. The intervention group received six sessions of the eye movement desensitization and reprocessing intervention. Data were collected before and 2 weeks after the intervention using the Hospital Anxiety and Depression Scale.

Findings: Measured levels of anxiety and depression were significantly reduced in the intervention group compared with preintervention levels and to the control group.

Practice implications: Nurses can use the eye movement desensitization and reprocessing intervention in clinical practice in combination with psychotropic drugs for the reduction of depression and anxiety in patients undergoing hemodialysis.

KEYWORDS

anxiety, depression, eye movement desensitization and reprocessing, hemodialysis, nursing care

1 | INTRODUCTION

The renal function of patients with end-stage renal disease (ESRD) cannot sustain their life without kidney transplantation or replacement therapies including hemodialysis. It has been reported that one million patients across the world are undergoing hemodialysis. Also, it has been estimated that by 2030, this number will be doubled indicating a global health challenge.[1] Patients with ESRD undergoing lifelong hemodialysis have complex healthcare needs in terms of the physical and psychological effects of ESRD, its treatment and comorbidities.[2]

1.1 | Psychological issues among patients with hemodialysis

Adherence to the hemodialysis regimen requires that patients adapt to fatigue and lack of energy, sexual dysfunction, fluid and diet control, fistula cannulation, and frequent hospital readmissions, which influence their quality of life (QoL).[3,4] Hemodialysis often limits patients' ability to carry out daily living activities,[5] and imposes high levels of mental stress on them.[6] Anxiety, depression, and suicidal ideation are prevalent among patients with ESRD, and are increased in proportion to the degree of renal failure.[7] Psychological

issues are associated with poor QoL,[8] increased rate of hospital readmissions, and length of hospital stay.[9] Consequences of hemodialysis, such as fatigue and loss of appetite, make it difficult to differentiate anxiety and depression from the physical effects of treatment.[10] While anxiety and depression are common in hemodialysis patients, they often remain undiagnosed. Therefore, a failure to diagnose anxiety and depression may result in treatment noncompliance, cardiac, and digestive issues.[11] Depression is associated with sorrow, helplessness, despair, guilt, sleep disturbances, decreased appetite, and sexual desire disorders.[11] It can lead to the increase of inflammation responses, acceleration of atherosclerosis, and cardiovascular diseases.[12] Untreated mental health illnesses in hemodialysis patients contribute to increased morbidity and mortality, reduced QoL and even suicide.[13]

1.2 | Research background

According to the study by Ng et al,[14] the mean level of anxiety and depression in 44.7% to 54.1% of hemodialysis patients were above the cut-off at both baseline and follow-up. Najafi et al[9] reported a high prevalence of untreated depression in patients on hemodialysis, with over 70% of them demonstrating some indices of depression and anxiety. However, patients were unaware of their symptoms and did not acknowledge the need for therapeutic measures. Liu et al[15] in a study on 194 older patients undergoing hemodialysis reported that 45.9% of them experienced depressive symptoms. The severity of the illness and inability to undertake activities of daily livings (ADLs) were the major causes of depressive symptoms. Therefore, there is a need to appropriately screen hemodialysis patients for early detection of depression and anxiety.

1.3 | Relieving anxiety and depression in hemodialysis patients

It is believed that both pharmacological and nonpharmacological methods can be used for the reduction of anxiety and depression in hemodialysis patients.[16] Psychotropic drugs used for relieving anxiety and depression are accompanied with side effects, such as an increased level of toxic metabolites in the blood, cardiovascular disorders, anorexia and vomiting, hepatotoxicity, and risk of bleeding.[17] Patients undergoing hemodialysis are at a high risk of altered pharmacokinetics and drug clearance due to renal dysfunction. Therefore, medicines' management including dosage adjustment, appropriate prescription timing, and careful monitoring are required.[11] Current guidelines have recommended the use of a selective serotonin reuptake inhibitor for the treatment of depression in hemodialysis patients. However, there is a paucity of conclusive evidence regarding the relative risks and benefits of antidepressants in patients with renal diseases.[18] On the other hand, nonpharmacological methods are more preferred than pharmacological methods for relieving depression and anxiety in hemodialysis patients due to lower side effects and costs, and limited potential for drug dependency.[16] Concerns about the side effects of medicines in hemodialysis patients have increased researchers' interests in the use of complementary and alternative medicine approaches. Nonpharmacological methods such as meditation, hypnotism, progressive muscle relaxation, cognitive behavior therapy (CBT),[19] and regular exercise[17] can reduce anxiety and depression in hemodialysis patients. The use of relaxation interventions such as the Benson's relaxation technique has been shown to prevent further health-related complications in hemodialysis patients through the reduction of their anxiety and stress.[20] Hemodialysis patients that receive acupuncture on a regular basis demonstrate a significant reduction in depression, anxiety, and general psychological distress compared with the control group.[21] Grigoriou et al[16] believe that the treatment of depression in hemodialysis patients should be a multidimensional approach with the application of different strategies drawing on the skills of the healthcare team. Accordingly, nurses spend the most time with patients undergoing hemodialysis and can impact their health outcomes.[22–24] For instance, nurses can educate patients to change their lifestyle and habits, and reduce their needs to emergency hemodialysis sessions.[25] Also, nurses have a responsibility for the provision of mental health support to hemodialysis patients, and prevention of further psychological problems due to the underlying disease.[26] In this respect, eye movement desensitization and reprocessing (EMDR) therapy as one of the nonpharmacological therapeutic interventions can be used by nurses working in hemodialysis centers.[27] It is suggested to be incorporated into the daily nursing practice for the management of psychological problems in patients with chronic diseases.[28]

1.4 | EMDR therapy

EMDR as an inexpensive, safe and noninvasive therapy has been endorsed by the American Psychiatric Association for the survivors of earthquake, patients with posttraumatic stress disorder (PTSD), cardiac diseases, and cancer.[27,29–32] In 2013, the World Health Organization recognized EMDR as a psychotherapy intervention for the treatment of PTSD[33].

As an underpinning assumption of EMDR therapy, anxiety is the product of distressing events, that has not been properly processed by the nervous system, and can lead to isolated neurobiological stasis.[34] EMDR initially has been developed for the treatment of PTSD and is guided by the use of a behavioral-cognitive technique on the basis of the adaptive information processing (AIP) model.[35,36] Stressful events can lead to prolonged negative consequences such as anxiety and depression. Therefore, EMDR aims to process and resolve any such underlying unprocessed events, which may cause negative mental consequences.[37]

The guided eye movements used in EMDR immediately activate the parasympathetic nervous system and lead to physiological responses.[38] During EMDR, alternating the left-right simulation of the brain by eye movements, sounds or taps is sought, although the mind is focused on troublesome issues in life for stimulating the blocked or frozen information processing system.[39,40] The patient is asked to focus on the causes of negative life issues and their

consequences, whilst simultaneously is attending to the alternate stimulus producing eye movements or other forms of bilateral stimulations.[37] While the patient focuses on a memory or negative experience, he/she is asked to report new thoughts that have emerged in an iterative process until the memory or experience is no longer experienced as distressing.[41]

Schneider et al[42] stated that EMDR was an important treatment for the reduction of depression and anxiety. Behnammoghadam et al[43] and Hase et al[44] reported statistically significant reductions in the depressive symptoms of patients after the use of EMDR. Staring et al[45] compared the effects of EMDR and competitive memory training (COMET), that were used in combination in patients with anxiety (n = 47). The use of EMDR therapy mediated reductions in anxiety and depression symptoms, but COMET was associated with more improvements in self-esteem. The use of EMDR therapy has demonstrated positive effects on the improvement of quality of sleep in patients with PTSD,[46] QoL in patients with myocardial infarction,[47] and preoperative anxiety in children.[40]

EMDR and CBT can significantly reduce mental distress, anxiety, and depression, and also enhance cognitive abilities in patients. Chen et al[48] in a systematic review study compared the effects of EMDR and CBT in adult patients with PTSD indicating more effectiveness of EMDR. Another systematic review of randomized controlled trials by Valiente-Gomez et al[33] showed that a few studies examined the effect of EMDR. Despite the presence of limited evidence, EMDR can influence mental disorders related to trauma, psychotic or affective symptoms and chronic pain. Gauhar[49] stated that after only 6 to 8 sessions of EMDR in patients with depression, negative thoughts, and depressive symptoms significantly decreased compared with the control group and an improvement in mood in a 3-month follow-up interview was observed.

Despite the availability of studies on the effect of EMDR in patients with various types of diseases suffering from anxiety or depression, only Rahimi et al[50] used an experimental study on the effect of EMDR on psychological stress in patients undergoing hemodialysis. They used the hemodialysis stress scale (HSS-Baldree) for data collection and indicated the effectiveness of EMDR in the reduction of patients' stress. Therefore, in the current study, the effect of EMDR on depression and anxiety in hemodialysis patients was examined.

2 | METHODS

2.1 | Design

This randomized controlled trial was conducted on patients recruited from the hemodialysis wards of two large referral teaching hospitals in an urban area of Iran. Data were collected from December 2015 to July 2016.

2.2 | Sampling

Using a convenience sampling method, 90 patients were recruited and were randomly assigned into intervention and control groups (n = 45 in each group). Given the results of Arefi et al's study,[51] power = 80%, $\alpha = 0.05$, $\beta = 20\%$, and the following sampling formula for two-tailed comparison groups (Machin, Campbell, Tan & Tan, 2009), the sample size was estimated 90 patients:

$$\frac{\left(z/1-\frac{\alpha}{2}+z/\beta\right)^2{}_*(\sigma 1^2+\sigma 2^2)}{(\mu 1-\mu 2)^2} = (1.96+0.85)^2{}_*(4.07^2+3.02^2) /(9.95-7.86)^2 = 90.$$

Therefore, 45 patients were required for each intervention and control group. Inclusion criteria were willingness to participate in this study, undergoing hemodialysis three times a week at least for 6 months that would allow for an adjustment to the hemodialysis process, age over 18 years, no history of seizure and hospitalization due to psychiatric disorders, no drug or alcohol addiction, no strabismus and visual problems based on the researcher's physical examination, no consciousness issues, ability to communicate in Farsi, no experience of stressful life events in the last 6 months such as the death of a family member, and no previous use of EMDR. Those patients who were unwilling to continue with the study or experienced any critical physical and psychological conditions were excluded.

2.3 | Procedure

Nurse managers in the hemodialysis wards were informed of the study's aim, procedure and inclusion criteria to help with the identification of eligible patients. A convenience sample of patients undergoing hemodialysis who met the inclusion criteria was identified, with no patient declining to participate. After explaining the aim and method of the study, the informed written consent form was signed by them. They were allocated to the groups randomly through a system of sealed envelopes, with each envelope was for an assignment to a specific group. The sampling process was continued until the required number of subjects was assigned to each group. To avoid selection bias, the second researcher generated the random allocation sequence. The primary researcher enrolled the patients, assigned them to the groups and approached them to participate in the study. A staff nurse in the hemodialysis ward, who was unaware of the subjects' allocation, collected data. Another person who was not a member of the research team fed data into the computer so that the researchers had no access to data processing.

The intervention group received the EMDR intervention during hemodialysis three times a week over 2 weeks within a total 4-week period.[41] It was carried out in a private and quiet room for 30 to 45 minutes in each session by the primary investigator, that was an experienced EMDR therapist. In the first session, the traumatic scenes of hemodialysis were identified. The most disturbing scene for the patient was selected for desensitization. The aim of this phase was to familiarize the patient with EMDR and its positive and useful effects as a complementary and nonpharmacological intervention for relieving anxiety and depression. This information also helped with patient participation and cooperation with the researcher when

performing EMDR. The procedure was conducted according to the Shapiro protocol[41] as follows:

- Facing the negative cognitions related to uncomfortable trauma: the patients were requested to describe their own understandings and visualizations of the traumatic event and recall it;
- Mental rehearsal of positive recognition;
- Active visual attention to the object (finger movement): the finger was rapidly moved with approximately 30 centimeters distance from patient's eyes in the visual field from right to left and vice versa. This included the sweep motion of the hand in the visual field, whilst the patient was visualizing the event successively;
- Stopping the thought or imagination;
- Deep breathing after each session.

The patients in the control group only received routine care consisting of weight measurement and blood pressure control. The process of the study was shown in Figure 1.

2.4 | Instruments

Data were collected via (a) a demographic and medical data form and (b) the hospital anxiety and depression scale (HADS).

2.5 | The demographic and medical data form

It included questions of the patients' age, sex, education level, marital status, employment status, and duration of hemodialysis.

2.6 | Hospital anxiety and depression scale

The patients' levels of anxiety and depression were assessed using the Farsi version of the HADS.[52,53] This self-reporting tool is time efficient and despite its brevity compares well with other measures such as the Beck's Depression Inventory-II and other valid tools.[54] The Farsi version of the HADS has an appropriate internal consistency for anxiety ($r = 0.78$) and depression ($r = 0.86$) based on the calculation of the Cronbach's alpha coefficient.[55] The HADS has been used by Zhang et al[56] to measure the severity of anxiety and depression among hemodialysis patients. The patient presents his/her own evaluation and self-report of anxiety and depression. This tool consists of 14 items consisting of two subscales of anxiety (HADS-A) and depression (HADS-D). Each subscale contains seven items (anxiety items: 1, 3, 5, 7, 9, 11, and 13; depression items: 2, 4, 6, 8, 10, 12, and 14). The anxiety and depression subscales have a 4-point Likert scale from 0 (absence of symptoms) to 3 (the maximal presentation of symptoms), with a total score of 21. Scores are categorized as normal (0-7), borderline (8-10), and abnormal (11-21)[57] with a higher score indicating a higher level of anxiety or depression. Scores higher than 10 on the anxiety or depression subscales indicate the probability of either anxiety or depression disorders.

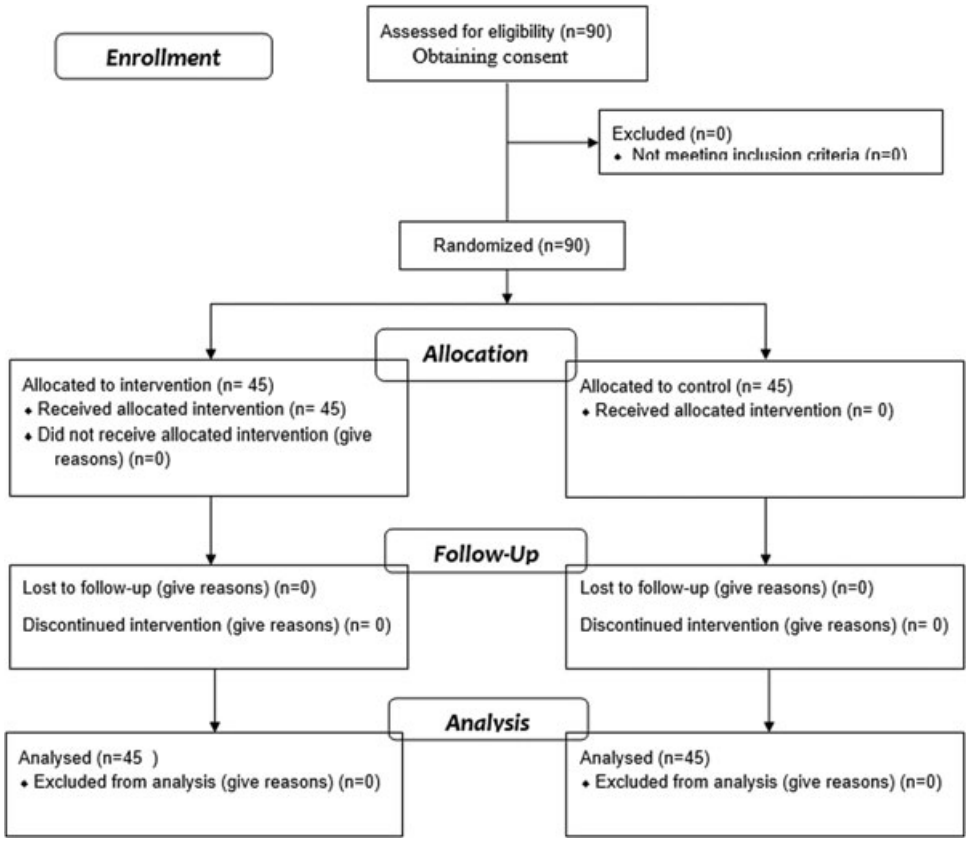

FIGURE 1 Process of the study according to the Consort flow diagram (2010)

2.7 | Ethical approval

Ethical approval was obtained from the review board affiliated with Shahed University before the study (decree code: 41-228111). In addition, the research protocol was registered in the Iranian Registry of Clinical Trials under the code of IRCT20152137529N10. Permissions were also obtained from administrators of the hemodialysis wards before the study. Also, the patients were given explanations about the study purpose and EMDR intervention. They could withdraw from the study at any time without any effect on their care. Those patients who agreed to take part in this study were asked to sign the written informed consent form. The anonymity of the patients was ensured using codes rather than names. Shahed University Review Board, No. 92/16/A/P.

2.8 | Data collection

Data were collected from both groups before the EMDR intervention and at the end of the second week. They were monitored closely for the occurrence of possible adverse effects during the intervention.

2.9 | Data analysis

Descriptive and inferential statistics were used to analyze data using the SPSS software v.21 (SPSS Inc, Chicago, IL). Data were explored and assessed for missing values, outliers, extreme values, and normal distribution. Descriptive statistics with the mean and SD for continuous variables and frequency for categorical variables were used for baseline data. The two-tailed independent samples *t* test, Chi-square, and Fisher's exact tests were used to assess whether there were statistically significant differences between the patients' characteristics, and anxiety and depression. The level of statistical significance was set as $P < 0.05$.

3 | RESULTS

All 90 patients completed the EMDR sessions without any of them declining to participate.

3.1 | Demographic characteristics of the patients

The patients' mean age was 51.52 ± 11.134 years, with a range of 19 to 70 years. The majority of them were male (52.2%) and the most prevalent comorbidities were hypertension (66.7%) and diabetes (56.7%). No statistically significant differences were reported between the groups in terms of baseline data ($P > 0.05$; Table 1).

TABLE 1 Demographic characteristics of the subjects (n = 90)

Characteristic	Total (n = 90) %(n)	Intervention (n = 45) %(n)	Control (n = 45) %(n)	Statistical analysis (independent *t* test and Chi-squared test) *P* value
Age, y	51.52 ± 11.134	49.27 ± 13.23	53.38 ± 10.17	$t = -1.65$
				$P = 0.10$
Sex				Fisher's exact
Female	47(52.2)	26(55.3)	21(44.7)	df = 1
Male	43(47.8)	19(44.2)	24(55.8)	$P = 0.390$
Education level				
Lower than diploma	50(55.6)	21(46.7)	29(64.4)	Fisher's exact
Diploma and higher	40(44.4)	24(53.3)	16(35.7)	$P= 0.130$
Marital status				
Single	12(13.3)	7(15.6)	5(11.1)	$X^2 = 0.73$
Married	68(75.6)	34(75.6)	34(75.6)	df = 2
Widow	10(11.1)	4(8.8)	6(13.3)	$P = 0.690$
Employment status				
Unemployed	15(16.7)	9(20.0)	6(13.3)	$X^2 = 4.96$
Employed	21(21.9)	14(31.1)	7(15.6)	df = 3
Retired	19(38.9)	7(15.6)	12(26.7)	$P = 0.170$
Housewife	35(38.9)	15(33.3)	20(44.4)	
Duration of hemodialysis (M ± SD)				
1-5 y	71(78.9)	36(50.7)	35(49.3)	$X^2 = 4.39$
5-10	9(10.0)	2(22.2)	7(77.8)	df = 2
>10	10(11.1)	7(70.0)	3 (30.0)	$P = 0.110$

TABLE 2 The effect of EMDR on anxiety (n = 90)

Before the intervention	Group			Statistical analysis
(Qualitative rating system)	**Intervention**	**Control**	**Total**	***P* value**
Normal (score 0-7)	–	–	–	Fisher's exact$P = 0.39$
Borderline (score 8-10)	19(21.1%)	24(26.7%)	43(47.8%)	
Abnormal (score of 11-21)	26(28.9%)	21(23.3%)	47(52.2%)	
(Quantitative rating system)	12.27 ± 3.96	11.07 ± 2.84		Independent t test $t = -1.65$, df = 79.88, $P = 0.10$
After the intervention				
(Qualitative rating system)				
Normal (Score 0-7)	23(25.5%)	6(6.7%)	29(32.2%)	Chi-square test$X^2(2) = 19.07$,
Borderline (Score 8-10)	17(18.9%)	19(21.1%)	36(40%)	$P = 0.01$.Cramer's $V = r = 0.46$Cohen's
Abnormal (Score 11-21)	5(5.6%)	20(22.2%)	25(27.8%)	$d = 1.03$Effect sizes = large
(Quantitative rating system)	7.27 ± 2.84	10.69 ± 3.24		Independent t test$t = -5.32$, df = 88, $P = 0.001$Cohen's $d = 1.12$Effect sizes = large

Abbreviation: EMDR, eye movement desensitization and reprocessing.

3.2 | The HADS

No statistically significant differences were identified in depression and anxiety between the groups at baseline ($P > 0.05$). The level of anxiety was significantly lower in the intervention group after the EMDR intervention ($P < 0.05$). Similarly, the patients' level of depression significantly reduced in the intervention group after the intervention ($P < 0.05$) (Tables 2 and 3).

4 | DISCUSSION

This study examined the effect of the EMDR intervention on anxiety and depression in patients undergoing hemodialysis. Comparison of the mean scores of anxiety and depression in the groups supported the effectiveness of the EMDR therapy in the reduction of anxiety and depression in the intervention group. Similar to this study, an experimental design was used by Rahimi et al[50] on the effect of EMDR on psychological stress in patients undergoing hemodialysis. They focused on patients' psychological stress and used the HSS-Baldree for data collection, and showed the effectiveness of EMDR in the reduction of patients' stress.

Other studies used a similar therapy, but on patients with various types of diseases. For instance, Behnammoghadam et al[43] conducted a clinical trial on sixty patients with myocardial infarction. The EMDR intervention in three sessions lasting for 45 to 90 minutes in four consecutive months led to the reduction of patients' depression. Similarly, Gauhar[49] used 6 to 8 sessions of EMDR therapy for treating the primary diagnosis of major

TABLE 3 The effect of EMDR on depression (n = 90)

Before the intervention	Group			Statistical analysis,
Qualitative rating system	**Intervention**	**Control**	**Total**	***P* value**
Normal (Score 0-7)	–	–	–	Fisher's exact$P = 0.20$
Borderline (Score 8-10)	29(32.2%)	22(24.4%)	51(56.7%)	
Abnormal (Score 11-21)	16(17.8%)	23(25.6%)	39(43.3%)	
Quantitative rating system	10.78 ± 3.32	11.73 ± 3.05		Independent t test $t = 1.42$, df = 88, $P = 0.15$
After the intervention				
Qualitative rating system				
Normal (Score 0-7)	20(22.2%)	5(5.6%)	25(27.8%)	Chi-square test$X^2(2) = 14.76$,
Borderline (Score 8-10)	13(14.4%)	13(14.4%)	26(28.8%)	$P = 0.01$.Cramer's $V = r = 0.40$Cohen's
Abnormal (Score 11-21)	12(13.3%)	27(30%)	39(43.3%)	$d = 0.88$Effect sizes = large
Quantitative rating system	6.27 ± 2.10	11.33 ± 3.14		Independent t test$t = 8.99$, df = 76.87, $P = 0.001$Cohen's $d = 1.89$Effect sizes = large

Abbreviation: EMDR, eye movement desensitization and reprocessing.

depressive symptoms in 26 patients. The results showed that EMDR improved depressive and trauma symptoms, and QoL.

In our study, the EMDR intervention was offered to patients only six times. Despite such a relatively short intervention period compared to CBT that is offered in eight sessions,[58] a positive outcome was reported. Similarly, Shapiro[41] reported that the EMDR therapy reduced negative emotions and disruptive experiences among patients after a limited number of sessions. Therefore, EMDR can decrease symptoms faster than standard behavioral and cognitive techniques and needs fewer intervention sessions. As an explanation, EMDR cuts the memory neurophysiologic bonds and leads to brain self-rehabilitation. Moreover, due to a close physical distance between neurologic bonds, the therapeutic effect is observed in a short period of time.[59] In the AIP model as a guide of the EMDR therapy, it is believed that stored memories can lead to mental disorders.[44] EMDR stimulates the information processing system in the brain and reprocesses information.[60] Although the somatic load is reduced after EMDR and physiological changes are shown, time can affect the creation of changes.[61]

Identification of depression and anxiety in patients is made easier by the use of the HADS questionnaire. According to Cohen et al[11] depression and anxiety are often undiagnosed in hemodialysis patients and symptoms can be mistaken for those of the renal impairment and/or the effects of hemodialysis.[10] The HADS can be used as a screening tool in hemodialysis patients given its ease of use and accessibility and can be administered by clinical nurses as one part of their routine patient assessment in hemodialysis centers.

5 | CONCLUSION

According to this study, the EMDR intervention had positive effects on anxiety and depression in patients undergoing hemodialysis. Nurses can use it in clinical practice in combination with psychotropic drugs for the reduction of depression and anxiety in patients undergoing hemodialysis.

5.1 | Limitations and suggestions for future studies

It was a small scale study on the effect of EMDR on the reduction of anxiety and depression in patients undergoing hemodialysis. Also, patients' blinding was impossible due to the nature of the intervention. A large scale study is needed to examine the effect of EMDR and compare and contrast various data collection instruments for the measurement of anxiety and depression. Future studies should be conducted with longer follow-up periods to assess the long-term effects of the EMDR intervention on patients' anxiety and depression. In addition, a comparison of other nonpharmacological interventions with EMDR is suggested.

6 | IMPLICATIONS FOR NURSING PRACTICE

EMDR as a safe and simple therapy can be educated to clinical nurses for the promotion of patients' psychological wellbeing during hospitalization. The use of EMDR helps reduce the need to pharmacological interventions in hemodialysis patients with a compromised renal function. EMDR can help alleviate the negative physical and psychological effects of anxiety and depression in patients with ESRD undergoing hemodialysis, improve their QoL, reduce hospital readmission, decrease healthcare costs and accelerate patients' discharge from hospital. Nurses are suggested to use the HADS tool and help with early detection of anxiety and depression in hemodialysis patients in their routine care.

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CONFLICT OF INTERESTS

The authors have no conflict of interests to declare.

AUTHOR CONTRIBUTIONS

All authors agreed on the final manuscript. Their contributions are as follows (as recommended by the ICMJE [http://www.icmje.org/recommendations/]). FR, NR, and MHK made substantial contributions to the conception or design of the work, the acquisition, analysis, or interpretation of data for the work, drafting the work or revising it critically for important intellectual content, and final approval of the version to be published. TB contributed to data analysis and interpretation of findings, and final approval of the version to be published. SDT, PG, MV significantly contributed to the analysis, or interpretation of data for the work, drafting the work or revising it critically for important intellectual content, and final approval of the version to be published.

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