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Psychological intervention for depression, anxiety, and quality of life in patients undergoing hemodialysis

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ABSTRACT

Background: *Psychological issues in chronic kidney disease patients undergoing hemodialysis are three times higher compared to other patients. Depression and anxiety in chronic kidney disease patients undergoing hemodialysis are the most significant variables related to the decrease in quality of life.*
Objectives: *This systematic review aims to determine the effectiveness of psychological interventions in reducing levels of depression and anxiety as well as improving the quality of life in patients undergoing hemodialysis.*
Methods: *Articles were identified using online databases such as ProQuest, PubMed, and Science Direct with the keywords Psychological Intervention AND Hemodialysis AND Depression OR Anxiety OR Quality of Life, published between 2020 and 2025. The PICO framework was utilized: patients undergoing hemodialysis with psychological interventions compared to other interventions, with outcomes including levels of depression, anxiety, and quality of life. The selection process was conducted using the PRISMA method, and article evaluation was performed using the Joanna Briggs Institute (JBI) checklist.*
Results: *A total of 16 selected scientific evidences were randomized controlled trials involving 1422 chronic kidney disease patients undergoing hemodialysis, aged 18–80 years. Fifteen types of therapies were identified as potential interventions due to their demonstrated effectiveness among participants, including: cognitive behavioral intervention, cognitive behavioral group therapy, cognitive behavioral intervention + resilience model, multifaceted education, positive thinking training, resilience training, spiritual care, mindfulness meditation + progressive muscle relaxation, recreational therapy, emotional disclosure writing, self-management program, live music, acupressure, aromatherapy massage, and virtual reality exercise.*
Conclusions: *Various types of psychological therapies can serve as effective and efficient intervention options to reduce levels of depression and anxiety, as well as improve the quality of life for chronic kidney disease patients undergoing hemodialysis.*

KEYWORD: *psychological intervention; hemodialysis; depression; anxiety; quality of life*

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INTRODUCTION

Chronic kidney disease is a progressive condition marked by impaired kidney function, defined by a reduction in the glomerular filtration rate to below 60 ml/min/1.73 m², persisting for a duration of three months or longer (1). Chronic kidney disease is widely prevalent among populations and one of the leading causes of death worldwide. This disease affects over 10% of the global population, with a prevalence of 843.6 million individuals (2). The 2023 Indonesian health survey reported that the prevalence of chronic kidney disease reached 638178 individuals(3). The high prevalence of chronic kidney disease highlights the necessity for advancing prevention and treatment strategies.

Hemodialysis therapy is one of the key treatment approaches for managing chronic kidney disease. Hemodialysis therapy must be routinely performed by chronic kidney disease patients to replace kidney function. As a result, patients' dependence on this therapy can impact changes in their lives both physiologically and psychologically (4). The side effects of hemodialysis therapy include physical weakness, decreased cognitive abilities, and the potential to trigger psychological problems (5). Studies reveal that patients undergoing hemodialysis experience psychological challenges at a rate three times higher than that of other patient groups (6). A study by Gedara et al. (7) highlights several factors that serve as stressors triggering psychological problems in hemodialysis patients. These include biological, psychological/behavioral, and social/environmental factors. These issues are linked to dietary restrictions, medication side effects, dependency on hemodialysis machines, sleep disorders, mobility challenges, changes in sexual activity, disease perception, employment, economic status, family support, and accessibility to healthcare facilities. Such problems can lead to psychological disturbances in patients, such as depression and anxiety(6).

Numerous studies highlight the widespread occurrence of depression and anxiety among individuals undergoing hemodialysis. Research conducted by Danial et al. (8) on 194 individuals with chronic kidney disease undergoing hemodialysis treatment found that 52% experienced moderate depression, 12.8% severe depression, 68.5% mild anxiety, as well as 24.7% mild stress, 42.7% moderate stress, and 42.7% severe stress. Another study by Nagy et al. (9) on 298 patients undergoing hemodialysis reported that 26.2% experienced anxiety and 28.3% were identified as having depression. This

data is further supported by the findings of Alshelleh et al., which revealed that 58.3% of chronic kidney disease patients experienced depression and 50.5% suffered from anxiety '(10). Untreated depression and anxiety, of course, have negative impacts on patients.

There are various issues faced by patients caused by depression. Research indicates that depression is associated with sleep disturbances and fatigue in chronic kidney disease patients receiving hemodialysis treatment (11). According to studies, 14.4% of chronic kidney disease patients undergoing hemodialysis exhibit suicidal ideation. Research also shows that the majority of patients experiencing depression cease engaging in their usual daily activities (12). In addition to depression, anxiety is also a psychological issue that has negative impacts. Research proves that depression and anxiety are associated with higher levels of pain in chronic kidney disease patients, which disrupts their daily activities (13). This finding is supported by research by Masià-Plana et al. (14), which reveals that patients experiencing anxiety report more intense levels of pain. Depression and anxiety are the most significant variables linked to the decline in hemodialysis patients' quality of life (9). Research highlights that patients with chronic kidney disease undergoing hemo-dialysis often experience declines in both physical and emotional dimensions of their quality of life (15). A study by Cheng et al. (16) highlighted a decline in the quality of life among patients with chronic kidney disease undergoing hemodialysis negatively correlates with depression and anxiety. Furthermore, the decline in quality of life is closely linked to disease complications, pain, anemia, and fatigue after hemodialysis therapy (17). Pain and fatigue experienced by patients disrupt daily activities, thereby lowering their quality of life (13). Research by Cheng et al. (18) demonstrated that quality of life is strongly related to patient mortality and hospital readmission. The statement emphasizes the importance of implementing interventions aimed at alleviating depression and anxiety while enhancing patients' quality of life. This review aims to explore the effectiveness of various interventions designed to alleviate depression and anxiety while enhancing the quality of life for chronic kidney disease patients receiving hemodialysis.

MATERIALS AND METHODS

Identification of studies was conducted using the ProQuest, PubMed, and Science Direct databases. The authors screened articles published between 2020 and 2025. The search strategy was carried out using the following keywords: Psychological Intervention AND Hemodialysis AND Depression OR Anxiety OR Quality of Life. Articles were selected based on eligibility criteria, and the selection process for scientific evidence was conducted using the PRISMA method (Figure 1).

Eligibility Criteria

The eligibility criteria in this review used

the PICO framework as follows; (1) Population: patients undergoing hemodialysis, (2) Intervention: psychological intervention, (3) Comparison: other interventions, (4) Outcome: levels of depression, anxiety, and quality of life. The inclusion criteria for the systematic review are as follows; (1) articles related to psychological interventions for depression, anxiety, and quality of life in patients undergoing hemodialysis, (2) published within 2020–2025, (3) randomized Controlled Trial study design, (4) original research consisting of authentic articles conducted by the researchers themselves, (5) full-text articles, (6) articles providing information on the effectiveness of therapy, and (7) articles written in English.

Scientific Evidence Selection Process

The selection process for scientific evidence was conducted using the PRISMA method (**Figure 1**) began by removing duplicate articles. The next step involved screening titles that align with the topic under

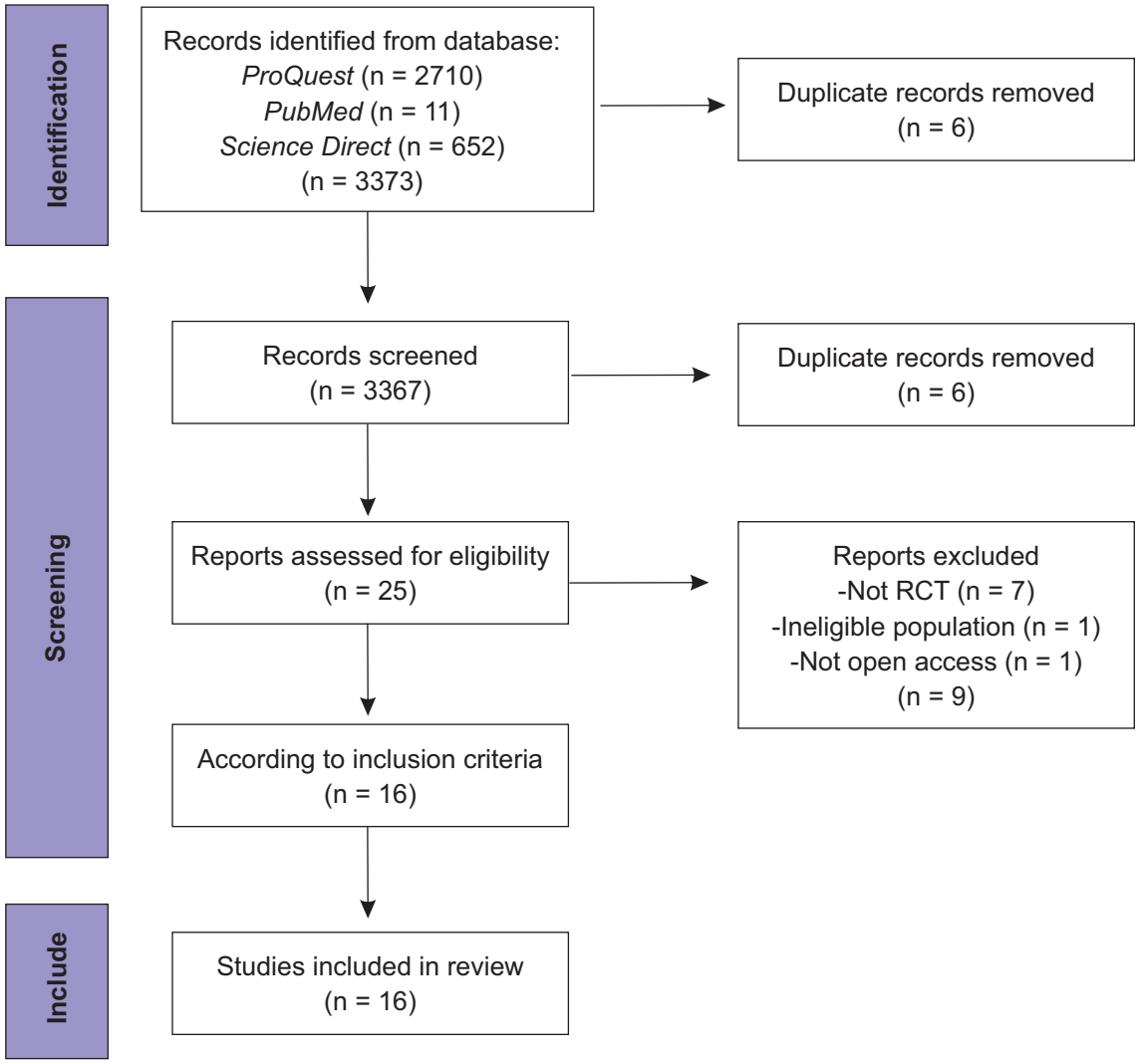

Figure 1. Scientific evidence selection process

review. Subsequently, the eligibility process was conducted on abstracts and full texts based on the predetermined inclusion criteria. Articles that matched the topic and criteria were synthesized and analyzed in this systematic review.

Assessment of Scientific Evidence

The assessment of articles was carried out using the Joanna Briggs Institute (JBI) checklist. This instrument evaluates the presence of sample selection, biases related to distribution, biases associated with

Tabel 1. Joanna Briggs Institute (JBI) check list for Randomized Controlled Trial article

Article	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Score
Suandika et al. (19)	Y	N/A	Y	Y	N	Y	N/A	Y	Y	Y	Y	Y	Y	77%
Shareh et al. (20)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	100%
González-Flores et al. (21)	Y	Y	Y	Y	N/A	Y	N/A	Y	Y	Y	Y	Y	Y	85%
Keivan et al. (22)	Y	Y	N	N	N	Y	N/A	Y	Y	Y	Y	Y	Y	69%
Nadort et al. (23)	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	85%
Alishahi et al. (24)	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	85%
Amirkhani et al. (25)	Y	U	Y	N	N	Y	N/A	Y	Y	Y	Y	Y	Y	69%
Turoń-Skrzypińska et al. (26)	Y	Y	N	N/A	N/A	Y	N/A	Y	Y	Y	Y	Y	Y	69%
Shokrpour et al. (6)	Y	Y	Y	Y	N/A	Y	Y	Y	Y	Y	Y	Y	Y	92%
Mohammadpourhodki et al. (27)	Y	Y	Y	N	N/A	Y	Y	Y	Y	Y	Y	Y	Y	85%
Durmuş and Ekinci (28)	Y	U	Y	N	N	Y	N/A	Y	Y	Y	Y	Y	Y	69%
Saki et al. (29)	Y	Y	Y	N/A	N/A	Y	U	Y	Y	Y	Y	Y	Y	77%
Khaleghi et al. (30)	Y	N/A	Y	N	N/A	Y	U	Y	Y	Y	Y	Y	Y	69%
Soliva et al. (31)	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y	Y	85%
Yong-Yao et al. (32)	Y	Y	Y	N/A	N/A	Y	N/A	Y	Y	Y	Y	Y	Y	77%
Zhianfar et al. (33)	Y	U	Y	N	N	Y	N/A	Y	Y	Y	Y	Y	Y	69%

Y: yes, N: no, U: unclear, N/A: not available

intervention/exposure, biases in outcome measurement, and biases related to participants without follow-up.

Each item in this checklist is rated as 'yes,' 'no,' 'unclear,' or 'not available.' Articles are deemed eligible for review if they have a score of >50% (**Table 1**).

Synthesis of Results

Selected articles will be analyzed based on participants, interventions and doses provided, comparators, outcomes, and study results. The findings of the analysis in this systematic review will be presented in the form of a table (**Table 2**) and narrative.

Table 2. Characteristics of Articles and Effectiveness of Interventions in Patients Undergoing Hemodialysis

Study	Sample	Intervention	Comparator	Outcome	Result
Suandika et al. (19)	96 patients (IG: 49 CG: 47) undergoing hemodialysis	Acupressure at K1, ST36, amd SP6 acupoints 9 minutes, 3 times per week for 4 weeks	Acupressure at the sham accupoints	-Depression -Anxiety	Acupressure is effective in improving anxiety and depression
Shareh et al. (20)	116 patients (IG: 58, CG: 58) with End Stage Renal Disease (ESRD) undergoing hemodialysis	Cognitive Behavioral Group Therapy for Insomnia (CBGT-I), 90 minutes, once a week for 9 weeks.	No treatment provided	-Depression -Anxiety -Sleep Quality -General psychological health	CBGT-I is more effective in enhancing sleep quality and general psychological health, as well as reducing levels of depression and anxiety.
González-Flores et al. (21)	53 patients (IG: 28, CG: 25) with ESRD undergoing hemodialysis	Cognitive Behavioral Intervention + resilience model (CBI + R) Once a week for 8 weeks.	Cognitive Behavioral Intervention (CBI)	-Depression -Anxiety -Quality of life -Resilience -Cognitive distortion	There were no significant differences between the two groups. -Total depression scores were lower in the CBI + R group, whereas there was no difference in total anxiety scores between the groups. -Quality of life improved in -Resilience and cognitive distortion scores improved in both groups but were better in the CBI + R group.

Keivan et al. (22)	60 patients (IG: 30 CG: 30) undergoing hemodialysis	Self-management program 5 stages in 3 months	Routine hospital program	Quality of life	Self-management program is effective in enhancing quality of life.
Nadort et al. (23)	190 patients (IG: 89, CG: 101) undergoing hemodialysis	Internet-based problem solving therapy, 5 modules within 10 weeks	Usual care	Depression	Guided internet-based self-help problem solving therapy not effective in reducing depression.
Alishahi et al. (24)	72 patients (IG: 36, CG: 36) with hemodialysis therapy	Smartphone-based recreational therapy for 30 days	Standard care	Depression	Smartphone-based recreational therapy is effective in alleviating depression.
Amirkhani et al. (25)	57 patients (IG: 29, CG: 28) with hemodialysis therapy	Resilience training, 90 minutes, 12 session workshop	No intervention	-Depression -Anxiety -Stress -Quality of Life	Resilience training is effective in alleviating anxiety and enhancing quality of life but does not show significant effectiveness in alleviating depression.
Turoń-Skrzypińska et al. (26)	85 (IG: 39, CG: 46) patients with ESRD undergoing hemodialysis	Virtual reality exercise using the NefroVR prototype for 20 minutes during hemodialysis, 3 times a week for 3 months	Usual care	-Depression -Anxiety	Virtual reality exercise is effective in alleviating depression and anxiety.
Shokrpour et al. (6)	70 (IG: 35, CG: 35) patients with ESRD undergoing hemodialysis	Positive thinking training 90 minutes per session, twice a week for 4 weeks	No intervention	-Depression -Anxiety -Stress -Quality of Life	Positive Thinking Training is effective in alleviating stress and anxiety levels and enhancing quality of life.
Mohammadpourhodki et al. (27)	105 (IG 1: 35 IG 2: 35 CG: 35) patients with ESRD undergoing hemodialysis	IG 1: Aromatherapy foot massage with lavender essential oil IG 2: Aromatherapy foot massage with citrus aurantium essential oil	Foot massage without aromatherapy	Quality of Life	Aromatherapy foot massage is significantly more effective in enhancing quality of life. However, there is no significant difference between the use of lavender

		Duration: 20 minutes, 3 times a week for 4			and citrus aurantium essential oils.
Durmuş and Ekinci (28)	71 patients (IG: 33 CG: 38) receiving hemodialysis treatment	Spiritual care training 20 – 30 minutes, 16 meetings, 2 meeting/week	Standard treatment	-Depression -Anxiety	Spiritual care training is effective in alleviating depression and anxiety.
Saki et al. (29)	84 (IG: 42 CG: 42) patients with ESRD undergoing hemodialysis	Cognitive Behavioral Intervention (CBI): 1 hour per session, once a week for 8 weeksu	Usual care	-Hope -Anxiety about death	CBI is effective in increasing hope and reducing anxiety about death.
Khaleghi et al. (30)	134 (IG: 67 CG: 67) patients with chronic kidney disease undergoing hemodialysis	Emotion disclosure writing 15–20 minutes over 4 consecutive days	Usual care	Depression	Emotion disclosure writing is effective in alleviating depression.
Soliva et al. (31)	90 (IG: 47 CG: 43) patients with chronic kidney disease undergoing hemodialysis	Live music for 30–45 minutes during hemodialysis, twice a week for 4 weeks	Usual care	-Depression -Anxiety	Live music is effective in reducing depression and anxiety.
Yong-Yao et al. (32)	49 (IG: 25 CG: 24) patients with chronic kidney disease and sarcopenia undergoing hemodialysis	Mindfulness meditation combined with progressive muscle relaxation + conventional care for 2 sessions/day, 3 times a week for 8 weeks. Continued practice at home for 15–20 minutes, 2 sessions/day, 3 times a week for 4 weeks	Conventional care: Balanced diet and adequate nutrition	-Quality of Life -Clinical efficacy	Mindfulness meditation combined with progressive muscle relaxation is effective in improving quality of life and reducing inflammatory markers.

Zhianfar et al. (33)	70 patients (IG: 35 CG: 35) receiving hemodialysis treatment	Multifaceted educational intervention, 8 weeks -The educational video: 1 hour, 3 consecutive sessions -Cognitive Behavioral Therapy: 90 minutes, 8 sessions -Telephone-based peer support: 4 times a week	Usual care	Quality of Life	Multifaceted educational intervention is effective in improving quality of life

IG: intervention group, CG: control group

RESULTS AND DISCUSSION

RESULTS

Study selection Results

The identification process retrieved 2710 articles from the ProQuest database, 11 articles from PubMed, and 652 articles from ScienceDirect. This resulted in a total of 3373 identified articles. Six articles were excluded as they were duplicates of other articles. Subsequently, 3367 articles were screened by title, resulting in 25 articles. These 25 articles underwent an abstract and full-text eligibility process with the specified inclusion criteria.

Seven articles were removed due to incompatible research design, one article was excluded as it was not specific to hemodialysis therapy, and one article was excluded because it was not open access. As a result, 16 articles successfully fulfilled the inclusion criteria and were selected for the analysis (**Figure 1**).

Study Characteristics

The characteristics of the 16 selected articles all consist of randomized controlled trial studies. All studies aim to determine the effectiveness of psychological therapies for individuals with chronic kidney disease who are undergoing hemodialysis treatment. These articles were published between the years 2020 and 2025.

Characteristics of Participants

The total number of participants in the 16 studies was 1422 ranging from 18 to 80 years. All participants were patients with chronic kidney disease undergoing hemodialysis therapy. One study specifically examined individuals with chronic kidney disease receiving hemodialysis therapy who were also diagnosed with sarcopenia.

Characteristic of Intervention

The 16 studies examined diverse

interventions. Four studies investigated the effectiveness of CBI, including original CBI (29), group-based CBT (20), CBI combined with the resilience model (21), and multi-faceted educational intervention (33). Other psychotherapies include positive thinking training (6), resilience training (25), spiritual care training (28), mindfulness meditation combined with progressive muscle relaxation (32), and recreational therapy (24). One study focused on the effectiveness of writing therapies spesifically emotional disclosure writing (30). Two studies focused on self-management programme (22) and problem solving therapy (23). The effectiveness of music therapy was explored in one study spesifically live music intervention (31). Two studies examined the effectiveness of massage therapy, including acupressure (19) and aromatherapy massage (27). The remaining study investigated the effectiveness of virtual reality exercise (26). The types of interventions and their effectiveness are presented in **Table 3**.

Tabel 3. Effectiveness of Interventions on Depression, Anxiety, and Quality of Life in Hemodialysis Patients

Intervention	Depression	Anxiety	Quality of Life
Cognitive behavioral intervention (29)		√	
Cognitive behavioral group therapy (20)	√	√	
Cognitive behavioral intervention + resilience model (21)	√		√
Multifaceted educational intervention (33)			√
Positive thinking training (6)		√	√
Resilience training (25)		√	√
Spiritual care training (28)	√	√	
Mindfulness meditation + progressive muscle relaxation (32)			√
Recreational therapy (24)	√		
Emotional disclosure writing (30)	√		
Self-management program (22)			√
Live music (31)	√	√	
Acupressure (19)	√	√	
Aromatherapy massage (27)			√
Virtual reality exercise (26)	√	√	

Interventions and Therapy Dosage for Depression

Based on the review, there are 8 interventions found to be effective in reducing depression levels among individuals with chronic kidney disease who are receiving hemodialysis treatment. Cognitive behavior group therapy combined with the resilience model, effective when conducted once per week for 8 weeks (21). Group-based CBI sessions lasting 90 minutes per session, held once per week for 9 weeks, also effective in

reducing depression (20). Spiritual care training provided for 20–30 minutes, 16 meetings, 2 meetings/week showed the effectiveness (28). Recreational therapy via smart-phone applications provided for 30 days with various content (24). Emotional disclosure writing sessions provided for 15-20 minutes over 4 consecutive days (30). Live music therapy is also effective in reducing depression among participants when provided for 30-45 minutes during hemodialysis (31). Other therapies include acupressure for 9 minutes, 3 times a week for 4 weeks (19) and virtual reality exercise for 20 minutes, 3 times a week for 3 months (26) (**Table 2**).

Interventions and Therapy Dosage for Anxiety

Based on the review, there are 8 interventions found to be effective in alleviating anxiety in individuals with chronic kidney disease who are receiving hemodialysis treatment. These interventions include CBI, provided for 1 hour per session, once per week, across 8 sessions (29). Group-based CBI sessions lasting 90 minutes per session, conducted once per week for 9 weeks (20). Other forms of psychotherapy proven to be effective include positive thinking training 20 minutes per session, twice per week for 4 weeks (6), resilience training 90 minutes/ session for 12 session workshop (25), and spiritual care training 20-30 minutes, 16 meetings, 2 meetings/week (28). Live music therapy is also effective in reducing anxiety among participants when provided for 30-45 minutes during hemodialysis (31). Other therapies include acupressure for 9 minutes, 3 times a week for 4 weeks (19) and virtual reality exercise for 20 minutes, 3 times a week for 3 months (26) (**Table 2**).

Interventions and Therapy Dosage for Quality of Life

According to the review results, there are 7 interventions proven effective in enhancing the quality of life for individuals with chronic kidney disease who are undergoing hemodialysis treatment. Two types of CBI include cognitive behavior group therapy combined with the resilience model, which showed effective results when administered once a week for 8 weeks (21) and multifaceted educational intervention for 8 weeks (3 session educational video, 8 session CBT, and 4 times a week peer support by telephone)(33). Another effective psychotherapies are positive thinking training, conducted for 20 minutes per session, twice a week for 4 weeks (6), as well as mindfulness meditation + progressive muscle relaxation, given 2 sessions per day, 3 times a week for 8 weeks (32),and resilience training 90 minutes/ session for 1 sessions workshop (25). Self-management program is also effective in enhancing quality of life among participants when provided for 5 stages in 3 months (22). In addition, an intervention that can be provided is aromatherapy massage using lavender or citrus aurantium essential oil for 20 minutes, 3 times a week for 4 weeks (27) (**Table 2**).

DISCUSSION

The findings reveal that 15 of 16 therapeutic approaches can be administered to participants, demonstrating their effectiveness in alleviating depression and anxiety, as well as enhancing the quality of life for chronic kidney disease patients receiving hemodialysis treatment. These therapies employ various mechanisms to achieve the targeted outcomes, depending on the type of therapy. The review results indicate that 25% of the therapies use the CBI method **(Table 3).**

Cognitive Behavioral Intervention (CBI) or Cognitive Behavioral Therapy (CBT) is a psychotherapy consisting of a series of complex clinical interventions encompassing cognitive, emotional, and behavioral components (34). This therapeutic approach is founded on a model that emphasizes the interconnection between cognition, emotions, and behavior. The cognitive framework comprises three key elements: automatic thoughts, cognitive distortions, and beliefs. Dysfunctional, distorted, or erroneous automatic thoughts play a significant role to the development of psychopathological conditions. Lastly, beliefs underlie the formation of perceptions and interpretations of various events in life. This therapy targeted at addressing these relationships (35). The goal of CBI is changing thought patterns and behaviors that are beneficial in assisting problem-solving and care protocols for hemodialysis patients (36). Evidence also shows that CBI provides positive results such as symptom improvement, well-being, satisfaction, and reduced medical costs (34). Based on review results, several CBT models that are beneficial for hemodialysis patients include individual CBI, group methods, combinations with the resilience model, and multifaceted educational intervention **(Table 3).**

Positive thinking training also demonstrates its effectiveness in reducing anxiety levels and improving the quality of life of hemodialysis patients **(Table 3).** The primary goal of positive thinking training is to strengthen the positive aspects within patients to prevent psychological issues and enhance mental health. Positive beliefs have a beneficial impact on both the physical and mental condition of patients, ultimately leading to an improved quality of life. This training helps patients manage their emotions, increase self-awareness, and enhance their adaptability. With the skills acquired, patients can better understand the connection between their thoughts, feelings, and behaviors, allowing them to face health challenges more effectively (37).

Based on **Table 3**, resilience training is also effective in improving anxiety and quality of life. During the resilience training process, patients learn how to manage stress caused by illness, and through their thought processes, they are able to develop resilience strategies. Resilience training functions as a mechanism for self-protection strategies in dealing with stressful life events. Individuals with high resilience tend to be calmer and more confident when facing stressful

situations, making it easier for them to control these factors (25).

Anxiety and depression in hemodialysis patients can be improved by providing spiritual care training **(Table 3)**. Spirituality is an integral part of the holistic approach that cannot be separated from patient care. Patients with low levels of spirituality may not be able to reach their maximum capacity. Spiritual beliefs are often crucial for patients with serious illnesses, serving as a resource for coping with illness and making treatment decisions. For hemodialysis patients, the concepts of religion and spirituality play an important role in helping them cope with illness, adapt to their condition, improve their mental health, and enhance their quality of life (38).

Mindfulness meditation combined with progressive muscle relaxation has been effective in improving the quality of life of hemodialysis patients **(Table 3).** The core principles of mindfulness meditation are 'conscious awareness,' 'being present,' and 'non-judgment.' This therapy enhances focus, regulates emotions, and maintains emotional stability. Studies show that mindfulness meditation not only reduces depression and anxiety but also alleviates symptoms like sleep disturbances and chronic pain. Additionally, it decreases fatigue, boosts activity levels, and improves overall health, contributing to better quality of life (32). Progressive muscle relaxation, which rapidly induces relaxation, helps patients enter a meditative state more easily and is often used as a supportive approach before mindfulness meditation interventions (39). Smartphone-based recreational therapy has been proven effective in reducing depression in hemodialysis patients **(Table 3).**

The application's content includes programs such as music listening, comedy movie viewing, exercise routines, and educational question-and-answer games. Each day, the app provides different content, allowing patients to interact through animations and answer questions to enhance engagement and understanding. Music listening has been shown to reduce depression in hemodialysis patients (31). Similarly, comedy videos with humorous content trigger laughter, which improves respiration, blood circulation, and mental function. Laughter also reduces pain and stress hormones, improves blood pressure and immune system function, and ultimately enhances quality of life (40).

Based on **Table 3**, another therapy proven effective as a psychological intervention for hemodialysis patients is emotional disclosure writing. This therapy involves expressing emotions and thoughts through writing. This therapy helps patients convey their emotions and thoughts in the form of stories without limitations, rules, feedback, or negative criticism. Writing reduces emotional load on the cognitive system, thereby enhancing an individual's cognitive function in using adaptive defense mechanisms. This therapy is an easy, affordable, effective, and efficient way to reduce psychological problems, improve hope, and quality of life

(30). The self-management program is an effective intervention for improving the quality of life of hemodialysis patients **(Table 3)**. It is a rehabilitation method where patients play a key role in all healthcare activities centered on their well-being. The program follows the 5A nursing model: Assess, Advise, Agree, Assist, and Arrange. Assess involves evaluating the patient's condition, followed by Advise, which provides recommendations based on the assessment. Agree focuses on setting behavioral goals with the patient and creating realistic, measurable plans. Finally, Assist includes guidance and training on fluid management, vascular access care, physical activity, diet, and medication. The primary goal of this intervention is to enable patients to make independent decisions, maximize autonomy, and improve personal health based on their capabilities and lifestyles, ultimately enhancing their quality of life (22).

In addition, music therapy has been shown to be effective in alleviating symptoms of anxiety and depression in hemodialysis patients **(Table 3).** Live music can alleviate depression and anxiety by providing relaxation effects, stimulating neurochemical responses, and offering distraction effects. Live music creates a calming environment that helps patients release their stress. Music can encourage the production of dopamine and serotoninhormones, which generate feelings of happiness and relaxation, thereby reducing psychological distress in patients. Moreover, live music can divert patients' attention away from pain, anxiety, and discomfort during the hemodialysis procedure (41).

Based on **Table 3**, massage therapy can also be an intervention option with psychological effectiveness for hemodialysis patients. The findings suggest that acupressure effectively helps to alleviate depression and anxiety. Stimulation at acupressure points such as K1, ST36, and SP6 is associated with the regulation of stress hormones like cortisol and the stimulation of endorphins, which improve mood and reduce anxiety and depression (19). In addition to acupressure, aromatherapy massage has also demonstrated positive outcomes in enhancing hemodialysis patients' quality of life. Beyond the nervous system regulation effects of the massage, aromatherapy using lavender and citrus can enhance a calming atmosphere and has been proven to reduce fatigue, restless legs syndrome, and pain at the AV shunt site (42).

The review findings in **Table 3** also demonstrate that virtual reality exercises are effective in alleviating depression and anxiety in patients receiving hemodialysis treatment. Virtual reality refers to an interactive simulation generated by computers that resembles real-life objects and events. This therapy provides distraction effects while creating a more enjoyable and interactive atmosphere, enhancing physical capacity by increasing energy, and improving patients' mental health (43). Physical exercise using virtual reality during hemodialysis treatment can make use of the patients' time at the hemodialysis

center, requiring no additional time, and serving as a therapy to reduce patients' boredom during hemodialysis. Moreover, it can be an intervention promoting a healthy lifestyle and improving patients' mental health (44).

CONCLUSION AND RECOMMENDATION

The review results show that there are various psychological therapies that can be effective and efficient options to complement pharmacological therapy in reducing anxiety and depression levels, as well as improving the quality of life for chronic kidney disease patients undergoing hemodialysis. Fifteen therapies that can be selected include cognitive behavioral intervention, cognitive behavioral group therapy, cognitive behavioral intervention + resilience model, multifaceted education, positive thinking training, resilience training, spiritual care, mindfulness meditation+progressive muscle relaxation, recreational therapy, emotional disclosure writing, self-management program, live music, acupressure, aromatherapy massage, and virtual reality exercise. The recommendation for future studies is to identify articles from a broader range of databases and perform a meta-analysis to obtain more diverse interventions and select those with the best effectiveness for implementation in hemodialysis patients.

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