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Complementary and Integrative Interventions for Improving Fatigue and Quality of Life in Adults Receiving Hemodialysis: A Review

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A B S T R A C T

Fatigue is a common symptom experienced by patients receiving hemodialysis and can significantly decrease patients' quality of life. Some studies have been conducted using complementary and integrative interventions, but a synthesis of the available evidence is still limited. The review aimed to map complementary and integrative interventions and summaries the potential benefit in fatigue and quality of life. Scoping review framework from Joanna Briggs Institute was adopted. A defined search strategy was used in reviewing literature from Emerald, Pro Quest, PubMed, Science Direct, and Scopus. Studies were selected for further evaluation based on relevance to the inclusion criteria. Findings were then summarized and reported based on PRISMA for Scoping Review guidelines. A total of 14 studies from 1128 searches were included in the review. Non-pharmaceutical interventions included educational-based interventions, aromatherapy, massage, and breathing exercises. Many studies demonstrated that the interventions improved fatigue status and quality of life. Complementary interventions provide benefits for patients in managing fatigue and improving their quality of life. The findings of this review will contribute to integrating complementary therapy into the nursing practice. Additional studies are needed to clarify the potential value of available complementary and integrative interventions in the hemodialysis setting.

Kata kunci:

Kelelahan
penyakit ginjal kronis
terapi komplementer
hemodialisis
kualitas hidup

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A B S T R A K

Kelelahan sebagai gejala umum yang dialami oleh pasien yang menerima hemodialisis dapat secara signifikan menurunkan kualitas hidup pasien. Beberapa penelitian telah dilakukan dengan menggunakan intervensi komplementer dan integratif tetapi sintesis pada bukti yang tersedia masih terbatas. Tinjauan ini bertujuan untuk memetakan intervensi komplementer dan integratif dan merangkum potensi manfaat dalam kelelahan dan kualitas hidup. Kerangka kerja tinjauan pelingkupan dari Joanna Briggs Institute diadopsi. Strategi pencarian yang ditentukan digunakan dalam meninjau literatur dari Emerald, Pro Quest, PubMed, Science Direct, dan Scopus. Studi dipilih untuk evaluasi lebih lanjut berdasarkan relevansi dengan kriteria inklusi. Temuan kemudian diringkas dan dilaporkan berdasarkan pedoman PRISMA for Scoping Review. Sebanyak 14 studi dari 1128 pencarian dimasukkan dalam ulasan. Intervensi non-farmasi termasuk intervensi berbasis pendidikan, aromaterapi, pijat, olahraga dan latihan pernapasan. Banyak penelitian menunjukkan bahwa intervensi meningkatkan status kelelahan dan kualitas hidup. Intervensi komplementer memberikan manfaat bagi pasien

dalam mengelola kelelahan dan meningkatkan kualitas hidup. Temuan ulasan ini akan berkontribusi pada integrasi terapi komplementer dalam praktik keperawatan. Studi tambahan diperlukan untuk memperjelas nilai potensial dari intervensi komplementer dan integratif yang tersedia dalam pengaturan hemodialisis.

INTRODUCTION

Chronic kidney disease (CKD) is a progressive and irreversible abnormality in renal functions (Aseneh et al., 2020). Peritoneal Dialysis (PD), hemodialysis and renal transplantation are renal replacement therapies used to manage CKD (Vassalotti et al., 2016). Hemodialysis is a widely used type of renal replacement therapy used to improve physical condition and prevent complications due to uremia (Reindl-Schwaighofer et al., 2017).

Adult patients with CKD who receive haemodialysis treatment often experience physiological and psychological problems. Patients receiving maintenance hemodialysis described fatigue as a debilitating symptom that prevents them from participating in social and recreational activities, which can lead to decrements in mental health and poor satisfaction with life (Salehi et al., 2020). Fatigue is a prevalent and debilitating symptom affecting 62%-72% of patients undergoing hemodialysis (Bossola et al., 2018; Gregg et al., 2019; Guerraoui et al., 2021). Fatigue is negatively associated with a patient's quality of life, general health and well-being (Debnath et al., 2021). Therefore, effective interventions should be implemented for adults experiencing fatigue to decrease its level and adverse effects (Jacobson et al., 2019). Nurses have an essential role in assisting patients in managing fatigue and improve quality of life. Fatigue management could be in the form of pharmacological and non-pharmacological. Nurses can use complementary-based therapy to manage fatigue, which can increase patients' quality of life.

Available interventions include a range of motion exercise (Rochmawati et al., 2021), relaxation (Hassanzadeh et al., 2018) and cognitive behaviour therapy (Picariello et al., 2021). The available interventions potentially positively impact fatigue in terms of being safe and cost-effective (Donald et al., 2018). However, there is no available summary of potential complementary and integrative interventions for managing hemodialysis patients' fatigue. Therefore, there is a need to map and summarise available evidence on complementary and integrative therapies for managing such symptoms. This scoping review aimed to map and summarise available literature on complementary and integrative interventions for fatigue management.

METHODS

A scoping review was conducted to map published research and provide an overview of evidence to provide contextual information or concepts. A scoping review may be utilized to the range or a variety of the evidence on a particular topic or question. The scoping study applied the structure of Participants/Concept/Context to define the scoping review search strategy:

(P) Population : patients experiencing fatigue and decreased quality of life
(C) Concept : complementary and integrative interventions
(C) Context : hemodialysis setting

A scoping review guideline from Joanna Briggs Institute was used as a frame for this review. The six steps in the guideline include: identifying research questions, identifying relevant studies, selecting studies, mapping data, and compiling, summarising and reporting results. For example, in the first step, a well-defined research question was developed to guide the scope of the review. The review questions: ''What observational or randomized controlled studies have been performed to manage fatigue and quality of life in the hemodialysis setting?"

A comprehensive search is required to enable identifying relevant literature. In the scoping review, five electronic databases were searched: Emerald, Pro Quest, PubMed, Science direct, and Scopus, to identify published studies meeting the inclusion criteria. We determined keywords based on the research questions before identifying the relevant journal articles. MeSH search keywords were then used jointly: "fatigue", "quality of life", "hemodialysis", "chronic kidney disease", "non-pharmacological", "exercise", "relaxation". "massage", and "complementary therapy". The keywords were searched individually and then combined using the Boolean term.

In the third step of scoping review, we exported all identified records in the initial search to Endnote 20 Software (Clarivate Analytics, PA, USA) and removed duplicates. A total of 3812 were reached in the study. Each article was evaluated by the first author (AK) for relevance according to predetermined inclusion criteria: Studies or interventions that addressed quality of life and dialysis-related fatigue, adult patients receiving hemodialysis as participants, and studies published from 2000 onwards and published in the English language. We excluded qualitative studies, review papers and non-research papers. Two reviewers (AK and ER) independently read and assessed the 21 full texts based on the relevance of the inclusion criteria. Fourteen studies were considered suitable for inclusion in the final dataset after reading the full text and assessing against the review questions. The selection of relevant articles was based on research questions and inclusion criteria, in addition to minimum quality standards.

In the fourth stage of the review, we extracted the data. The reviewers developed a table based on the Joanna Briggs model for extracting details, including characteristics and results of studies. The author captured all relevant information and ensured that there was no missed vital information; the two authors thoroughly read each of the 14

selected full-text papers. The dataset from the included papers was built by extracting the results relevant to the questions asked. Categories included in the data extraction tool and spreadsheet were as follows: author and publication year, the aim of the study, study design, setting for study (country, hospital, clinic), characteristics of participants (number of participants, age, length of Dialysis), intervention (type, duration, length), study outcomes, and strengths of the study and implications. The detailed findings are displayed.

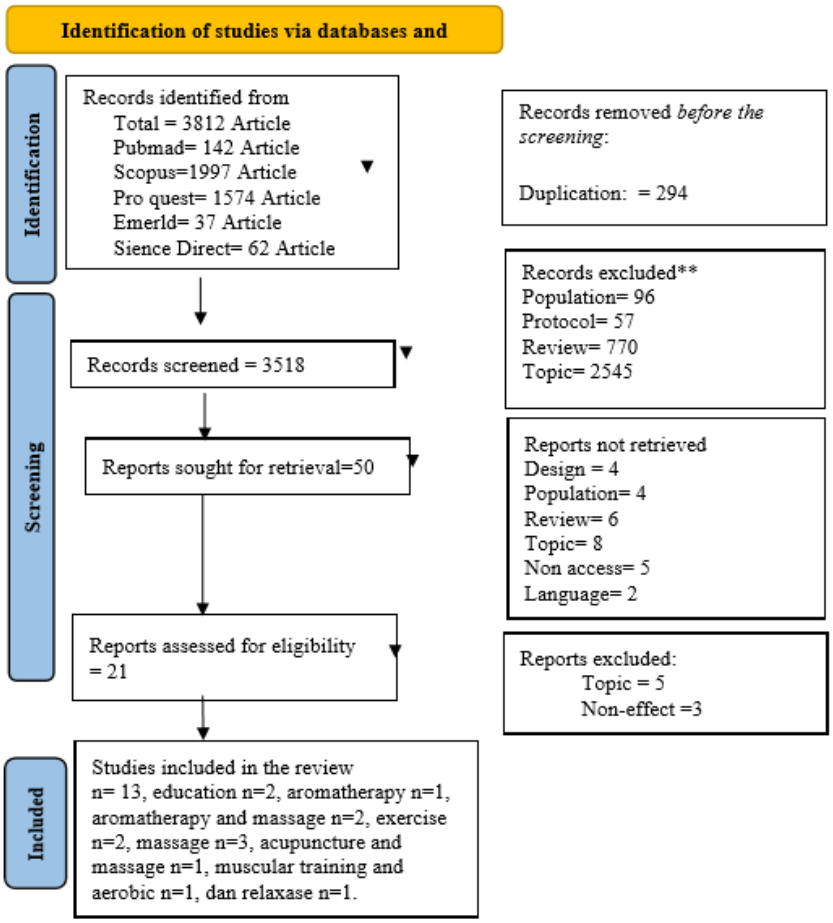

Figure 1: PRISMA flow diagram

RESULTS AND DISCUSSION

Characteristics of Studies

Based on 3812 studies identified, 14 eligible studies involving 1128 participants receiving hemodialysis across seven countries were included. These included 10 (71.4%) randomized controlled trials and 4 (28.6%) quasi-experimental studies. The characteristics of the study are shown in table 1.

Among the 14 studies, six measures were utilized to measure fatigue and three to assess the quality of life. The measurement of fatigue includes Piper Fatigue Scale (Kaplan Serin et al., 2020), Novel Fatigue Scale for Hemodialysis (Chou et al., 2020); Fatigue Severity Scale (Ahmadidarrehsima et al., 2018; Lazarus et al., 2020; Shahdadi et al., 2016), Fatigue Scale (Chang et al., 2010); Rothen Fatigue Scale (Varaei et al., 2020), and visual analogue scale (Muz & Taşcı, 2017). Quality of life was assessed using PROMIS (Bullen et al., 2018; Chou et al., 2020; Kao et al., 2012) and KDQOL-SF 3 (Ahmadidarrehsima et al., 2018; Chang et al., 2017; Chang et al., 2010; Figueiredo et al., 2018; Lazarus et al., 2020; Mohammadpourhodki et al., 2021; Muz & Taşcı, 2017; Shahdadi et al., 2016; Varaei et al., 2020; Zhianfar et al., 2020).

Characteristics of samples

The participants' age in the included studies ranges from 40-60. Regarding the length of dialysis, seven articles had patients with a minimum of three months of receiving dialysis, and the frequency of hemodialysis was two to three times per week (Chang et al., 2017; Chou et al., 2020; Figueiredo et al., 2018; Mohammadpourhodki et al., 2021; Muz & Taşcı, 2017; Zhianfar et al., 2020). Five studies included patients receiving Dialysis at least six months before the survey (Ahmadidarrehsima et al., 2018; Kao et al., 2012; Kaplan Serin et al., 2020; Shahdadi et al., 2016). The other two studies included patients who have received hemodialysis for at least one year (Bullen et al., 2018; Varaei et al., 2020).

Characteristics of interventions

There are several types of intervention in the included studies, such as education-based intervention, aroma therapy, a combination of aroma therapy and massage, exercise, and massage, and breathing exercise. Two studies utilized education intervention (Kao et al., 2012; Zhianfar et

al., 2020). The education-based intervention was conducted for 12 weeks, with the duration twice per week and 2-4 per month. Each session was approximately 90 minutes of intervention (Kao et al., 2012; Zhianfar et al., 2020).

Aromatherapy-based interventions in the study used lavender and citrus. The aroma therapy was conducted once a week for four weeks, 2 minutes in each intervention (Muz & Taşcı, 2017), and 3x/week for eight weeks with the duration of 20 minutes in each session (Varaei et al., 2020). Both studies performed aroma therapy inhalation using lavender and citrus. A study combined aromatherapy and massage in the intervention group (Mohammadpourhodki et al., 2021). A combination of aroma therapy was performed three times per week, each session lasting 20 minutes.

Three studies performed exercise-based interventions to manage fatigue and improve patients' quality of life receiving hemodialysis (Chang et al., 2017; Chang et al., 2010; Chou et al., 2020). One-hour short-form Yang-style Tai Chi session was performed each week for a total of 12 weeks (Chang et al., 2017). The other studies involved exercise-based interventions that were conducted for 8 weeks with a frequency of three times per week, each session lasting between 30 minutes and 40 minutes (Chang et al., 2010; Chou et al., 2020). Intradialytic leg ergometry exercise was performed by Chang et al.'s. (2010) study, while Chou et al. conducted virtual reality training using Nintendo® Wii Fit to promote exercises such as pitching, swinging, and punching (Chou et al., 2020).

Massage-based interventions were performed in three studies (Ahmadidarrehsima et al., 2018; Bullen et al., 2018; Shahdadi et al., 2016). A slow backstroke massage was conducted for three weeks, two sessions per week that lasted 10 minutes for each session in both studies. One study compares the effectiveness of massage and acupuncture (Bullen et al., 2018). Patients undergoing their usual hemodialysis session were given the option to choose between 20 min sessions of massage or acupuncture therapy once a week for eight weeks. Patients in both groups improve their quality of life, particularly in the mental domain.

Two studies performed breathing exercises to manage fatigue and improve quality of life. (Figueiredo et al., 2018; Kaplan Serin et al., 2020). The breathing exercise and aerobic training were performed during the first two hours of Dialysis, three times a week for eight weeks (Figueiredo et al., 2018). Another study provided the patients with a compact disk containing progressive breathing exercises. The patients were asked to practice the exercises at home at least once daily for six weeks (Kaplan Serin et al., 2020).

Table 1. Data Extraction

Author, Year	Design	Setting	Participants	Non-pharmacological interventions	Finding
Kao et al. / 2021	A quasi-experimental design.	Taiwan, Nephrology outpatients clinic	94 patients, 45 intervention and 49 control. Dialysis> 6 month Average age 71.18 years	exercise education Duration of 12 weeks 2x-4x /month education for 90 minutes Measuring instruments: FS	Interventions based on education affect lowering fatigue, exercise programs using methods that are limited to intervention group health education, The research time is three months.
Zhianfar et al. / 2020	A randomized controlled trial (RCT).	North Iran, Two hemodialysis wards	70 patients 35 intervention 35 control. Dialysis > 3 month Age 40-60 years	Educational Enhance Therapeutic Regimen Duration 12 weeks by 2x / week for 90 minutes Measuring instruments: SF - 36	Education based Intervention increases QOL, therapeutic interventions given in the short term, The data collection instrument used can potentially be a source of bias.
Muz & Tasci / 2017	A randomized controlled trial (RCT).	Turkey, Five HD units in two cities	62 patients, 27 interventions and 35 controls Dialysis > 3 month Average age 52.6 years	Aromatherapy via Inhalation Duration of 4 weeks with 1x a week for 2 minutes Measuring instruments: 'LL PFS	Aromatherapy Based interventions affect lowering fatigue; individual sleep and fatigue levels were only measured for one month
Mohammadpourhdokie et al / 2021	A Parallel Randomized Clinical Trial Study	Iran, Hemodialysis ward, April-July 2019	105 patients, Two interdependence, one control consisting of 35 patients, Dialysis >3 month Average age 50.42 years	Aromatherapy Massage Duration 4 weeks by 3x a week for 20 minutes Measuring instruments: Survey SF-36	Aromatherapy and massage-based interventions increase QOL; There is no provision regarding whether aromatherapy massage treatments have long-term effects.
Varaei et al / 2021	A randomized controlled trial (RCT).	Iran, HD in Three teaching hospitals	96 patients Two interventions, one control consists of 32 patients. Dialysis > 1 years	inhalation and massage aromatherapy, Duration of 16 weeks with 3x a week for 20 minutes, Measuring instruments:	Aromatherapy and massage-based interventions that have the effect of reducing fatigue;

			Ages 41-59	Rothen Fatigue Scale	unable to verify the accuracy of patient response to fatigue
Chang et al. / 2010	A randomized controlled trial (RCT).	Northern Taiwan, Two hemodialysis units	71 patients, 36 interventions, 35 controls, Dialysis>3 months, Average age of 50.8 years	intradialytic leg ergometry exercise, Duration 8 weeks with 3x a week for 30 minutes, Measuring instrument: Fatigue Scale	Exercise-based intervention lowers fatigue; the study was a single site with a small sample size which limits its generalizability
Figueiredo et al. / 2018	A randomized controlled trial (RCT).	Brazil, Hemodialysis ward January or December 2015	37 patients, 3 groups 11 CT, 13 AT, & 13 CT, Dialysis > 3 month, Average age 52.8 years	inspiratory muscle training and aerobic training. Duration 8-16 weeks with 3x a week for 180 minutes. Measuring instrument: KDQOL-SF 36	Intervention based on muscle training and aerobic training can increase QOL but did not evaluate the volume and capacity of the lungs for the rate of respiratory distress in the sample.
Shahidi et al. / 2016	A randomized controlled trial (RCT).	Iran, Hemodialysis ward	52 patients Twenty-six interventions, 26 controls. Dialysis >6 months. Average age 47	Slow stroke back massage Duration of 4 weeks with 2x a week for 10 minutes Measuring instruments: Fatigue Severity Scale	Intervention-based massage lowers fatigue, Small sample size, which limits its generalizability.
Chang et al. / 2017	Pre-post experimental design	Taiwan, a hemodialysis unit	46 patients: a control group (n=25) and an intervention group (n=21). Older than 20 years old	A weekly Tai chi was conducted for 12 weeks Measures: KDQOL	Interventions based on improving QOL, The five dimensions of the KDQOL are significantly higher in the intervention group, except for the SF-12 physical health score.
Bullen et al. / 2018	A quasi-experimental Pre–posttest design.	USA Unit (HD)	101 patients 80 patients were selected for massage, and 21 were selected for acupuncture Dialysis > 1 years Average age 57.6 years	Acupuncture or Massage Duration 8 weeks with 1x a week for 20 minutes. Measuring instrument: Survey PROMIS	Intervention-based acupuncture and massage effect on increasing QOL, single-centre study and lacked randomization and blinding.
Ahmadidar rehsima et al. / 2018	A randomized controlled trial (RCT).	Iran, Dialysis Center	52 patient, 26 SSBM & 26 foot reflexology. Dialysis >6 months. Average age 47.04 years	foot reflexology and slow stroke back massage Duration 4 weeks with 2x a week for 30 minutes. Measuring instrument: FSC	Intervention-based massage lowers fatigue; Further research is needed to implement broader interventions.
Lazarus et al. / 2020	A randomized controlled trial (RCT).	India, Unit HD	200 patients, One hundred interventions and 100 control. Dialysis > 6 month. Age > 50 years	olive-oil massage. Duration of 8 weeks is done before HD and during HD 4 hours. Measuring instruments: Fatigue Severity Scale	Intervention-based massage lowers fatigue; the detailed timing of the intervention is not clear.
Chou & Song / 2021	Semi experimental pretest-posttest design	South Korea. Dialysis Clinic	46 patients, Thirty-two interventions, 23 controls. Dialysis > 3 month. Average age 57.7-60.8 years	Virtual Reality Exercise Program. Duration 8 weeks by 3x a week for 40 minutes. Measuring instruments: Novel Fatigue Scale for Hemodialysis	Exercise-based intervention lowers fatigue Because VREP is relatively new and doesn't have many clinical studies.
Kaplan Serin & Ovayulo / 2020	randomized, controlled, and experimental.	Turkey, Two hospital Unit HD	Ninety-six patients: 48 control and 48 intervention. Dialysis > 6 month Age > 55 years old	Relaxation Exercises, Duration of 6 weeks with 1x per week for 30-40 minutes Measuring instruments: Piper Fatigue Scale SF-36	Relaxation-based interventions lower fatigue and increase QOL, extended periods and larger sample groups.

In the scoping review, we map several non-pharmaceutical interventions to address fatigue and improve hemodialysis patients' quality of life. Therefore, such interventions can be considered an option according to patients' preferences and abilities.

Two studies that performed education-based interventions show a significant improvement in quality of life and reduced fatigue level (Kao et al., 2012; Zhianfar et al., 2020). In line with this study, a systematic review found that educational interventions can improve patient's quality of life and outcome with chronic kidney disease (Lopez-Vargas et al., 2016). It was suggested further that effective interventions include interactive workshops/practical skills, integrated negotiated goal setting, active groups of patients and their families and frequent participant/educator encounters (Lopez-Vargas et al., 2016).

We found various exercises that patients can perform, including leg ergometry, Tai Chi, and virtual reality training. Exercise-based interventions significantly impacted patient fatigue (Chang et al., 2017; Chang et al., 2010; Chou et al., 2020). Previous studies confirm the benefit of exercise in reducing fatigue and improving quality of life. For example, twice a week range of motion exercise can improve a patient's quality of life (Rochmawati et al., 2021). A previous review shows the benefit of training in managing fatigue in hemodialysis patients (Nurmansyah & Arofiati, 2019).

Complementary and integrative interventions using massage were used in three studies and showed a significant reduction in fatigue (Ahmadidarrehsima et al., 2018; Bullen et al., 2018; Shahdadi et al., 2016). A previous review showed a significant effect of massage in reducing cancer patients' fatigue (Hilfiker et al., 2018). Therefore, massage can be considered an option according to patients' preferences and abilities to address fatigue.

We found three studies involving aromatherapy inhalation using lavender and citrus that were performed from 2 to 20 minutes in eight weeks (Mohammadpourhodki et al., 2021; Muz & Taşcı, 2017; Varaei et al., 2020). In the three studies, patients' fatigue significantly decreased. Previous findings stated aromatherapy inhalation significantly affects fatigue in adults receiving hemodialysis treatment (Yangöz Ş et al., 2021). Aromatherapy can be used as an alternative and effective intervention in the management of fatigue.

Two papers reported the use of breathing exercises (Figueiredo et al., 2018; Kaplan Serin et al., 2020). One study combined intradialytic breathing exercise with aerobic training three times a week for eight weeks (Figueiredo et al., 2018), while another study asked the patients to practice the progressive breathing exercises at home at least once a day for six weeks (Kaplan Serin et al., 2020). Both studies show benefits in managing patients' fatigue. This study confirms previous reviews that suggest breathing exercise as a complementary medicine that has short-term benefits in symptom improvement (Zeng et al., 2018).

LIMITATION OF THE STUDY

The review has several limitations. We searched using several keywords, and the number of terms under "non-pharmacological" varied greatly. Although we added specific terms such as exercise, relaxation, aromatherapy and massage, potential studies that did not list our search terms may not have populated in the search results. We limit our search and inclusion criteria for literature published in English. This may cause relevant studies excluded from our review.

CONCLUSION AND SUGESTIONS

This review maps out the state of current research on the complementary and integrative interventions to manage fatigue of adults receiving haemodialysis. These interventions benefit patients in managing fatigue and improving their quality of life. Such interventions can be applied to patients during dialysis sessions to help reduce the effects of symptoms in dialysis patients with uncomplicated, inexpensive, and effective interventions. The findings of this review will contribute to the integration of complementary therapy in the nursing practice. Additional studies are needed to clarify the potential value of available complementary and integrative interventions in the hemodialysis setting.

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Conflict of Interest Statement

The author declares no conflict with other parties related to this research.

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