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Psychosocial interventions for preventing and treating depression in dialysis patients (Review)

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[Intervention Review]

Psychosocial interventions for preventing and treating depression in dialysis patients

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ABSTRACT

Background

People with end-stage kidney disease (ESKD) treated with dialysis are frequently affected by major depression. Dialysis patients have prioritised depression as a critically important clinical outcome in nephrology trials. Psychological and social support are potential treatments for depression, although a Cochrane review in 2005 identified zero eligible studies. This is an update of the Cochrane review first published in 2005.

Objectives

To assess the effect of using psychosocial interventions versus usual care or a second psychosocial intervention for preventing and treating depression in patients with ESKD treated with dialysis.

Search methods

We searched Cochrane Kidney and Transplant's Register of Studies up to 21 June 2019 through contact with the Information Specialist using search terms relevant to this review. Studies in the Register are identified through searches of CENTRAL, MEDLINE, and EMBASE, conference proceedings, the International Clinical Trials Register (ICTRP) Search Portal and ClinicalTrials.gov.

Selection criteria

We included randomised controlled trials (RCTs) and quasi-RCTs of psychosocial interventions for prevention and treatment of depression among adults treated with long-term dialysis. We assessed effects of interventions on changes in mental state (depression, anxiety, cognition), suicide, health-related quality of life (HRQoL), withdrawal from dialysis treatment, withdrawal from intervention, death (any cause), hospitalisation and adverse events.

Data collection and analysis

Two authors independently selected studies for inclusion and extracted study data. We applied the Cochrane 'Risk of Bias' tool and used the GRADE process to assess evidence certainty. We estimated treatment effects using random-effects meta-analysis. Results for continuous outcomes were expressed as a mean difference (MD) or as a standardised mean difference (SMD) when investigators used different scales. Dichotomous outcomes were expressed as risk ratios. All estimates were reported together with 95% confidence intervals (CI).

Main results

We included 33 studies enrolling 2056 participants. Twenty-six new studies were added to this 2019 update. Seven studies originally excluded from the 2005 review were included as they met the updated review eligibility criteria, which have been expanded to include RCTs in which participants did not meet criteria for depression as an inclusion criterion.

Psychosocial interventions included acupressure, cognitive-behavioural therapy, counselling, education, exercise, meditation, motivational interviewing, relaxation techniques, social activity, spiritual practices, support groups, telephone support, visualisation, and voice-recording of a psychological intervention.

The duration of study follow-up ranged between three weeks and one year. Studies included between nine and 235 participants. The mean study age ranged between 36.1 and 73.9 years.

Random sequence generation and allocation concealment were at low risk of bias in eight and one studies respectively. One study reported low risk methods for blinding of participants and investigators, and outcome assessment was blinded in seven studies. Twelve studies were at low risk of attrition bias, eight studies were at low risk of selective reporting bias, and 21 studies were at low risk of other potential sources of bias.

Cognitive behavioural therapy probably improves depressive symptoms measured using the Beck Depression Inventory (4 studies, 230 participants: MD -6.10, 95% CI -8.63 to -3.57), based on moderate certainty evidence. Cognitive behavioural therapy compared to usual care probably improves HRQoL measured either with the Kidney Disease Quality of Life Instrument Short Form or the Quality of Life Scale, with a 0.5 standardised mean difference representing a moderate effect size (4 studies, 230 participants: SMD 0.51, 95% CI 0.19 to 0.83) , based on moderate certainty evidence. Cognitive behavioural therapy may reduce major depression symptoms (one study) and anxiety, and increase self-efficacy (one study). Cognitive behavioural therapy studies did not report hospitalisation.

We found low-certainty evidence that counselling may slightly reduce depressive symptoms measured with the Beck Depression Inventory (3 studies, 99 participants: MD -3.84, 95% CI -6.14 to -1.53) compared to usual care. Counselling reported no difference in HRQoL (one study). Counselling studies did not measure risk of major depression, suicide, or hospitalisation.

Exercise may reduce or prevent major depression (3 studies, 108 participants: RR 0.47, 95% CI 0.27 to 0.81), depression of any severity (3 studies, 108 participants: RR 0.69, 95% CI 0.54 to 0.87) and improve HRQoL measured with Quality of Life Index score (2 studies, 64 participants: MD 3.06, 95% CI 2.29 to 3.83) compared to usual care with low certainty. With moderate certainty, exercise probably improves depression symptoms measured with the Beck Depression Inventory (3 studies, 108 participants: MD -7.61, 95% CI -9.59 to -5.63). Exercise may reduce anxiety (one study). No exercise studies measured suicide risk or withdrawal from dialysis.

We found moderate-certainty evidence that relaxation techniques probably reduce depressive symptoms measured with the Beck Depression Inventory (2 studies, 122 participants: MD -5.77, 95% CI -8.76 to -2.78). Relaxation techniques reported no difference in HRQoL (one study). Relaxation studies did not measure risk of major depression or suicide.

Spiritual practices have uncertain effects on depressive symptoms measured either with the Beck Depression Inventory or the Brief Symptom Inventory (2 studies, 116 participants: SMD -1.00, 95% CI -3.52 to 1.53; very low certainty evidence). No differences between spiritual practices and usual care were reported on anxiety (one study), and HRQoL (one study). No study of spiritual practices evaluated effects on suicide risk, withdrawal from dialysis or hospitalisation.

There were few or no data on acupressure, telephone support, meditation and adverse events related to psychosocial interventions.

Authors' conclusions

Cognitive behavioural therapy, exercise or relaxation techniques probably reduce depressive symptoms (moderate-certainty evidence) for adults with ESKD treated with dialysis. Cognitive behavioural therapy probably increases health-related quality of life. Evidence for spiritual practices, acupressure, telephone support, and meditation is of low certainty . Similarly, evidence for effects of psychosocial interventions on suicide risk, major depression, hospitalisation, withdrawal from dialysis, and adverse events is of low or very low certainty.

PLAIN LANGUAGE SUMMARY

Are psychosocial interventions effective for treating depression among people on dialysis?

What is the issue?

Depression is frequently experienced by people treated with dialysis. Dialysis patients consider treatments that help with depression to be a high priority. Despite that fact that psychosocial interventions have been shown to decrease depression in various chronic diseases, we are very uncertain about whether treatments prevent or treat depression for dialysis patients as studies are rare.

What did we do?

This evidence is current to June 2019. We searched the medical literature and identified 33 studies with 2056 participants treated by dialysis. Studies evaluated a range of possible treatments including acupressure, cognitive-behavioural therapy (CBT), counselling, education, exercise, meditation, motivational interviewing, relaxation techniques, social activity, spiritual practices, support groups, telephone support, visualisation, and voice control compared to usual care or other psychosocial treatments. We also checked the quality of the information in the studies to learn how certain we could be about the results.

What did we find?

We are moderately certain that CBT, exercise, and relaxation techniques probably decrease symptoms of depression for patients treated with long-term dialysis. Counselling may slightly decrease depression symptoms, while we are uncertain whether acupressure, telephone support, or meditation make any difference. We found moderate certainty evidence that CBT provides higher quality of life for dialysis patients. Studies did not measure effects of psychosocial treatments on major depression, suicide risk, and whether therapies made any difference to anxiety, hospital admissions, or withdrawal from dialysis treated is uncertain. Adverse events from treatment is very uncertain.

Some study authors did not report the methods for their studies clearly, so we could not be certain whether patients truly had a random chance of being in each treatment group or whether the trial results were assessed by people knowing which treatments that patients actually received. For most outcomes, we identified very few studies, which decreased our confidence in the results.

Conclusions

CBT, exercise, and relaxation techniques probably decrease depressive symptoms for dialysis patients while CBT also improves life quality. Counselling may slightly reduce depression among those receiving dialysis. We are not certain whether interventions prevent or treat major depression, anxiety, suicide risk, or withdrawal from dialysis care before death or whether psychological and social treatments have adverse effects.

SUMMARY OF FINDINGS

Summary of findings for the main comparison. Cognitive-behavioural therapy versus usual care

Cognitive-behavioural therapy (CBT) versus with usual care for depression in people treated with dialysis

Patient or population: people with ESKD

Settings: dialysis

Intervention: CBT

Comparison: usual care

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	No. of participants (studies)	Certainty of the evidence (GRADE)	Comments
	Assumed risk	Corresponding risk				
	Usual care	CBT				
Major depression Mini International Neuropsychiatric Interview (MINI) (median follow-up: 39.6 weeks)	Not estimable[1]	Not estimable	Not estimable	Insufficient data observations	**Not estimable**	Studies were not designed to measure effects of Cognitive behavioural therapy on major depression
Depression (any severity, including mild, moderate and severe depression) Investigators measured depression using the Beck Depression Inventory (BDI). A higher score is indicative of more depressive symptoms. (median follow-up: 17.7 weeks)	The mean Beck Depression Inventory ranged across control groups from **14.5** to **21.39**	The mean Beck Depression Inventory score in the intervention groups was **6.10 lower** (95% CI -8.63 to -3.57)	**MD -6.10** (95% CI -8.63 to -3.57)	230 (4)	⊕⊕⊕⊖ **moderate** [2]	Cognitive behavioural therapy probably decreases depressive symptoms
Health-related quality of life	The mean quality of life score	The mean QoL score in the inter-	**SMD 0.51**	230 (4)	⊕⊕⊕⊖ **moderate** [2]	As a rule of thumb, 0.2 SMD represents a small effect size, 0.5 SMD a moderate effect

Investigators measured health-related quality of life using different instruments: Quality of Life Scale (QoL) and HRQoL Short Form-36, Kidney Disease and Quality of Life-Short Form (KDQOL-SF-36) (median follow-up: 17.7 weeks). A higher score is indicative of higher perceived of QoL.	ranged across control groups from **40.46** to **110.6**	vention groups was **0.51 standard deviations higher** (95% CI 0.19 to 0.83)	(95% CI 0.19 to 0.83)			size and 0.8 SMD a large effect size. Cognitive behavioural therapy probably moderately improves health-related quality of life
Anxiety Beck Anxiety Inventory (BAI) (median follow-up: 9 weeks)	Not estimable[3]	Not estimable	Not estimable	Insufficient data observations	**Not estimable.**	Studies were not designed to measure effects of cognitive behavioural therapy on anxiety
Withdrawal from dialysis	No data observations	Not estimable	No observations	Insufficient data observations	**Not estimable.**	Studies were not designed to measure effects of cognitive behavioural therapy on withdrawal from dialysis
Withdrawal from intervention	No data observations	Not estimable	No observations	Insufficient data observations	**Not estimable.**	Studies were not designed to measure effects of cognitive behavioural therapy on withdrawal from intervention
Death (any cause) (median follow-up: 24.3 weeks)	**13.8 per 1000**	**-1.2 per 1000** (95% CI 4.83 to 47.61)	**RR 1.09** (95% CI 0.35 to 3.45)	145 (2)	⊕⊕⊖⊖ **low** [4, 5]	It is uncertain whether CBT makes any difference to death (any cause)

*The basis for the **assumed risk** (e.g. the median control group risk across studies) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).
ESKD: end-stage kidney disease; **CI:** Confidence interval; **MD:** mean difference; **SMD:** standardised mean difference; **RR:** Risk Ratio; **HRQoL:** health-related quality of life

GRADE Working Group grades of evidence
High quality: Further research is very unlikely to change our confidence in the estimate of effect.
Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.
Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.
Very low quality: We are very uncertain about the estimate.

[1] The estimated risk of major depression was not estimable as a single study reported this outcome.
[2] All studies had unclear risks of bias for allocation concealment and high risk of blinding of participants or investigators. Two studies (Cukor 2014; Duarte 2009) reported low risk methods for blinding of outcome assessment.

[3] The estimated risk of anxiety was not estimable as a single study reported this outcome.

[4] All studies had high or unclear risks of bias for allocation concealment and blinding of participants or investigators. One out of two studies reported low risk methods for blinding of outcome assessment.

[5] The certainty in the evidence was downgraded due to imprecision in the treatment estimates, consistent with benefit or harm.

Summary of findings 2. Counselling versus usual care

Counselling versus usual care for depressive outcomes in people treated with dialysis

Patient or population: people with ESKD

Settings: dialysis

Intervention: counselling[1]

Comparison: usual care

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	No. of participants (studies)	Certainty of the evidence (GRADE)	Comments
	Assumed risk	Corresponding risk				
	Usual care	Counselling				
Major depression	No data observations	Not estimable	No observations.	Insufficient data observations	**Not estimable**	Studies were not designed to measure effects of counselling on major depression
Depression (any severity, including mild, moderate and severe depression) Investigators measured depression using the Beck Depression Inventory (BDI). A higher score is indicative of more depressive symptoms. (median follow-up: 13.2 weeks)	The mean depression score ranged across control groups from **-2.43** to **18.54**	The mean depression score in the intervention groups was **3.84 lower** (95% CI -6.14 to -1.53)	**MD -3.84** (95% CI -6.14 to -1.53)	99 (3)	⊕⊕⊖⊖ **low [2,3]**	Counselling may decrease depressive symptoms
HRQoL Kidney Disease Quality of Life (KDQOL-36)	Not estimable[4]	Not estimable	Not estimable	Insufficient data observations	**Not estimable**	Studies were not designed to measure effects of counselling on health related quality of life

(median follow-up: 6 weeks)						
Anxiety	No data observations	Not estimable	No observations	Insufficient data observations	**Not estimable**	Studies were not designed to measure effects of counselling on anxiety
Withdrawal from dialysis	No data observations	Not estimable	No observations	Insufficient data observations	**Not estimable**	Studies were not designed to measure effects of counselling on withdrawal from dialysis
Withdrawal from intervention (median follow-up: 6 weeks)	Not estimable[5]	Not estimable	Not estimable	Insufficient data observations	**Not estimable**	Studies were not designed to measure effects of counselling on withdrawal from intervention
Death (any cause) (median follow-up: 22.8 weeks)	**2.5 per 1000**	**-1.7 per 1000** (95% CI 0.8 to 22.03)	**RR 1.69 (**95% CI 0.32 to 8.81)	270 (2)	⊕⊕⊖⊖ **low [2,6]**	It is uncertain whether counselling makes any difference to death

*The basis for the **assumed risk** (e.g. the median control group risk across studies) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).
ESKD: end-stage kidney disease; **CI:** Confidence interval; **MD:** mean difference; **RR:** Risk Ratio; **HRQoL:** health-related quality of life

GRADE Working Group grades of evidence
High quality: Further research is very unlikely to change our confidence in the estimate of effect.
Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.
Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.
Very low quality: We are very uncertain about the estimate.

[1] Counselling included existentialism philosophy and cognitive approach, counselling component, problem-solving therapy and NKF-NUS self-management intervention.
[2] All studies had high or unclear risks of bias for allocation concealment, blinding of participants or investigators, and blinding of outcome assessment.
[3] The certainty in the evidence was downgraded due to imprecision in the treatment estimates for the limited number of participants, according with Optimal Information Size (OIS).
[4] The estimated risk of quality of life was not estimable as a single study reported this outcome.
[5] The estimated risk of withdrawal from intervention was not estimable as a single study reported this outcome.
[6] The certainty in the evidence was downgraded due to imprecision in the treatment estimates, consistent with benefit or harm.

Summary of findings 3. Exercise versus usual care

Exercise versus usual care for depression in people treated with dialysis
Patient or population: people with ESKD
Settings: dialysis

Intervention: exercise

Comparison: usual care

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	No of Participants (studies)	Certainty of the evidence (GRADE)	Comments
	Assumed risk	Corresponding risk				
	Usual care	Exercise				
Major depression (median follow-up: 44 weeks)	**86.02 per 1000**	**45.59 per 1000** (95% CI 23.23 to 69.68)	**RR 0.47** (95% CI 0.27 to 0.81)	108 (3)	⊕⊕⊖⊖ **low** [1,2]	Exercise may decrease risk of major depression
Depression (any severity, including mild, moderate and severe depression) Investigators measured depression using the Beck Depression Inventory (BDI). A higher score is indicative of more depressive symptoms (median follow-up: 44 weeks)	The mean depression score ranged across control groups from **19.4** to**22.1**	The mean depression score in the intervention groups was **7.61 lower** (95% CI -9.59 to -5.63)	**MD -7.61** (95% CI -9.59 to -5.63)	108 (3)	⊕⊕⊕⊖ **moderate** [1]	Exercise probably decreases depressive symptoms
HRQoL Investigators measured health related quality of life using the Quality of Life Index (QLI). A higher score is indicative of higher perceived of QoL (median follow-up: 35.2 weeks)	The mean QoL score ranged across control groups from **5.6** to **6.3**	The mean QoL score in the intervention groups was **3.06 higher** (95% CI 2.29 to 3.83)	**MD 3.06** (95% CI 2.29 to 3.83)	64 (2)	⊕⊕⊖⊖ **low** [1,3]	Exercise may improve HRQoL
Anxiety Hospital Anxiety and Depression Scale (HADS) (median follow-up: 52.1 weeks)	Not estimable[4]	Not estimable	Not estimable	Insufficient data observations	**Not estimable**	Studies were not designed to measure effects of exercise on anxiety
Withdrawal from dialysis	No data observations	Not estimable	No observations	Insufficient data observations	**Not estimable**	Studies were not designed to measure effects of exercise on withdrawal from dialysis

Withdrawal from intervention	No data observations	Not estimable	No observations	Insufficient data observations	**Not estimable**	Studies were not designed to measure effects of exercise on withdrawal from intervention
Death (any cause)	No data observations	Not estimable	No observations	Insufficient data observations	**Not estimable**	Studies were not designed to measure effects of exercise on death

*The basis for the **assumed risk** (e.g. the median control group risk across studies) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).
ESKD: end-stage kidney disease; **CI:** Confidence interval; **RR:** Risk Ratio; **MD:** mean difference; **HRQoL:** health-related quality of life

GRADE Working Group grades of evidence
High quality: Further research is very unlikely to change our confidence in the estimate of effect.
Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.
Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.
Very low quality: We are very uncertain about the estimate.

[1] All studies had high or unclear risks of bias for allocation concealment and blinding of participants or investigators. One study out of four reported low risk methods for blinding of outcome assessment.
[2] There was moderate heterogeneity in the findings of available studies.
[3] The certainty in the evidence was downgraded due to imprecision in the treatment estimates for the limited number of participants, according with Optimal Information Size (OIS).
[4] The estimated risk of anxiety was not estimable as a single study reported this outcome.

Summary of findings 4. Relaxation techniques versus usual care

Relaxation techniques versus usual care for depression in people treated with dialysis

Patient or population: people with ESKD

Settings: dialysis

Intervention: relaxation techniques[1]

Comparison: usual care

Outcomes	**Illustrative comparative risks* (95% CI)**		**Relative effect (95% CI)**	**No. of participants (studies)**	**Quality of the evidence (GRADE)**	**Comments**
	Assumed risk	**Corresponding risk**				

	Usual care	Relaxation techniques				
Major depression	No data observations	Not estimable	No observations	Insufficient data observations	**Not estimable**	Studies were not designed to measure effects of relaxation techniques on major depression
Depression (any severity, including mild, moderate and severe depression) Investigators measured depression using the Beck Depression Inventory (BDI). A higher score is indicative of more depressive symptoms. (median follow-up: 4.2 weeks)	The mean depression score ranged across control groups from **9.56** to **30.83**	The mean depression score in the intervention group was **5.77 lower** (95% CI -8.76 to -2.78)	**MD -5.77** (95% CI -8.76 to -2.78)	122 (2)	⊕⊕⊕⊖ **moderate** [2]	Relaxation techniques probably decrease depressive symptoms
HRQoL Investigators measured health-related quality of life using the Health Status Questionnaire Short Form (SF-36) (median follow-up: 6 weeks)	Not estimable[3]	Not estimable	No observations	Insufficient data observations	**Not estimable**	Studies were not designed to measure effects of relaxation techniques on HRQoL
Anxiety	No data observations	Not estimable	No observations	Insufficient data observations	**Not estimable**	Studies were not designed to measure effects of relaxation techniques on anxiety
Withdrawal from dialysis	No data observations	Not estimable	No observations	Insufficient data observations	**Not estimable**	Studies were not designed to measure effects of relaxation techniques on withdrawal from dialysis
Withdrawal from intervention	No data observations	Not estimable	No observations	Insufficient data observations	**Not estimable**	Studies were not designed to measure effects of relaxation techniques on withdrawal from intervention
Death (any cause)	No data observations	Not estimable	No observations	Insufficient data observations	**Not estimable**	Studies were not designed to measure effects of relaxation techniques death

*The basis for the **assumed risk** (e.g. the median control group risk across studies) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).
ESKD: end-stage kidney disease; **CI:** Confidence interval; **MD:** mean difference; **HRQoL:** health-related quality of life

GRADE Working Group grades of evidence
High quality: Further research is very unlikely to change our confidence in the estimate of effect.
Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.
Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.
Very low quality: We are very uncertain about the estimate.

[1] Relaxation techniques included Benson relaxation technique and nurse-led breathing training.
[2] Studies had high or unclear risks of bias for allocation concealment, blinding of participants or investigators, and blinding of outcome assessment.
[3] Treatment effects on HRQoL was not estimable as a single study reported this outcome.

Summary of findings 5. Spiritual practice versus usual care

Spiritual practice versus usual care for depression in people treated with dialysis

Patient or population: people with ESKD

Settings: dialysis

Intervention: spiritual practice[1]

Comparison: usual care

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	No of Participants (studies)	Certainty of the evidence (GRADE)	Comments
	Assumed risk	Corresponding risk				
	Usual care	Spiritual practice				
Major depression	No data observations	Not estimable	No observations	Insufficient data observations	**Not estimable**	Studies were not designed to measure effects of spiritual practice on major depression
Depression (any severity, including mild, moderate and severe depression) Investigators measured depression using different instruments: Beck Depression Inventory (BDI) and Brief Symptom Inventory (BSI). A higher	The mean depression score ranged across control groups from **31.6** to **53.53**	The mean depression score in the intervention groups was **1.00 standard deviations lower** (95% CI -3.52 to 1.53)	**SMD -1.00** (95% CI -3.52 to 1.53)	116 (2)	⊕⊖⊖⊖ **very low [2,3,4]**	As a rule of thumb, 0.2 SMD represents a small effect size, 0.5 SMD a moderate effect size and 0.8 SMD a large effect size. As SMD is -1.00, it is very uncertain whether spiritual practice makes any difference to depressive symptoms

score is indicative of more depressive symptoms. (median follow-up: 5.2 weeks)						
Health-related quality of life Health Status Questionnaire Short Form (SF-36) (median follow-up: 6 weeks)	Not estimable[5]	Not estimable	Not estimable	Insufficient data observations	**Not estimable**	Studies were not designed to measure effects of spiritual practice on quality of life
Anxiety Brief Symptom Inventory (BSI) (median follow-up: 6 weeks)	Not estimable[6]	Not estimable	Not estimable	Insufficient data observations	**Not estimable**	Studies were not designed to measure effects of spiritual practice on anxiety
Withdrawal from dialysis	No data observations	Not estimable	No observations	Insufficient data observations	**Not estimable**	Studies were not designed to measure effects of spiritual practice on withdrawal from dialysis
Withdrawal from intervention	No data observations	Not estimable	No observations	Insufficient data observations	**Not estimable**	Studies were not designed to measure effects of spiritual practice on withdrawal from intervention
Death (any cause)	No data observations	Not estimable	No observations	Insufficient data observations	**Not estimable**	Studies were not designed to measure effects of spiritual practice on death

*The basis for the **assumed risk** (e.g. the median control group risk across studies) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).
ESKD: end-stage kidney disease; **CI:** Confidence interval; **SMD:** standardised mean difference; **HRQoL:** health-related quality of life

GRADE Working Group grades of evidence
High quality: Further research is very unlikely to change our confidence in the estimate of effect.
Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.
Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.
Very low quality: We are very uncertain about the estimate.

[1] Spiritual practice included Holy Qur'an recitation and Christian prayer.
[2] All studies had high or unclear risks of bias for allocation concealment, blinding of participants or investigators, and blinding of outcome assessment.
[3] There was substantial heterogeneity in the findings of available studies (two downgrades).
[4] The certainty in the evidence was downgraded due to imprecision in the treatment estimates, consistent with benefit or harm.
[5] The estimated risk of anxiety was not estimable as a single study reported this outcome.

[6] The estimated risk of quality of life was not estimable as a single study reported this outcome.

BACKGROUND

Description of the condition

Depression is the most common psychological problem in patients undergoing dialysis (Finkelstien 2000; Kimmel 1993; Levenson 1991). Approximately one-quarter of dialysis patients meet diagnostic criteria for major depression (Palmer 2013a; Szeifert 2012). The main factors that contribute to the develop of depressive symptoms are medications, reduction of physical function and dietary restrictions (Farrokhi 2014). The Beck Depression Inventory (BDI), Patient Health Questionnaire and Center for Epidemiologic Studies Depression Scale are validated tools for depression in people undergoing haemodialysis (HD), although the optimal screening tool is still uncertain (King-Wing Ma 2016).

Depression can adversely affect the well-being of patients receiving long-term dialysis in several ways. Health-related quality of life (HRQoL) of patients on chronic dialysis has been shown to correlate more strongly with depression than with dialysis adequacy measures (Martin 2000; Steele 1996). Depression in dialysis patients is associated with lower adherence to dialysis prescriptions (Kaveh 2001; Kimmel 1995) and recommended fluid restrictions (Everett 1993), which may lead to poorer clinical outcomes (Chilcot 2018). One study (Davies 2003) found a significant association between depression and intolerance to antihypertensive drugs because of nonspecific adverse effects in the general population. This may be of relevance to patients treated with long-term dialysis as 80% of HD and 50% of peritoneal dialysis (PD) patients are hypertensive (Levey 1998) and hypertension may contribute to the burden of cardiovascular disease in the dialysis population. Depressed patients on PD have been shown to have higher rates of peritonitis (Juergenson 1996). Depression has been associated with increased death for dialysis patients (Hedayati 2010; Palmer 2013b; Weisbord 2014). The risk of hospitalisation is increased in patients with depression (Flythe 2017; Lopes 2002).

Description of the intervention

Depression can be treated by both physical (drugs and electro-convulsive therapy (ECT)) and psychosocial interventions.

Psychosocial interventions can be defined as those interventions that provide psychological, emotional, or social support without using pharmacological substances. These may include counselling, social group support, cognitive-behavioural therapy (CBT), relaxation or visualisation techniques, exercise, education, or individual social support including by telephone. Therapies may vary in their mode of delivery, intensity, or methodology, and level of contact with an individual therapist or support worker. Psychosocial interventions may help reduce distressing symptoms, increase coping strategies, increase social connectedness, assist in strategies to address specific disease-related problems, and decrease anxiety and stress.

How the intervention might work

Several meta-analysis of psychosocial interventions have found such therapies to be effective treatments for depression in the wider population (Churchill 2001; Dobson 1989; Robinson 1990; Scoggin 1994). In some studies, although participants did not report a specific diagnosis of depression when they were enrolled, psychosocial interventions were effective to prevent depression and impede the progression of the disease (Heshmatifar 2015). Dialysis patients, caregivers, and health professionals have identified depression as a critical outcome for evaluation in nephrology research (Tong 2017); however a previous version of this Cochrane review published in 2005 (Rabindranath 2005) did not identify any randomised controlled trials (RCTs) of psychosocial interventions to treat depression in the dialysis setting. Psychosocial interventions may be especially appropriate for patients on dialysis, since they avoid potential drug interactions and adverse effects of antidepressant medication. Psychosocial interventions are also known to be acceptable to patients and form a core recommendation in guidelines for the treatment of depression in adults (NICE 2018).

Why it is important to do this review

Depression is common for dialysis patients and may increase the substantial burden of symptoms and treatment. Patients, health professional and policy-makers have identified research on the psychosocial impact of chronic kidney disease (CKD) as a priority (Tong 2015). This is an update of a Cochrane review that was first published in 2005, which identified no relevant studies of psychosocial interventions to treat depression in dialysis patients (Rabindranath 2005). Similarly, a Cochrane review in 2016 of antidepressants for treatment depression in adults with end-stage kidney disease (ESKD) treated with dialysis included four studies including 170 participants (Palmer 2016). In very low certainty or ungraded evidence, antidepressant therapy had uncertain effects on quality of life (QoL), might reduce depression symptoms and might incur nausea.

Given the priority placed on psychosocial support for dialysis by patients and health professionals, the very low certainty of existing evidence for depression treatment, and the poor outcomes associated with depression in the dialysis setting, our aim was to provide an updated summary of the evidence of the benefits and potential harms of psychosocial interventions among adults with ESKD treated with dialysis.

OBJECTIVES

To assess the effect of using psychosocial interventions versus usual care or a second psychosocial intervention for preventing and treating depression in patients with ESKD treated with dialysis.

METHODS

Criteria for considering studies for this review

Types of studies

We included RCTs and quasi-RCTs (e.g. studies in which the method of assignment is based on alternation, date of birth or medical record number) of psychosocial interventions for prevention and treatment of depression among adults treated with long-term dialysis.

Types of participants

Inclusion criteria

We included participants aged 18 years or above undergoing dialysis (either HD or PD) for ESKD with or without a diagnosis of depression.

See Differences between protocol and review.

Exclusion criteria

We excluded studies evaluating treatment for other psychiatric disorders including bipolar affective disorder.

Types of interventions

We included studies that compared a psychosocial intervention (such as cognitive and behavioural therapies, exercise training, and counselling) versus usual care or a second psychosocial intervention. We excluded studies comparing psychosocial interventions with drugs or ECT.

Types of outcome measures

We did not exclude studies that did not measure or report review outcomes.

We collected outcome data for depression by any measure and at any time point including incidence of major depression, depression (any severity), and depression score at end of treatment (any measure).

Primary outcomes

- Depression (any measure)
- HRQoL

Secondary outcomes

- Anxiety (any measure)
- Cognitive function (any measure)
- Hospitalisation
- Death from any cause
- Suicide or suicide attempts
- Adherence to dialysis treatment
- Withdrawal from dialysis treatment
- Withdrawal from trial intervention
- Adverse events

Search methods for identification of studies

Electronic searches

We searched the Cochrane Kidney and Transplant Register of Studies up to 21 June 2019.The specialised register contains studies identified from the following sources.

1. Monthly searches of the Cochrane Central Register of Controlled Trials (CENTRAL)
2. Weekly searches of MEDLINE OVID SP
3. Handsearching of kidney-related journals and the proceedings of major kidney and transplant conferences
4. Searching of the current year of EMBASE OVID SP
5. Weekly current awareness alerts for selected kidney journals
6. Searches of the International Clinical Trials Register (ICTRP) Search Portal and ClinicalTrials.gov.

Studies contained in the Register are identified through searches of CENTRAL, MEDLINE, and EMBASE based on the scope of Cochrane Kidney and Transplant. Details of search strategies, as well as a list of handsearched journals, conference proceedings and current awareness alerts, are available on the Cochrane Kidney and Transplant website.

See Appendix 1 for search terms used in strategies for this review.

Searching other resources

1. Reference lists of review articles, relevant studies and clinical practice guidelines.
2. Letters seeking information about unpublished or incomplete trials to investigators known to be involved in previous studies.
3. For the original review, the American College of Physicians Database and PsycINFO were also searched.

Data collection and analysis

Selection of studies

For this 2019 update, two authors independently reviewed study titles and abstracts. Full text articles of studies considered potentially relevant were obtained and reviewed for eligibility by both authors. We consulted a third author to resolve discrepancies if necessary. We reassessed eligibility of studies excluded in the last version of the review (Rabindranath 2005) because of changes to the review criteria.

Data extraction and management

For this update, data extraction and assessment of risk of bias was performed by two authors using standardised data extraction forms. Disagreements not resolved by discussion between authors could be referred to a third author. Studies reported in languages other than English were translated before data extraction. Where more than one report of a study was identified, data were extracted from all reports. Where there were discrepancies between reports, data from the primary source were used. Study authors were contacted for additional information about studies.

We extracted the following information:

- Methods: type of study design, setting, country, funding sources, time frame, duration of follow-up
- Participants: number of participants randomised to each group, number of analysed participants, inclusion criteria, exclusion criteria, age, sex, antidepressant medication
- Interventions: details of intervention
- Outcomes: all outcomes measured by study authors summary statistics of continuous data (mean, standard deviation (SD) and dichotomous data (number who experienced endpoint and number at risk).

Assessment of risk of bias in included studies

Two authors independently assessed methodological reporting using the Cochrane risk of bias assessment tool (Higgins 2011) (see Appendix 2).

We assessed the following:

- Was there adequate sequence generation (selection bias)?
- Was allocation adequately concealed (selection bias)?
- Was knowledge of the allocated interventions adequately prevented during the study (detection bias)?
  - Participants and personnel (performance bias)
  - Outcome assessors (detection bias)
- Were incomplete outcome data adequately addressed (attrition bias)?

- Are reports of the study free of suggestion of selective outcome reporting (reporting bias)?
- Was the study apparently free of other problems that could put it at a risk of bias?

Measures of treatment effect

Dichotomous data

For dichotomous outcomes (hospitalisation, death, suicide or suicide attempts, withdrawal from trial treatment, withdrawal from dialysis, adverse events), results were expressed as risk ratio (RR) with 95% confidence intervals (CI).

Continuous data

Where continuous scales of measurement were used to assess the effects of treatment (HRQoL, depression score), we used mean differences (MD) where the studies employed the same outcome measure. Where the studies used different scales to assess a given outcome, we used the standardised mean difference (SMD). We considered SMD of 0.2 a small effect size, SMD 0.5 a medium effect size and SMD 0.8 a large effect size (Cohen 1988).

Change scores and missing standard deviations

We included change scores and missing standard deviations (SD) according to the Cochrane Handbook for Systematic Reviews of Interventions (Higgins 2011).

Unit of analysis issues

Cross-over studies

A primary concern with cross-over trials is the "carry-over" effect in which the effect of the intervention treatment influences the participant's response to the subsequent intervention in the second phase of the study. As a consequence, participants entering the second phase of the study may differ systematically from their "baseline" state even after a wash-out phase. To minimise the carry-over effect, we only extracted data from the first phase of the study, prior to cross-over.

Dealing with missing data

Any further information required from the original author was requested by written correspondence and any relevant information obtained was to be included in the review. Evaluation of important numerical data such as screened, randomised patients as well as intention-to-treat, as-treated and per-protocol population were carefully performed. Attrition rates, for example drop-outs, losses to follow-up and withdrawals were investigated. Issues of missing data and imputation methods (for example, last-observation-carried-forward) were critically appraised (Higgins 2011).

Assessment of heterogeneity

We first assessed the heterogeneity by visual inspection of the forest plot. We then quantified statistical heterogeneity using the I^2 statistic, which describes the percentage of total variation across studies that is due to heterogeneity rather than sampling error (Higgins 2003). A guide to the interpretation of I^2 values was as follows.

- 0% to 40%: might not be important
- 30% to 60%: may represent moderate heterogeneity
- 50% to 90%: may represent substantial heterogeneity
- 75% to 100%: considerable heterogeneity.

The importance of the observed value of I^2 depends on the magnitude and direction of treatment effects and the strength of evidence for heterogeneity (e.g. P-value from the Chi^2 test, or a confidence interval for I^2) (Higgins 2011).

Assessment of reporting biases

Reporting bias may occur when the direction and/or magnitude of a study's results influence a decision to publish the study. Empirical evidence suggests that studies with statistically significant findings are more likely to be submitted and accepted for publication, and may lead to over-estimation of the true treatment effect. To assess whether studies in our meta-analyses may be affected by publication bias, we planned to enter data into a funnel plot when a meta-analysis included the results of at least 10 studies and in the absence of moderate or substantial heterogeneity (Higgins 2011). In this version of the review, there were insufficient data to generate funnel plots.

Data synthesis

Data were summarised using the random-effects model and the fixed-effect model was also used to ensure robustness of the model chosen and susceptibility to outliers.

Subgroup analysis and investigation of heterogeneity

Although subgroup analyses have to be treated with caution, as they are hypothesis-forming rather than hypothesis-testing, we considered conducting *a priori* defined analyses in order to explore whether methodological and clinical differences between the trials may have systematically influenced the differences that were observed in the treatment outcomes.

Sensitivity analysis

We considered performing sensitivity analyses to explore the influence of the following factors on effect size, although in this version of the review, there were insufficient data to generate sensitivity analyses.

- Repeating the analysis excluding unpublished studies
- Repeating the analysis taking account of risk of bias, as specified
- Repeating the analysis excluding any very long or large studies to establish how much they dominate the results
- Repeating the analysis excluding studies using the following filters: diagnostic criteria, language of publication, source of funding (industry versus other), or country.

'Summary of findings' tables

We presented the main results of the review in 'Summary of findings' tables. These tables present key information concerning the quality of the evidence, the magnitude of the effects of the interventions examined, and the sum of the available data for the main outcomes (Schunemann 2011a). The 'Summary of findings' tables also include an overall grading of the evidence related to each of the main outcomes using the GRADE (Grades of Recommendation, Assessment, Development and Evaluation) approach (GRADE 2008; GRADE 2011). The GRADE approach defines the quality of a body of evidence as the extent to which one can be confident that an estimate of effect or association is close to the true quantity of specific interest. The quality of a body of evidence involves consideration of

within-trial risk of bias (methodological quality), directness of evidence, heterogeneity, precision of effect estimates and risk of publication bias (Schunemann 2011b).

We used the GRADE process to assess the certainty of the body of the evidence associated with the following outcomes.

- Major depression
- Depression score (any measure)
- Anxiety
- QoL
- Withdrawal from dialysis
- Withdrawal from intervention
- Death (any cause)

We constructed four 'Summary of Findings' tables for the following comparisons in this review.

- CBT versus usual care
- Counselling versus usual care
- Exercise versus usual care
- Relaxation techniques versus usual care
- Spiritual practice versus usual care

One author completed the tables in consultation with a second author.

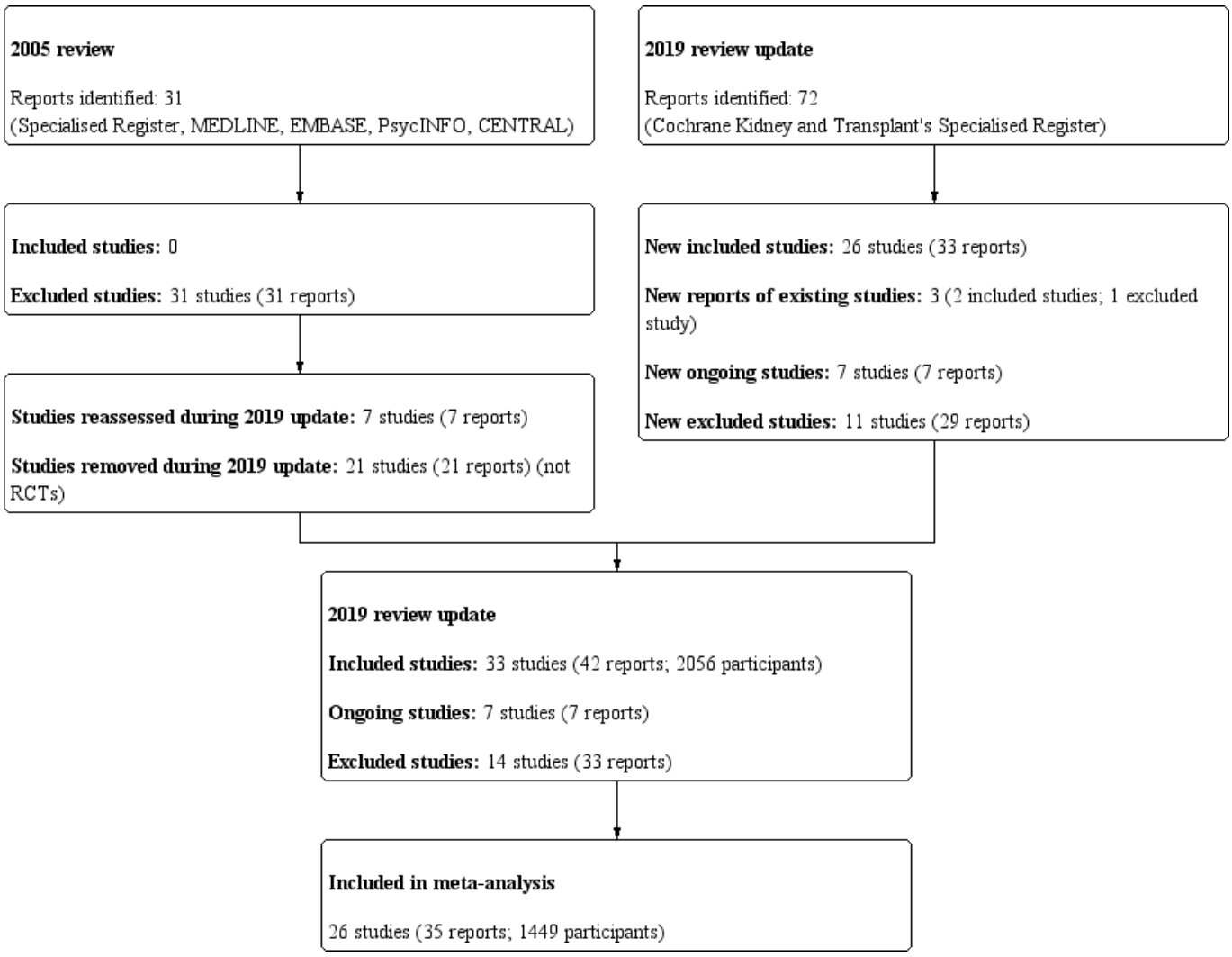
RESULTS

Description of studies

Results of the search

Search results are shown in Figure 1. For this 2019 review update, we screened 72 titles and abstracts. We reclassified seven studies in seven publications from the 2005 review as eligible due to the expanded criteria in this review to include participants without depression at baseline. We removed 21 studies (21 publications) from the 2005 review as they were not RCTs. From the 2019 search update, we identified 26 new studies (33 reports) that met the review eligibility criteria (Characteristics of included studies); 11 studies (29 reports) were and excluded, and there are 7 ongoing studies.

Figure 1. Study flow diagram



Included studies

See Characteristics of included studies.

We included 33 studies in 42 publications. One study (Cukor 2014) was a cross-over study design in which participants were administered each of the study interventions sequentially without a washout period. One study (Dziubek 2016) was a quasi-randomised study.

Study design, setting and characteristics

Study duration varied from three weeks to one year. Studies were conducted in fifteen different countries including Brazil (Duarte 2009), Canada (Thomas 2017), Greece (Kouidi 1997; Kouidi 2010; Ouzouni 2009), Indonesia (Sofia 2013), Iran (Babamohamadi 2017; Bahmani 2016; Espahbodi 2015; Heshmatifar 2015; Kargar Jahromi 2016), Jordan (Al Saraireh 2018), Malaysia (Hmwe 2015), Mexico (Lerma 2017), Poland (Bargiel-Matusiewicz 2011; Bargiel-Matusiewicz 2011a; Dziubek 2016), Singapore (HED-SMART 2011), Taiwan (Lii 2007; Tsai 2015), UK (iDiD 2016; Krespi 2009; Vogt 2016), Tunisia (Frih 2017), Turkey (Sertoz 2009), and USA (Beder 1999; Carney 1987; Cukor 2014; Erdley 2014; Frey 1999; Leake 1999; Mathers 1999; Matthews 2001). One study (Thomas 2017) received at least some funding from companies, while 32 studies provided no specific details about funding sources.

Study participants

The 33 studies included 2056 randomised participants treated with HD. The sample size varied from 9 participants (Vogt 2016) to 235 participants (HED-SMART 2011). One study (Sofia 2013) did not report the number of participants. The mean study age ranged from 36.1 years (Carney 1987) to 73.9 years (Erdley 2014), with a median of 52.4 years.

Interventions

Details of interventions in each study are presented in the Characteristics of included studies and in Table 1.

Interventions included acupressure (Hmwe 2015) (108 participants), CBT in five studies (Al Saraireh 2018; Cukor 2014; Duarte 2009; Lerma 2017; Lii 2007) (405 participants), counselling in six studies (Bahmani 2016; Bargiel-Matusiewicz 2011a; Beder 1999; Erdley 2014; HED-SMART 2011; Vogt 2016) (527 participants), education in two studies (Espahbodi 2015; Mathers 1999) (70 participants), exercise in six studies (Carney 1987; Dziubek 2016; Frey 1999; Kouidi 1997; Kouidi 2010; Ouzouni 2009) (190 participants), meditation in Thomas 2017 (41 participants), motivational interviewing in Leake 1999 (42 participants), relaxation in four studies (Heshmatifar 2015; Krespi 2009; Sofia 2013; Tsai 2015) (287 participants), social activity in Sertoz 2009 (31 participants), spiritual practice in three studies (Babamohamadi 2017; Frih 2017; Matthews 2001) (208 participants), telephone support in Kargar Jahromi 2016 (60 participants), telephone support and CBT in iDiD 2016 (25 participants) and audio-recording of a psychological intervention in Bargiel-Matusiewicz 2011 (62 participants).

Three studies reported three treatment groups. In Leake 1999, motivational interviewing was compared with another motivational interviewing or video recording. In Krespi 2009, relaxation was compared with voice control or usual care. Matthews 2001 compared spiritual practice with visualisation or usual care.

The methods for implementation, tailoring, and measurement of adherence of interventions are provided in Table 1 using a TIDIeR [Template for Intervention Description and Replication] checklist (Hoffmann 2014).

Excluded studies

We excluded 14 studies (33 reports) as the intervention or treatment comparison were judged as not eligible, the study did not include the population of interest, or the study was not an RCT. See Characteristics of excluded studies.

Ongoing studies

Our search identified seven studies that have yet to been completed (DOHP 2016; NCT02011139; NCT03162770; NCT03330938; NCT03406845; van der Borg 2016; WICKD 2019). Study comparisons include:

- Structured information/workbook, psychosocial and educational supports compared to skills building to usual care (DOHP 2016)
- CBT for 12 weeks compared to usual care (NCT02011139)
- Meditation for 8 weeks compared to usual care (NCT03162770)
- CBT together with resilience training for eight weeks compared to CBT alone (NCT03330938)
- Meditation for eight weeks compared to a program of health education, diet, music, exercise, and positive life changes (NCT03406845)
- Counselling by a social worker for 16 weeks compared to usual care (van der Borg 2016)
- Early treatment with motivational care planning compared to delayed treatment with motivational care planning and usual care (WICKD 2019).

Risk of bias in included studies

The risk of bias for studies overall are summarised in Figure 2 and the risk of bias in each individual study is reported in Figure 3.

Figure 2. Risk of bias graph: review authors' judgements about each risk of bias item presented as percentages across all included studies.

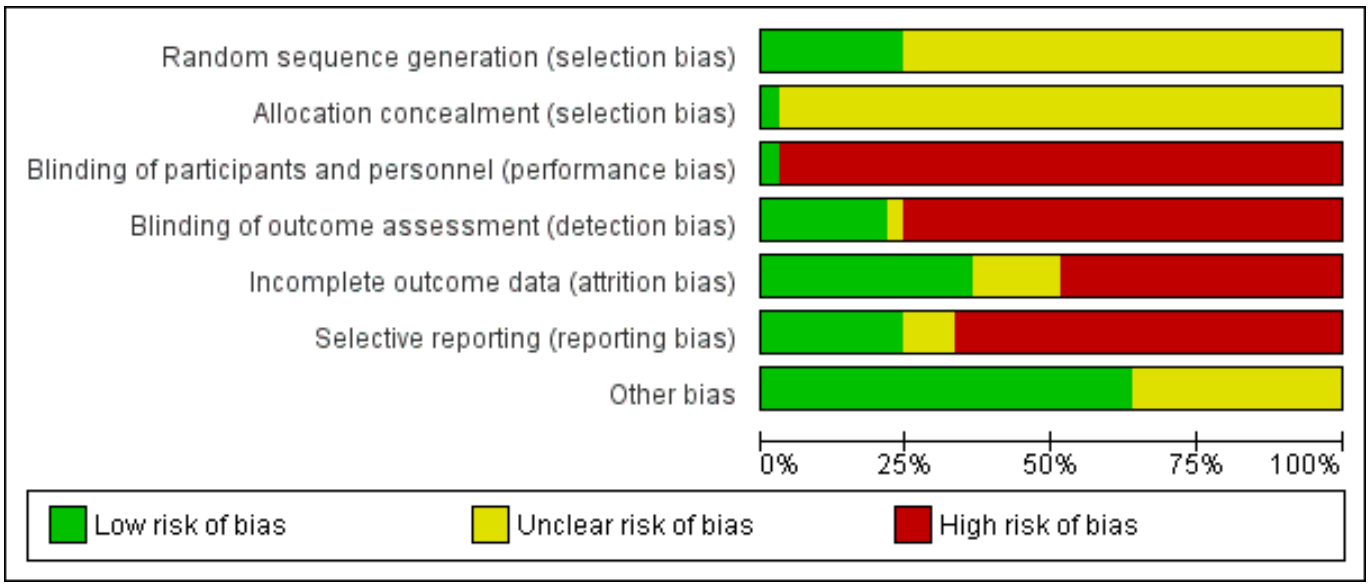


Figure 3. Risk of bias summary: review authors' judgements about each risk of bias item for each included study.

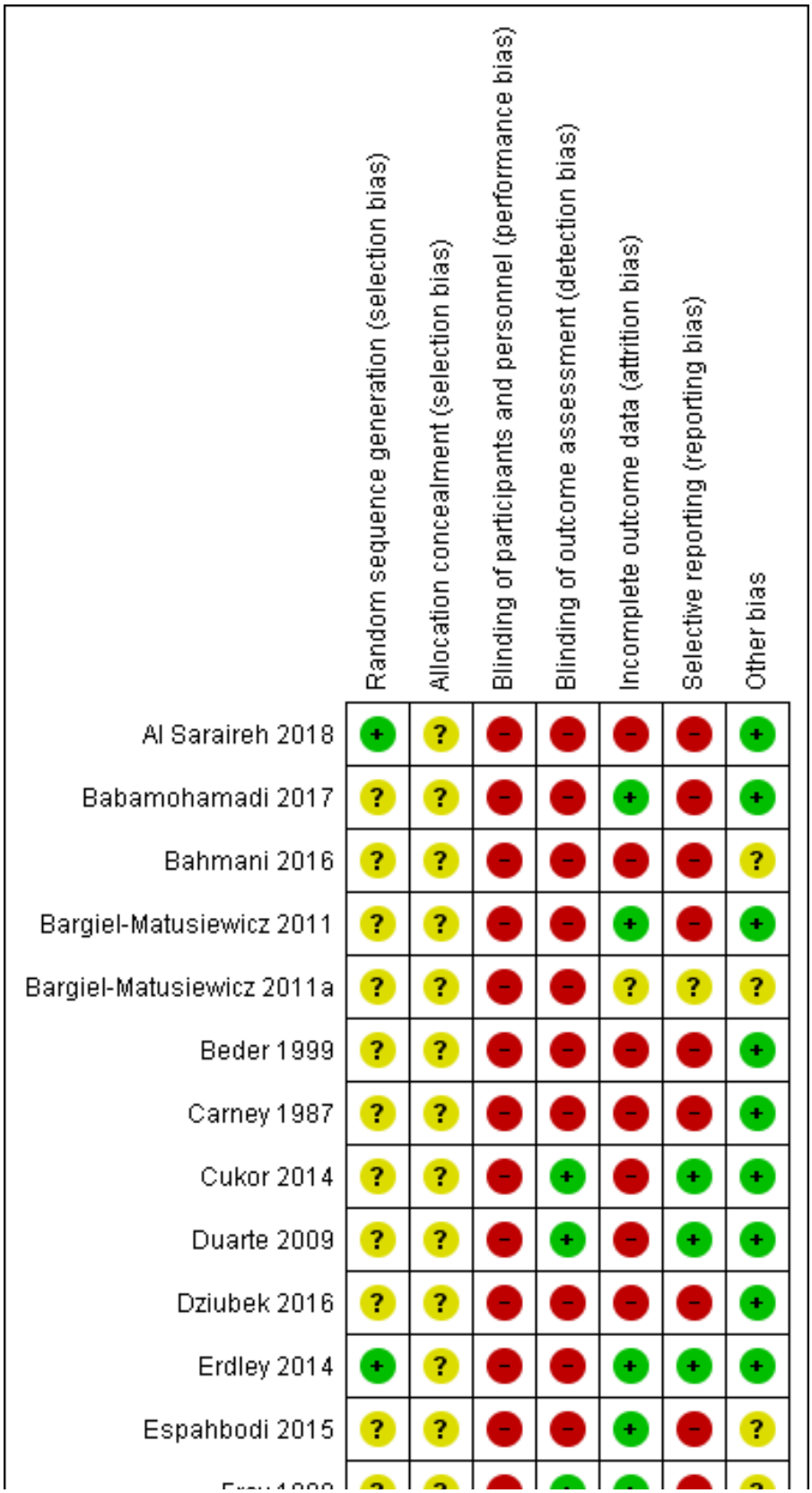


Figure 3. (Continued)

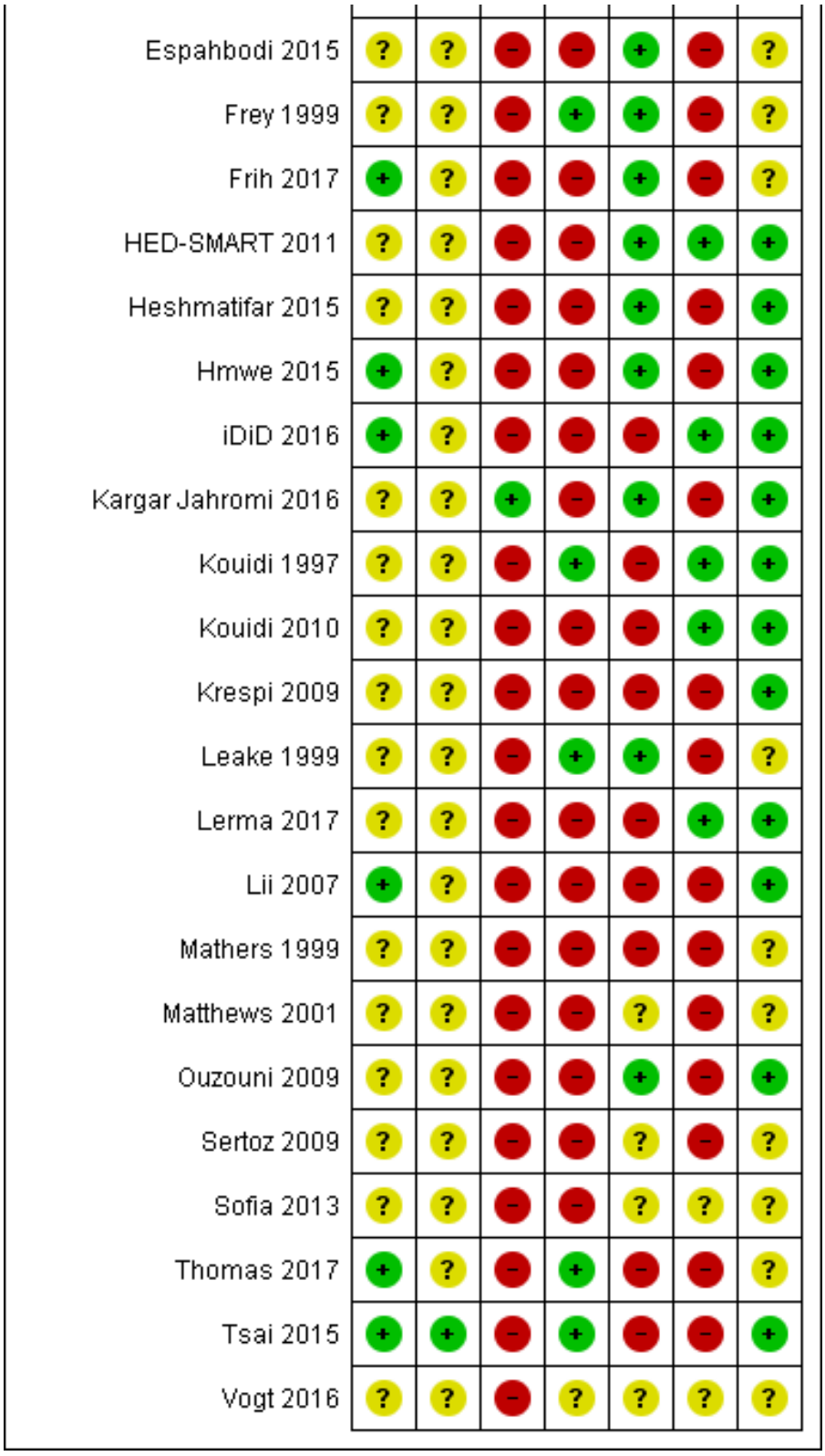


Figure 3. (Continued)

Allocation

Methods for generating the random sequence were deemed to be at low risk of bias in eight studies (Al Saraireh 2018; Erdley 2014; Frih 2017; Hmwe 2015; iDiD 2016; Lii 2007; Thomas 2017; Tsai 2015). In the remaining 25 studies, the method for generating the random sequence was unclear.

Allocation concealment was adjudicated as low risk of bias in one study (Tsai 2015). The risk of bias for allocation concealment was unclear in the remaining 32 studies.

Blinding

One study was blinded and considered to be at low risk of bias for performance bias (Kargar Jahromi 2016). The remaining 32 studies were not blinded and were considered at high risk of performance bias.

Blinding of outcome assessment was assessed to be at low risk in seven studies (Cukor 2014; Duarte 2009; Frey 1999; Kouidi 1997; Leake 1999; Thomas 2017; Tsai 2015). The risk of bias for blinding of outcome assessment was unclear in one study (Vogt 2016). The remaining 25 studies were considered at high risk of detection bias.

Incomplete outcome data

Twelve studies met criteria for low risk of attrition bias (Babamohamadi 2017; Bargiel-Matusiewicz 2011; Erdley 2014; Espahbodi 2015; Frey 1999; Frih 2017; HED-SMART 2011; Heshmatifar 2015; Hmwe 2015; Kargar Jahromi 2016; Leake 1999; Ouzouni 2009). Sixteen studies were considered at high risk of attrition bias when there was differential loss to follow-up between treatment groups and high attrition rates (Al Saraireh 2018; Bahmani 2016; Beder 1999; Carney 1987; Cukor 2014; Duarte 2009; Dziubek 2016; iDiD 2016; Kouidi 1997; Kouidi 2010; Krespi 2009; Lerma 2017; Lii 2007; Mathers 1999; Thomas 2017; Tsai 2015). In the remaining five studies, attrition bias was considered unclear. Loss to follow-up was commonly due to death, hospitalisation, transplantation, withdrawal of consent, or medical problems.

Selective reporting

Eight studies reported expected and clinically-relevant outcomes and were deemed to be at low risk of bias (Cukor 2014; Duarte 2009; Erdley 2014; iDiD 2016; HED-SMART 2011; Kouidi 1997; Kouidi 2010; Lerma 2017). The risk of bias for reporting bias was unclear in three studies (Bargiel-Matusiewicz 2011a; Sofia 2013; Vogt 2016). The remaining 22 studies did not report patient-centred outcomes of life participation, fatigue, dialysis withdrawal, adverse events, or death.

Other potential sources of bias

Twenty-one studies appeared to be free from other sources of bias (Al Saraireh 2018; Babamohamadi 2017; Bargiel-Matusiewicz 2011; Beder 1999; Carney 1987; Cukor 2014; Duarte 2009; Dziubek 2016; Erdley 2014; HED-SMART 2011; Heshmatifar 2015; Hmwe 2015; iDiD 2016; Kargar Jahromi 2016; Kouidi 1997; Kouidi 2010; Krespi 2009; Lerma 2017; Lii 2007; Ouzouni 2009; Tsai 2015). It was unclear whether the remaining 12 studies had other sources of bias.

Effects of interventions

See: **Summary of findings for the main comparison** Cognitive-behavioural therapy versus usual care; **Summary of findings 2** Counselling versus usual care; **Summary of findings 3** Exercise versus usual care; **Summary of findings 4** Relaxation techniques versus usual care; **Summary of findings 5** Spiritual practice versus usual care

See: Summary of findings for the main comparison CBT versus to usual care; Summary of findings 2 Counselling versus usual care; Summary of findings 3 Exercise versus usual care; Summary of findings 4 Relaxation techniques versus usual care; Summary of findings 5 Spiritual practice versus usual care.

Acupressure versus usual care

Hmwe 2015 reported outcome measures for acupressure compared to usual care for four weeks. Depression was assessed as a continuous outcome either as major (or severe) depression and depression (end of treatment), reported as a score. Since the Depression Anxiety Stress Scales (DASS) score showed that all participants reported depressive symptoms at the baseline, the intervention was delivered to treat depression. The study measured major depression and HRQoL using the General Health Questionnaire (GHQ), and depression, anxiety and stress scores using DASS.

Hmwe 2015 (108 participants) reported no differences between acupressure and usual care for major depression (Analysis 1.1: GHQ score MD -0.89, 95% CI -2.42 to 0.64), depression (Analysis 1.2: DASS score MD -0.93, 95% CI -3.95 to 2.09), anxiety (Analysis 1.4: DASS score MD 0.23, 95% CI -2.21 to 2.67), stress (Analysis 1.5: DASS score MD -1.48, 95% CI -4.32 to 1.36), withdrawal from treatment (Analysis 1.6: RR 7.00, 95% CI 0.37 to 132.35), and hospitalisation (Analysis 1.7: RR 3.00, 95% CI 0.12 to 72.05). Acupuncture may improve HRQoL (Analysis 1.3: GHQ score MD -5.00, 95% CI -9.59 to -0.41). Adverse events of acupressure were rarely reported (Table 2).

Cognitive-behavioural therapy versus usual care

Four studies reported outcomes for CBT (Cukor 2014; Duarte 2009; Lerma 2017; Lii 2007). Studies involved HD patients in centres in the USA, Brazil, Mexico, and Taiwan. CBT was administered chairside during dialysis in one study and in groups in the remaining three studies. The duration of treatment ranged between five weeks and three months. Cukor 2014 used a cross-over design and Lerma 2017 administered CBT to the control group after five weeks.

Depression was assessed as a continuous outcome either as major (or severe) depression and depression (end of treatment). Depression (any severity) was reported as a dichotomous outcome. All studies reported depression score using the Beck Depression Inventory (BDI). Since BDI score showed that not all participants reported depressive symptoms at the baseline, or depression was not an inclusion criterion, the intervention was delivered both to prevent and to treat depression. Duarte 2009 measured major depression and suicides using the Mini International Neuropsychiatric Interview (MINI). Lerma 2017 reported anxiety using the Beck Anxiety Inventory (BAI) and distorted thinking using the Distorted Thought Scale (DTS), and Lii 2007 reported self-efficacy using the Strategies Used by People to Promote Health (SUPPH). Three studies (Cukor 2014; Duarte 2009; Lii 2007) reported HRQoL using the Kidney Disease Quality of Life Instrument Short Form (KDQOL-SF36), while Lerma 2017 used the Quality of Life (QoL) Scale.

Duarte 2009 (74 participants) reported CBT may improve major depression compared to usual care (Analysis 2.1: MINI score MD -1.50, 95% CI -2.87 to -0.13). Cukor 2014 reported CBT may reduce

the number with depression (any severity) during 6 months of follow-up (Analysis 2.2: RR 0.17, 95% CI 0.04 to 0.69). Four studies reported the depression score at end of treatment (median follow-up was 17.7 weeks) using BDI. CBT probably improves depressive symptoms to a clinically-important extent (Analysis 2.3 (4 studies, 230 participants): BDI score MD -6.10, 95% CI -8.63 to -3.57; I^2 = 0%; moderate-certainty evidence). As a rule of thumb, 0.5 SMD represented a moderate effect size (Cohen 1988), and CBT probably improves HRQoL compared to usual care, measured either with KDQOL-SF36 or QoL scale, during a median follow-up of 17.7 weeks (Analysis 2.4 (4 studies, 230 participants): KDQOL-SF36 and QoL scale SMD 0.51, 95% CI 0.19 to 0.83; I^2 = 31%; moderate-certainty evidence).

Lerma 2017 (49 participants) reported CBT may reduce anxiety (Analysis 2.5: BAI score MD -8.70, 95% CI -15.67 to -1.73) and distorted thinking during follow-up (Analysis 2.8: DTS score MD -11.80, 95% CI -22.87 to -0.73) compared to usual care.

Duarte 2009 reported no difference in suicide (Analysis 2.6: MINI score MD 0.00, 95% CI -0.75 to 0.75) between CBT and usual care.

Lii 2007 (48 participants) reported CBT may improve self-efficacy compared to usual care (Analysis 2.7: SUPPH score MD 22.30, 95% CI 12.65 to 31.95).

We found that CBT had uncertain effects on death (any cause), during a median follow-up of 24.3 weeks (Analysis 2.9 (2 studies, 145 participants): RR 1.09, 95% CI 0.35 to 3.45; I^2 = 0%; low-certainty evidence).

Adverse events were not reported in studies of CBT.

No study measured the outcomes of hospitalisation, withdrawal from dialysis, withdrawal from intervention, or adherence to dialysis treatment.

Cognitive-behavioural therapy versus education

Al Saraireh 2018 compared counselling (CBT) to psychoeducation for seven sessions during three months. Since the Hamilton inventory (HAM-D) score showed that all participants reported depressive symptoms at the baseline, the intervention was delivered to treat depression. The study did not measure major depression or depression (any severity) as an outcome.

Al Saraireh 2018 (105 participants) reported psychoeducation may reduce depression (end of treatment) compared to CBT (Analysis 3.1: HAM-D score MD 3.90, 95% CI 2.27 to 5.53).

No other review outcomes were measured.

Counselling versus usual care

Four studies evaluated counselling compared to usual care. Bahmani 2016 evaluated cognitive-existential group therapy twice a week for 12 sessions, Erdley 2014 evaluated problem-solving therapy for six weekly sessions with an individual counsellor, Beder 1999 evaluated social worker-based counselling and support during the first three months of dialysis care, and HED-SMART 2011 evaluated NKF-NUS self-management intervention for four sessions during nine months. Three studies(Bahmani 2016; Beder 1999; Erdley 2014) measured depression score using BDI, Since BDI score showed that not all participants reported depressive symptoms at the baseline, or depression was not an inclusion criterion, the intervention was delivered both to prevent and to treat depression. Erdley 2014 reported HRQoL using KDQOL-SF36 and Beder 1999 reported coping using the Psychosocial Adjustment to Illness (PAIS).

None of the four studies measured the outcomes of major depression, depression (any severity), anxiety, or withdrawal from dialysis.

Counselling may reduce depressive symptoms compared to usual care (median follow-up was 13.2 weeks) (Analysis 4.1 (3 studies, 99 participants): BDI score MD -3.84, 95% CI -6.14 to -1.53; I^2 = 31%; low-certainty evidence).

Erdley 2014 (33 participants) reported no difference in HRQoL (Analysis 4.2: KDQOL-SF36 score MD 3.28, 95% CI -3.57 to 10.13) between counselling and usual care.

Beder 1999 (46 participants) reported coping may improve (Analysis 4.3: PAIS scale MD -13.70, 95% CI -16.79 to -10.60) with counselling compared to usual care.

Erdley 2014 reported no difference in withdrawal from treatment (Analysis 4.4: RR 5.28, 95% CI 0.27 to 102.58) between counselling and usual care.

Counselling had uncertain effects on death (any cause), during a median follow-up of 22.8 weeks (Analysis 4.5 (2 studies, 270 participants): RR 1.69, 95% CI 0.32 to 8.81; I^2 = 0%; low-certainty evidence).

Education versus usual care

Espahbodi 2015 reported outcomes for an education intervention during one month in one hour sessions. The group educational sessions provided information about anatomy, pathophysiology, explanation of the causes of kidney failure and treatment, education about dialysis care, problem-solving skills, stress management, adaptive responses, and muscle relaxation. The study measured the depression and anxiety score using the Hospital Anxiety and Depression Scale (HADS) at the end of the study. The study did not measure major depression or depression (any severity) as an outcome. Since the HADS score showed that not all participants reported depressive symptoms at the baseline, the intervention was delivered both to prevent and to treat depression.

Espahbodi 2015 (55 participants) reported no differences in depression (Analysis 5.1: HADS scale MD -1.78, 95% CI -3.66 to 0.10) or anxiety (Analysis 5.2: HADS scale MD -1.26, 95% CI -2.99 to 0.47) scores between education and usual care.

Exercise versus usual care

Four studies evaluating exercise compared to usual care. In Ouzouni 2009, participants followed a 10-month exercise programme during HD treatment 3 times/week for 60 to 90 minutes of cycling and flexibility exercises. In Kouidi 1997, participants did three weekly sessions of exercise training for 6 months. In Kouidi 2010, participants did between 60 and 90 minutes of exercise during the first two hours of dialysis for one year. In Frey 1999, participants cycled on a stationary bicycle ergometers for 3 days/week for 12 weeks.

Depression was assessed as a continuous outcome either as major (or severe) depression and depression (end of treatment). Depression (any severity) was reported as a dichotomous outcome. Since all participants had depressive symptoms, the intervention

was delivered to treat depression. Three studies(Kouidi 1997; Kouidi 2010; Ouzouni 2009) measured depression score using BDI, and Kouidi 2010 reported anxiety using HADS.

Exercise may reduce the risk of major depression (Analysis 6.1 (3 studies, 108 participants): RR 0.47, 95% CI 0.27 to 0.81; I^2 = 50%; low-certainty evidence) after a median study follow-up of 44 weeks. Exercise probably decreases risk of depression of any severity (Analysis 6.2 (3 studies, 108 participants): RR 0.69, 95% CI 0.54 to 0.87; I^2 = 38%; moderate-certainty evidence), and probably decreases depressive symptoms (Analysis 6.3 (3 studies, 108 participants): BDI score MD -7.61, 95% CI -9.59 to -5.63; I^2 = 0%; moderate-certainty evidence) during a median follow-up of 44 weeks.

Two studies (Kouidi 1997; Ouzouni 2009) measured HRQoL using the Quality of Life Index (Spitzer Index) (QLI) translated for a Greek population. Exercise may improve HRQoL (Analysis 6.4 (64 participants): QLI score MD 3.06, 95% CI 2.29 to 3.83; I^2 = 0%; low-certainty evidence) after a median study follow-up of 35.2 weeks. All three studies reported that no adverse events occurred (Table 2).

Kouidi 2010 (44 participants) reported exercise may reduce anxiety compared to sedentary control group (Analysis 6.5: HADS score MD -2.27, 95% CI -3.55 to -0.99).

Frey 1999 (11 participants) reported two hospitalisations in the exercise group (Analysis 6.6: RR 5.83, 95% CI 0.34 to 99.23).

None of the studies measured withdrawal from dialysis, withdrawal from intervention, or death from any cause.

Exercise versus exercise

Dziubek 2016 reported outcomes for two different types of exercise during six months for three times a week. The intervention group performed the endurance training, while the control group performed the resistance training during the first two hours of HD. Depression was measured using BDI. Since BDI score showed that not all participants reported depressive symptoms at the baseline, the intervention was delivered both to prevent and to treat depression. The study did not measure major depression as an outcome.

Dziubek 2016 (28 participants) reported no differences in the depression score (Analysis 7.1: BDI score MD 0.90, 95% CI -5.44 to 7.24) or death (any cause) (Analysis 7.2: RR 0.25, 95% CI 0.03 to 2.22) between the two types of exercise.

No other review outcomes were measured.

Exercise versus support group

Carney 1987 compared exercise (three weekly exercise for 45 to 60 minutes of callisthenics, stationary bicycling, and walking at 50-60% of V_{02max}) for six months compared to a support group for 60 to 90 minutes twice a week. The study measured treatment effects on major depression, depression score using BDI, and HRQoL according to the Pleasant Events Schedule (PES). Depression was assessed as a continuous outcome either as major (or severe) depression and depression (end of treatment). Since depression was not an inclusion criterion, the intervention was delivered both to prevent and to treat depression.

Carney 1987 (17 participants) reported exercise may reduce major depression (Analysis 8.1: RR 0.14, 95% CI 0.02 to 0.95) and depression score (Analysis 8.2: BDI score MD -6.80, 95% CI -9.46 to -4.14) compared to support group, while there was no difference in HRQoL between the groups (Analysis 8.3: PES score MD -20.50, 95% CI -65.07 to 24.07).

No other review outcomes were measured.

Meditation versus usual care

Thomas 2017 compared mindfulness meditative practice three times/week during HD (body scan, guided meditation, silent meditation, and arm movement for 10 to 15 minutes) for eight weeks to usual care. Symptoms of depression and anxiety were measured using the Patient Health Questionnaire (PHQ) and the General Anxiety Disorder (GAD), respectively. The study did not measure major depression or depression (any severity) as an outcome. Since the included population had depressive symptoms in the inclusion criteria, the intervention was delivered to treat depression.

Thomas 2017 (32 participants) reported no differences between the two groups for either depression (Analysis 9.1: PHQ score MD 2.00, 95% CI -1.90 to 5.90) or anxiety scores (Analysis 9.2: GAD score MD 1.90, 95% CI -1.31 to 5.11).

The investigators reported that no adverse events occurred (Table 2).

Motivational interviewing versus motivational interviewing

Leake 1999 compared motivational interviewing with another motivational interviewing technique for one month, with no extractable data for meta-analysis.

Motivational interviewing versus education

Leake 1999 compared motivational interviewing with education about dialysis delivered by video for one month, with no extractable data for meta-analysis.

Relaxation techniques versus usual care

Two studies compared relaxation techniques to usual care. In Heshmatifar 2015, participants did relaxation exercises (Benson technique) for 20 minutes during each HD session as well as twice a day (for 20 minutes) at home over one month. In Tsai 2015, participants did eight sessions of breathing training (guided by an audio device) over four weeks. The studies did not measure major depression or depression (any severity) as an outcome. These studies measured depression score using BDI. Since BDI score showed that not all participants reported depressive symptoms at the baseline, or the enrolled participants did not report depressive symptoms at the beginning of the study, the intervention was delivered both to prevent and to treat depression.

Relaxation techniques may reduce depressive symptoms (Analysis 10.1 (2 studies, 122 participants): BDI score MD -5.77, 95% CI -8.76 to -2.78; I^2 = 0%; moderate-certainty evidence), after a median study follow-up of 4.2 weeks.

Tsai 2015 measured HRQoL using the Short Form Health Survey (SF-36). Tsai 2015 (64 participants) reported no differences between relaxation and usual care for either HRQoL (Analysis 10.2: SF-36 score MD 2.36, 95% CI -4.72 to 9.44) or hospitalisation (Analysis 10.3: RR 0.14, 95% CI 0.01 to 2.66).

Other review outcomes including adverse events were not measured.

Relaxation with imagery techniques versus imagery techniques

Krespi 2009 compared relaxation techniques with imagery visualisation delivered using audio recordings with imagery visualisation alone for nine weeks, with no extractable data for meta-analysis.

Spiritual practice versus usual care

Spiritual practices were evaluated in two studies. In Matthews 2001, prayer (prayers offered by religious personnel over five minutes for five days a week for six weeks and in a group once a week) was compared to usual care or positive visualization in a factorial study design. In Babamohamadi 2017, participants listened to a Qur'an recitation three times a week for 20 minutes for one month. Neither of the two studies measured major depression, withdrawal from dialysis, withdrawal from intervention, or death from any cause. The studies did not measure major depression or depression (any severity) as an outcome. Matthews 2001 measured anxiety and psychological symptoms using the Brief Symptom Inventory (BSI), and HRQoL using SF-36. Since depression was not an inclusion criterion, the intervention was delivered both to prevent and to treat depression. Depression scores were measured using either the BDI (Babamohamadi 2017) or BSI (Matthews 2001).

As a rule of thumb, at least 0.8 SMD represented a large effect size (Cohen 1988), and spiritual practices had uncertain effects on depressive symptoms (Analysis 11.2 (2 studies, 116 participants): BDI and BSI score SMD -1.00, 95% CI -3.52 to 1.53; $I^2 = 97\%$; very low certainty evidence), after a median study follow-up of 5.2 weeks.

Matthews 2001 (60 participants) reported no differences between spiritual practice versus usual care for HRQoL (Analysis 11.1: SF-36 score MD -1.02, 95% CI -3.31 to 1.27), anxiety (Analysis 11.3: BSI score MD -0.18, 95% CI -5.48 to 5.12) or psychological symptoms (Analysis 11.4: BSI score MD 0.82, 95% CI -1.54 to 3.18).

Spiritual practice versus exercise

Frih 2017 compared the spiritual practice (listening to Holy Qur'an recitation) to recitation practice with endurance resistance physical training, or physical training alone and measured depression score using HADS, HRQoL (SF-36) and anxiety score (HADS) at 24 weeks. The study did not measure major depression or depression (any severity) as an outcome. Since the HADS score showed that all participants reported depressive symptoms at the baseline, the intervention was delivered to treat depression.

Frih 2017 (53 participants) reported that spiritual practice may reduce depression (Analysis 12.1: HADS score MD -1.90, 95% CI -2.95 to -0.85) and anxiety (Analysis 12.4: HADS score MD -3.90, 95% CI -4.79 to -3.01), and may improve QoL (mental component summary: Analysis 12.2: SF-36 score MD 15.60, 95% CI 9.84 to 21.36; physical component summary: Analysis 12.3: SF-36 score MD 5.10, 95% CI -0.19 to 10.39).

Other review outcomes including adverse events were not measured.

Spiritual practice versus visualisation

Matthews 2001 evaluated spiritual practice versus positive visualisation for six weeks. The study did not measure major depression or depression (any severity) as an outcome. This study measured depression, anxiety and psychological symptoms using BSI, and HRQoL using SF-36. Since depression was not an inclusion criterion, the intervention was delivered both to prevent and to treat depression.

Matthews 2001 reported no differences in scores for depression (Analysis 13.1: BSI score MD 2.86, 95% CI -2.91 to 8.63), HRQoL (Analysis 13.2: SF-36 score MD -1.03, 95% CI -10.80 to 8.74), anxiety (Analysis 13.3: BSI score MD -1.20, 95% CI -4.76 to 2.36), and psychological symptoms (Analysis 13.4: BSI score MD 1.25, 95% CI -1.10 to 3.60).

Social activity versus usual care

Sertoz 2009 evaluated social activity (rehearsing and performing in a theatre play for 4 months) versus usual care. The study did not measure major depression or depression (any severity) as an outcome. Since BDI score showed that not all participants reported depressive symptoms at the baseline, the intervention was delivered both to prevent and to treat depression. The study measured depression score using BDI, HRQoL using the Turkish version of the World Health Organization Quality of Life Scale short form (WHOQOL-Bref), anxiety using BAI, and self-esteem using the Turkish version of the Rosenberg Self-Esteem Scale (RSES).

Sertoz 2009 (31 participants) reported no differences in scores for depression (Analysis 14.1: BDI score MD -2.60, 95% CI -7.03 to 1.83), HRQoL (Analysis 14.2: WHOQOL-BREF score MD -1.70, 95% CI -3.55 to 0.15), anxiety (Analysis 14.3: BAI score MD 1.60, 95% CI -7.00 to 10.20), and self-esteem (Analysis 14.4: RSES score MD -0.40, 95% CI -1.36 to 0.56).

Telephone support versus usual care

Kargar Jahromi 2016 evaluated telephone support (tele-nursing consisting of a 30 minutes phone call 30 days after a dialysis shift to discuss communication, cognition/development, breathing/circulation, nutrition, elimination, sleep, pain/perception, skin/tissue, sexuality/reproduction, activity, psychosocial/spirituality/culture) versus usual care. The study did not measure major depression or depression (any severity) as an outcome. Since DASS score showed that all participants reported depressive symptoms at the baseline, the intervention was delivered to treat depression. Depression, anxiety, and stress scores were measured using DASS. Outcomes of withdrawal from dialysis and death from any cause were measured.

Kargar Jahromi 2016 reported telephone support may improve depression (Analysis 15.1: DASS score MD -7.24, 95% CI -7.99 to -6.49), anxiety (Analysis 15.2: DASS score MD -8.04, 95% CI -8.86 to -7.22), and stress scores (Analysis 15.3: DASS score MD -5.40, 95% CI -6.07 to -4.73), but made no difference to withdrawal from dialysis (Analysis 15.4: RR 5.00, 95% CI 0.25 to 99.95) or death (Analysis 15.5: RR 0.33, 95% CI 0.01 to 7.87).

Telephone support and cognitive-behavioural therapy versus cognitive-behavioural therapy

iDiD 2016 evaluated telephone support and CBT versus CBT for 12 weeks. The study did not measure major depression or depression

(any severity) as an outcome. Since all the included population had depressive symptoms in the inclusion criteria, the intervention was delivered to treat depression. This study measured depression score using PHQ, anxiety using GAD and QoL using the EuroQoL scale (EQ-5D),

iDiD 2016 reported no differences in depression (Analysis 16.1: PHQ score MD -0.10, 95% CI -4.47 to 4.27), QoL (Analysis 16.2: EQ-5D score MD 4.90, 95% CI -10.42 to 20.22), anxiety (Analysis 16.3: GAD score MD 0.50, 95% CI -2.84 to 3.84) and death (Analysis 16.4: RR 1.26, 95% CI 0.06 to 27.82).

Adverse events of telephone support and CBT were rarely reported (Table 2).

Voice recording versus usual care

Bargiel-Matusiewicz 2011a evaluated a voice recording of a psychological intervention listened to twice a day for 3 weeks versus usual care. Data could not be extracted.

DISCUSSION

Summary of main results

In this update, we included 33 studies (2056 participants) comparing a psychosocial intervention with a second psychosocial intervention or usual care on depression, HRQoL, anxiety, hospitalisation, withdrawal from treatment, or death (any cause) in adult patients with ESKD treated with dialysis. All studies involved patients treated with HD. In addition, we identified seven ongoing studies.

Interventions included (in alphabetical order) acupressure, CBT, counselling, education, exercise, meditation, relaxation techniques, spiritual practice, social activity, and telephone support. The primary outcome of depression was predominantly measured as a depression score using BDI. HRQoL was measured using a range of instruments. Adverse events were infrequently reported and evidence of adverse events was very uncertain.

The duration of study follow-up ranged between three weeks and one year. Studies included between nine and 235 participants. The mean study age ranged between 36.1 and 73.9 years.

We noted that random sequence generation and allocation concealment were at low risk of bias in eight and one studies, respectively. One study reported low risk methods for blinding of participants and investigators, and outcome assessment was blinded in seven studies. Twelve studies were at low risk of attrition bias, eight studies were at low risk of selective reporting bias, and twenty-one studies were at low risk of other potential sources of bias.

Depressive outcomes were assessed in heterogeneous way. Depression was assessed as a continuous outcome either as major (or severe) depression and depression (end of treatment). In addition, the severity of depressive symptoms was assessed as a dichotomous outcome. Since the enrolled population had/did not have depressive symptoms in the inclusion criteria, the intervention was delivered both to treat and to prevent depression.

We found moderate certainty evidence that CBT probably improves depression symptoms (4 studies, 230 participants: BDI score MD -6.10, 95% CI -8.63 to -3.57) and HRQoL (4 studies, 230 participants: KDQOL-SF36 and QoL scale SMD 0.51, 95% CI 0.19 to 0.83) compared to usual care. CBT makes no difference in suicide risk (one study), but may reduce anxiety (one study) and distorted thinking (one study) compared to usual care. No studies measured hospitalisation.

We found low-certainty evidence that counselling may reduce depressive symptoms slightly (3 studies, 99 participants: BDI score MD -3.84, 95% CI -6.14 to -1.53) compared to usual care. Counselling makes no difference in HRQoL (one study) compared to usual care. Counselling studies did not measure risk of major depression, suicide, or hospitalisation.

Low-certainty evidence indicates exercise may reduce or prevent major depression (3 studies, 108 participants: RR 0.47, 95% CI 0.27 to 0.81), depression of any severity (3 studies, 108 participants: RR 0.69, 95% CI 0.54 to 0.87) and HRQoL (2 studies, 64 participants: QLI score MD 3.06, 95% CI 2.29 to 3.83) compared to usual care. In moderate-certainty evidence, exercise probably improves depression symptoms (3 studies, 108 participants: BDI score MD -7.61, 95% CI -9.59 to -5.63). Exercise may reduce anxiety (one study) compared to sedentary control group. No studies measured suicide risk or withdrawal from dialysis.

We found moderate-certainty evidence that relaxation techniques probably reduce depressive symptoms (2 studies, 122 participants: BDI score MD -5.77, 95% CI -8.76 to -2.78). Relaxation techniques make no differences in HRQoL (one study) and hospitalisation (one study) compared to usual care. Counselling studies did not measure risk of major depression or suicide.

Spiritual practices have uncertain effects on depressive symptoms, since a rule of thumb, at least 0.8 SMD represented a large effect size (Cohen 1988) (2 studies, 116 participants: BDI and BSI score SMD -1.00, 95% CI -3.52 to 1.53; very low certainty evidence). Spiritual practices report no difference in anxiety (one study), psychological symptoms (one study) and HRQoL (one study), when compared with usual care. No study measured suicide risk, withdrawal from dialysis, or hospitalisation.

There were few or no data on acupressure, telephone support, meditation and adverse events related to psychosocial interventions.

Overall, there was insufficient evidence to conduct subgroup and sensitivity analyses.

Overall completeness and applicability of evidence

This review found that studies evaluating specific psychosocial interventions to prevent and treat depression for adult dialysis patients are few. Meta-analyses for the primary outcome of depression included four of fewer studies for all interventions. Due to the small number of studies and heterogeneity of psychosocial interventions, it was not possible to assess whether treatment effects differed according to duration of treatment or patient clinical and demographic characteristics. Studies did not measure effects of treatment in patients treated with peritoneal dialysis. The psychosocial interventions were not standardised, and we could not be certain whether comparisons by type of intervention were always equivalent. In addition, due to the large variability of psychosocial interventions, the assessment and the implementation in clinical practice and the associated resource use might be challenging. The external validity of the review may be limited as most of the studies were not specifically designed to examine interventions in patients with a prespecified diagnosis of depression, were conduct-

ed in higher income countries, and were frequently continued for a few weeks.

Standardisation of outcome reporting in future psychosocial intervention trials as prioritised by the Standardised Outcomes in Nephrology (SONG) by patients, caregivers and health professionals may assist to improve the evidence base for nephrology trials. In the HD setting, this would include the compulsory reporting of end points for fatigue, cardiovascular disease, vascular access, and death (SONG-HD). Based on SONG-HD, priority outcomes for trials of psychosocial interventions might include the outcomes of depression, the ability to travel, ability to work, dialysis-free time, impact on family/friends, mobility, pain, cognition, financial impact, food enjoyment, itching, nausea/vomiting, restless legs syndrome, sexual function, and sleep. Consistent measures for these outcomes would improve our confidence in the results of available studies.

Potential adverse events are not well understood based on existing studies.

Quality of the evidence

We used the GRADE process to consider the effect of study limitations on our outcomes. The overall certainty of the evidence for depression outcomes was moderate, meaning additional studies will increase our confidence in the results. We found that many studies did not report adequate methods of randomisation and due to the nature of the interventions, blinding of investigators and participants was not possible. Empirical evidence suggests that treatment effects may be exaggerated when allocation concealment and blinding are not reported within trials, although this is particularly relevant for subjective outcomes including symptoms and adverse events (Wood 2008). As many clinical outcomes such as depression, HRQoL, and anxiety were measured using a self-rating scale by participants who were aware of treatment assignment, many studies were at high risk of bias for outcome assessment. Minimisation of selection and detection bias in future research studies would increase the certainty of treatment benefits and harms. The limited number of studies prevented exploration of potential sources of heterogeneity in the analyses.

Potential biases in the review process

This review was carried out using standard Cochrane methods. Each step was completed independently by at least two authors including selection of studies, data management, and risk of bias assessment, thus reducing the risks of errors in identification of eligible studies and adjudication of evidence certainty. A highly sensitive search of the Cochrane Kidney Transplant specialised register was completed without language restriction in June 2019. The registry contains hand-searched literature and conference proceedings, maximising the inclusion of grey literature in this review. Many studies did not report key outcomes in a format available for meta-analysis. Formal assessment for publication bias through visualisation of asymmetry in funnel plots was precluded for many treatments and outcomes because of few studies.

Agreements and disagreements with other studies or reviews

Few studies have examined the efficacy of psychosocial interventions for people with CKD and the number of meta-analysis published in this field is limited. The current Cochrane review is consistent with the findings of systematic review and meta-analysis of published RCTs evaluating psychosocial interventions for depressive and anxiety symptoms in individuals with CKD (Pascoe 2017). In that review that included eight studies, the authors found that psychosocial interventions (empowerment program, QoL therapy, liquid-intake program, preparing patients for end-of-life) reduced depressive symptoms and slightly improved HRQoL for patients and caregivers. Differences between Pascoe 2017 and this review update were related to the inclusion of all patients in CKD (stages 3 to 5) and adults approved for kidney transplantation, languages restrictions in the search strategy, and limited consideration of evidence certainty when drawing conclusions about treatment effects. A second meta-analysis of RCTs evaluating psychological interventions to prevent or treat depression in HD patients included eight studies. Interventions included CBT, rational-emotive therapy, adaptation training programme, and visual imagery (Xing 2016). In that analysis, GRADE was not used to evaluate evidence certainty, and the outcome of depression symptoms included different measurement tools. Psychological interventions decreased depressive symptoms but did not improve HRQoL.

In our previous Cochrane review of antidepressant medication (4 studies, 170 participants) for treating depression in adults with ESKD treated with dialysis, medication may reduce depressive symptoms when compared to placebo, but there was low certainty about whether medication made any difference to depression symptoms compared to psychological interventions (Palmer 2016).

AUTHORS' CONCLUSIONS

Implications for practice

Our updated review suggests there is now moderate certainty that CBT, exercise and relaxation techniques probably reduce depressive symptoms for patients treated with long-term dialysis when compared to usual care, although the small number of studies with few enrolled participants lead to considerable uncertainty, and may not provide sufficient evidence to inform clinical practice. The evidence to support improvements in HRQoL with psychosocial strategies is of lower certainty, and current studies are limited to short-term follow-up. Since CBT probably decreases depression and improves HRQoL, Internet-based treatments could reduce waiting-lists and save therapist time compared with traditional interventions (Cuijpers 2008). In most studies, interventions were very brief (often a few weeks) and variable in structure and delivery. Other interventions such as spiritual practices and meditation had uncertain effects on depression, anxiety, and HRQoL. It was not possible to detect whether treatment effects differed by intensity (one-on-one or group, frequency) or for different patient groups. Evidence is largely lacking in the setting of PD or home-based HD. It is not possible to definitively establish the impact of psychosocial interventions on major depression, anxiety, withdrawal from dialysis, or death from any cause. The potential adverse events of treatment are largely unknown.

Implications for research

Further research is likely to change the estimated effects of different psychosocial interventions in dialysis patients with or without depressive symptoms, and increase our certainty of the evidence based on limitations in existing studies and a paucity of evidence for specific clinical questions. Given the high symptom burden experienced by dialysis patients, together with the prioritisation of

research informing symptom management, new research initiatives for preventing and treating depression would address important clinical uncertainties. Depression was assessed using different tools, outcomes data were measured in heterogeneous ways and the aim of the intervention was delivered either to prevent or to treat dialysis patients with or without depressive symptoms. The findings of this review suggest that CBT, exercise, and relaxation techniques are promising interventions for improving symptoms for dialysis patients that warrant further research. Based on this review, future studies of exercise and CBT would increase our certainty about whether these interventions improve patient well-being. Systematic assessment of adverse events would inform the design of such interventions for wider use.

Researchers investigating psychosocial treatments should consider standardised interventions, efficient study design to provide adequate statistical power to detect outcome measures, blinding of outcome assessment for subjective outcomes, and inclusion of all participants in the outcome assessments regardless of whether they complete the intervention as designed. Future psychosocial interventions studies should be designed to evaluate patient-centred core outcomes based on SONG-HD such as HRQoL, impaired mobility, and inability to participate in life and work that are becoming new priorities to aid in clinical decision-making.

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References to other published versions of this review

Rabindranath 2003

Rabindranath KS, MacLeod AM, Daly C, Roderick P, Butler J, Wallace S. Psychosocial interventions for depression in dialysis patients. *Cochrane Database of Systematic Reviews* 2003, Issue 4. [DOI: 10.1002/14651858.CD004542]

Rabindranath 2005

Rabindranath KS, Daly C, Butler JA, Roderick PJ, Wallace S, Macleod AM. Psychosocial interventions for depression in dialysis patients. *Cochrane Database of Systematic Reviews* 2005, Issue 3. [DOI: 10.1002/14651858.CD004542.pub2]

* Indicates the major publication for the study

CHARACTERISTICS OF STUDIES

Characteristics of included studies *[ordered by study ID]*

Al Saraireh 2018

Methods	• Study design: parallel RCT • Time frame: January to April 2017 • Follow-up period: 3 months (7 dialysis session)
Participants	• Country: Jordan • Setting: multicentre (5) • Inclusion criteria: patients undergoing HD; received no antidepressants at the time of enrolment in the study; had diagnosis of CKD and were on chronic dialysis for at least 1 year prior to the study; were able to comprehend and communicate verbally • Number (analysed/randomised): treatment group (54/65); control group (51/65) • Hamilton score at baseline: treatment group (19.5 ± 5.4); control group (19.6 ± 5.4) • Mean age ± SD (years): treatment group (53.4 ± 8.0); control group (52.0 ± 10.7) • Sex (M/F): treatment group (not reported); control group (not reported) • Antidepressant medication: none of the participant was on antidepressants agents

Al Saraireh 2018 *(Continued)*

- Exclusion criteria: not reported

Interventions	Treatment group • CBT Control group • Psychoeducation therapy Co-interventions • Not reported
Outcomes	• Depression * HAM-D: the scale has 17 multiple choice items to rate the severity of depression in adults. A score from 0 to 7 indicates no depression, 8 to 13 mild depression, 14 to 18 moderate depression, 19 to 22 severe depression, and > 23 very severe depression
Notes	• Funding source: none • Corresponding author: Faris A. Al saraireh (faa13@case.edu)

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "This study was a randomised clinical trial in which patients were randomly assigned to one of two treatment groups using a random number generator." Comment: Random number generator is considered as low risk of bias
Allocation concealment (selection bias)	Unclear risk	Method of allocation concealment was not reported in sufficient detail to perform an adjudication
Blinding of participants and personnel (performance bias) All outcomes	High risk	Blinding of participants and/or the investigators was not reported. However, the methods of intervention and control treatment were physically different, and therefore masking of intervention was unlikely
Blinding of outcome assessment (detection bias) All outcomes	High risk	Quote: "Hamilton depression rating scale was completed by the participants in both groups prior to the therapies and after completion." Comment: The Hamilton depression rating scale was completed by participants before and after interventions. Participants were likely to be aware of the intervention they received. Therefore, the outcome assessment for depression was not blinded
Incomplete outcome data (attrition bias) All outcomes	High risk	Quote: "Only 130 patients agreed to participate in the study, and were randomly assigned to one of the two groups (N = 65 in each). Of the 130 participants, 14 dropped out from the psychoeducation group and 11 from the CBT group, making the number of participants who completed the study 105 (51 and 54)." Comment: 54/65 in the treatment group and 51/65 in the control group completed the study.
Selective reporting (reporting bias)	High risk	There was no published protocol for this study. This study did not report many patient-centred outcomes that might be expected for a study of this type (i.e. life participation, fatigue, dialysis withdrawal, adverse events, death)

Al Saraireh 2018 *(Continued)*

Other bias	Low risk	No evidence of other sources of bias

Babamohamadi 2017

Methods	• Study design: parallel RCT • Time frame: not reported • Follow-up period: 1 month
Participants	• Country: Iran • Setting: single centre (Shahid Mahalati hospital in Tabriz, Iran) • Inclusion criteria: aged 18 to 65 years; a BDI-II score ≥ 20; willingness to listen to recitation of the Holy Qur'an; having command of the Arabic language (on which the Qur'an is based); having a history of HD treatment for at least 6 months; haemodynamically stable; not using antidepressant drugs; not having acute mental problems or impaired level of consciousness; provided informed consent to participate in the study • Number (analysed/randomised): treatment group (27/30); control group (27/30) • BDI score at baseline: treatment group (33.6 ± 6.7); control group (29.3 ± 9.0) • Mean age ± SD (years): treatment group (50.2 ± 12.9); control group (56.4 ± 8.9) • Sex (M/F): treatment group (14/13); control group (17/10) • Antidepressant medication: none of the participant was on antidepressants agents • Exclusion criteria: mental disabilities or hearing impairment; history of mental illness or hospitalisation in the psychiatric hospital; significant change in medical or psychiatric condition during the course of the study
Interventions	Treatment group • Listened to recitation of the Holy Qur'an Control group • No intervention Co-interventions • Not reported
Outcomes	• Depression * BDI: the absence of depression (scores of 0 to 9), mild depression (10 to 19), moderate depression (20 to 29), relatively severe depression (30 to 39), and severe depression (40 to 63)
Notes	• Funding source: This study was based on a master's thesis in Critical Care Nursing and a research plan approved by the Nursing and Allied Health School at Semnan University of Medical Sciences that gave permission and financial support • Corresponding author: N. Sotodehasl (sotodeh1@yahoo.com)

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Quote: "The present study was a clinical trial involving 60 haemodialysis patients randomly assigned to either an experimental or a control group." Comment: Sequence generation methods were not reported in sufficient detail to perform an adjudication

Babamohamadi 2017 *(Continued)*

Allocation concealment (selection bias)	Unclear risk	Method of allocation concealment was not reported in sufficient detail to perform an adjudication
Blinding of participants and personnel (performance bias) All outcomes	High risk	Blinding of participants and/or the investigators was not reported. However, the methods of intervention and control treatment were physically different, and therefore masking of intervention was unlikely
Blinding of outcome assessment (detection bias) All outcomes	High risk	Quote: "The Beck Depression Inventory (BDI-II) was self-completed at baseline before the start of dialysis and the first session, and then again 1 month from baseline when the intervention was completed." Comment: The BDI-II was completed by participants before and after interventions. Participants were likely to be aware of the intervention they received. Therefore, the outcome assessment for depression was not blinded
Incomplete outcome data (attrition bias) All outcomes	Low risk	Quote: "Three participants in each group did not complete the follow-up evaluation at 1 month because of deterioration in their medical or psychiatric condition that prevented further participation or inability to complete the follow-up evaluation." Comment: 3/30 in the intervention group and 3/30 in the control group were lost to the follow-up (10% loss to follow-up; there was not a differential loss between groups)
Selective reporting (reporting bias)	High risk	There was no published protocol for this study. This study did not report many patient-centred outcomes that might be expected for a study of this type (i.e. life participation, fatigue, dialysis withdrawal, adverse events, death)
Other bias	Low risk	There was no evidence of imbalance at baseline. No interim analyses were reported. Funding was not involved into the analysis. There were no other apparent sources of bias

Bahmani 2016

Methods	• Study design: parallel RCT • Time frame: not reported • Follow-up period: 3 months
Participants	• Country: Iran • Setting: single centre (Shahid Hasheminejad Hospital dialysis section, Iran) • Inclusion criteria: female patients with ESKD who were required to refer to the treatment centre 2 to 3 times/week • Number (analysed/randomised): treatment group (9/11); control group (11/11) • BDI score at baseline: treatment group (16.37 ± 9.37); control group (19.09 ± 9.01) • Mean age ± SD (years): not reported • Sex (M/F): treatment group (0/11); control group (0/11) • Antidepressant medication: not reported • Exclusion criteria: not reported
Interventions	Treatment group • Combination of treatment including some elements of "existentialism" philosophy and a "cognitive" approach, 12 sessions of 90 minutes 2 days/week Control group

Bahmani 2016 *(Continued)*

	• No intervention Co-interventions • Not reported

Outcomes	• Depression
	  * BDI-II: score lower than 14 defines the minimum level of depression, between 14 to 19 is considered mild, 20 to 28 is moderate, and 29 to 63 is interpreted as a high level of depression
	• Hope
	  * MHS

Notes	• Funding source: not reported • Trial registration identification number: not reported • Corresponding author: M. M. Najjar (maryam.motamed@gmail.com)

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "The patients were randomly assigned into two groups of experimental and control conditions." Comment: Sequence generation methods were not reported in sufficient detail to perform an adjudication
Allocation concealment (selection bias)	Unclear risk	Method of allocation concealment was not reported in sufficient detail to perform an adjudication
Blinding of participants and personnel (performance bias) All outcomes	High risk	Blinding of participants and/or the investigators was not reported. However, the methods of intervention and control treatment were physically different, and therefore masking of intervention was unlikely
Blinding of outcome assessment (detection bias) All outcomes	High risk	Quote: "The tool is used for self-report of signs of depression for individuals above 13 years old and higher." Comment: BDI-II was completed by participants. Participants were likely to be aware of the intervention they received. Therefore, the outcome assessment for depression was not blinded
Incomplete outcome data (attrition bias) All outcomes	High risk	Quote: "Two of the participants in the experimental group withdrew their participation due to personal problems." Comment: 2/11 in the intervention group and 0/11 in the control group were lost to the follow-up for reasons that appeared unrelated to the treatment (> 10% loss to follow-up; there was a differential loss between groups)
Selective reporting (reporting bias)	High risk	There was no published protocol for this study. This study did not report many patient-centred outcomes that might be expected for a study of this type (i.e. life participation, fatigue, dialysis withdrawal, adverse events, death)
Other bias	Unclear risk	It was not clear if there was evidence of imbalance at baseline. Not reported in sufficient detail to perform an adjudication

Bargiel-Matusiewicz 2011

Methods	• Study design: parallel RCT • Time frame: 2007 to 2008 • Follow-up period: 3 weeks
Participants	• Country: Poland • Setting: not reported • Inclusion criteria: fully informed and consenting patients with the ESKD (HD) • Number (analysed/randomised): treatment group (30/not reported); control group (30/not reported) • Overall anxiety score at baseline: 3.42 ± 0.64; depression was not reported • Mean age ± SD: 50.17 ± 11.76 years (not reported for individual groups) • Sex (M/F): 54.2%/45.8% • Antidepressant medication: not reported as depression was not an inclusion criterion • Exclusion criteria: not reported
Interventions	Treatment group • Psychological intervention: listened to a CD with a psychological intervention twice a day during 3 weeks. The duration of the recording was 20 minutes Control group • Usual care Co-interventions • None reported

Outcomes	• Anxiety
	  * STAI
	• Cognitive function
	  * Cognitive Appraisal Inventory
	  ☐ Challenge
	  ☐ Threat
	  ☐ Harm/loss

Notes	• Funding source: This project was supported by The Polish Ministry of Science and Higher Education • Trial registration identification number: not reported • Corresponding author: K. Bargiel-Matusiewicz (kmatusiewicz@psych.uw.edu.pl)

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "The dialyzed patients were randomly assigned to the control or experimental group and filled a set of questionnaires during researchers' first visit." Comment: Sequence generation methods were not reported in sufficient detail to perform an adjudication
Allocation concealment (selection bias)	Unclear risk	Method of allocation concealment was not reported in sufficient detail to perform an adjudication
Blinding of participants and personnel (performance bias) All outcomes	High risk	Blinding of participants and/or the investigators was not reported. However, the methods of intervention and control treatment were physically different, and therefore masking of intervention was unlikely

Bargiel-Matusiewicz 2011 *(Continued)*

Blinding of outcome assessment (detection bias) All outcomes	High risk	Quote: "The instruments were the Cognitive Appraisal Inventory and the State-Trait Anxiety Inventory (STAI)." Comment: The STAI was completed by participants before and after interventions. Participants were likely to be aware of the intervention they received. Therefore, the outcome assessment for anxiety was not blinded. It was not reported who completed the cognitive assessment measure. Therefore it was unclear whether the completion of this outcome was blinded
Incomplete outcome data (attrition bias) All outcomes	Low risk	The number of participants randomised was 62. The number of participants included in analyses was 60. The reasons for withdrawal or non-inclusion in analyses were not reported
Selective reporting (reporting bias)	High risk	There was no published protocol for this study. This study did not report many patient-centred outcomes that might be expected for a study of this type (i.e. life participation, fatigue, dialysis withdrawal, adverse events, depression)
Other bias	Low risk	No evidence of other sources of bias

Bargiel-Matusiewicz 2011a

Methods	• Study design: parallel RCT • Time frame: not reported • Follow-up period: 5 weeks
Participants	• Country: not reported • Setting: not reported • Inclusion criteria: 171 fully informed and consenting patients with ESKD and with multiple sclerosis • Number (analysed/randomised): not reported/171 • Mean age ± SD (years): not reported • Sex (M/F): not reported • Antidepressant medication: not reported • Exclusion criteria: not reported
Interventions	Treatment group • Psychological intervention (not described) Control group • Usual care Co-interventions • Not reported
Outcomes	• Acceptance of illness * AIS
Notes	• Abstract-only publication • Funding source: not reported • Trial registration identification number: not reported • Corresponding author: not reported.
Risk of bias	

Bargiel-Matusiewicz 2011a *(Continued)*

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Sequence generation methods were not reported in sufficient detail to perform an adjudication
Allocation concealment (selection bias)	Unclear risk	Method of allocation concealment was not reported in sufficient detail to perform an adjudication
Blinding of participants and personnel (performance bias) All outcomes	High risk	Blinding of participants and/or the investigators was not reported. However, the methods of intervention and control treatment were physically different, and therefore masking of intervention was unlikely
Blinding of outcome assessment (detection bias) All outcomes	High risk	The AIS was a self-reported measurement. As such, the outcome assessment was conducted by participants who could be aware of the treatment received. We judged the outcome assessment to be at high risk of bias for these outcome measures
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Not reported in sufficient detail to perform an adjudication
Selective reporting (reporting bias)	Unclear risk	Not reported in sufficient detail to perform an adjudication
Other bias	Unclear risk	It was not clear if there was evidence of imbalance at baseline. Not reported in sufficient detail to perform an adjudication

Beder 1999

Methods	• Study design: parallel RCT • Time frame: not reported • Follow-up period: 3 months
Participants	• Country: USA • Setting: single centre (Winthrop University Hospital Dialysis Center) • Inclusion criteria: patients with ESRD undergoing HD • Number (analysed/randomised): treatment group (23/23); control group (23/23) • BDI score at baseline indicated 76% of the cohort registered mild to moderate levels of depression and 24% were moderately to severely depressed) • Mean age: treatment group (60.7 years); control group (63.3 years) • Sex (M/F): treatment group (14/9); control group (15/8) • Antidepressant medication: not reported • Exclusion criteria: not reported
Interventions	Treatment group • Social worker services with counselling component Control group • Social worker services Co-interventions

Beder 1999 *(Continued)*

	• Not reported

Outcomes	• Depression
	  * BDI-II: the absence of depression (scores of 0 to 9), mild depression (10 to 19), moderate depression (20 to 29), relatively severe depression (30 to 39), and severe depression (40 to 63)
	• Psychosocial Adjustment
	  * Psychosocial Adjustment to Illness Scale (PAIS)
	• Death (all causes)
	• Hospitalisation

Notes	• Funding Source: not reported • There was no reported registration of the trial within a trial registry, as trial registration was not required in 1999 • Corresponding author: not reported

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "Random assignment to each group–the process whereby cases are assigned to experimental and control groups–ensured that each case had the same probability of being assigned to either group." Comment: Sequence generation methods were not reported in sufficient detail to perform an adjudication
Allocation concealment (selection bias)	Unclear risk	Quote: "The issue of confidentiality was assured as each patient participating in the study was assigned a number by the researcher. All records pertaining to the study were kept off-site in the office of the researcher." Comment: Method of allocation concealment was not reported in sufficient detail to perform an adjudication
Blinding of participants and personnel (performance bias) All outcomes	High risk	Quote: "Patients were not told whether they were in the experimental or control group." Comment: The methods of intervention and control treatment were physically different, and therefore masking of treatment allocation for participants and investigators was unlikely
Blinding of outcome assessment (detection bias) All outcomes	High risk	Quote: "Upon gaining consent to participate, patients were administered the Beck Depression Inventory (BDI-II) and the Psychosocial Adjustment to Illness Scale by the researcher." Comment: BDI-II and the Psychosocial Adjustment to Illness Scale used a subjective measure which was likely to be influenced by knowledge of treatment allocation
Incomplete outcome data (attrition bias) All outcomes	High risk	Quote. "A total of 55 participants were initially interviewed in the study. Before reaching their three month re interview date, four participants died, one began dialysis at home, and four were hospitalised too long to remain in the study (over one week). The final sample consisted of 46 participants; 23 participants were in the experimental group and 23 formed the control group." Comment: Overall, 9/55 were lost to the follow up for reasons that appeared unrelated to treatment (> 10% loss to follow-up, it seems that there was not a differential loss between groups)

Beder 1999 *(Continued)*

Selective reporting (reporting bias)	High risk	There was no published protocol for this study. This study did not report many patient-centred outcomes that might be expected for a study of this type (i.e. life participation, fatigue, dialysis withdrawal, adverse events)
Other bias	Low risk	No evidence of other sources of bias

Carney 1987

Methods	• Study design: parallel RCT • Time frame: not reported • Follow-up period: 6 months
Participants	• Country: USA • Setting: single centre (Chromalloy American Kidney Centre at Barnes Hospital, St. Louis, Mo) • Inclusion criteria: minimum of 6 months of HD; a stable medication, diet and dialysis schedule; aged 18 to 70 years; willingness and motivation to participate • Number (analysed/randomised): treatment group (10/11); control group (7/10) • Mean age ± SD (years): treatment group (36.1 ± 10.1); control group (40.7 ± 14.0) • Sex (M/F): treatment group (5/5); control group (3/4) • Antidepressant medication: not reported • Exclusion criteria: coexisted disease such as unstable coronary artery disease, cardiac arrhythmias, clinically significant valvular heart disease, congestive heart failure, severe retinal disease, insulin-dependent diabetes mellitus, hypothyroidism, or poorly controlled hypertension
Interventions	Treatment group • Aerobic exercise training program Control group • Support group Co-interventions • Medications were not altered during the experimental protocol except in 4 patients whose dosages of antihypertensive drugs were reduced to adjust for the blood pressure-reducing effects of exercise

Outcomes	• Personality
	  * Minnesota Multiphasic Personality Inventory (MMPI)
	• Frequency and enjoyment of pleasant activities
	  * Pleasant Events Schedule (PES)
	• Frequency and enjoyment of unpleasant activities
	  * Unpleasant Events Schedule (UES)
	• Depression
	  * BDI-II: The absence of depression (scores of 0 to 9), mild depression (10 to 19), moderate depression (20 to 29), relatively severe depression (30 to 39), and severe depression (40 to 63)
	  ☐ Hypochondriasis
	  ☐ Depression
	  ☐ Hysteria
	• Cardiopulmonary exercise testing
	  * VO_{2peak}

Notes	• Funding source: Supported by a contract from the Chronic Renal Disease Program NIADDK, NIH, No. N01-AM-9-2221, NIH Grant AM09976, AM07126, NIH Grant RR-0036 (Washington University Clinical Research Centre) and NIH Contract N01-HV2916L

Carney 1987 *(Continued)*

- There was no reported registration of the trial within a trial registry, as trial registration was not required in 1987
- Corresponding author: not reported

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "The patients were randomly assigned to either and exercise training group or to a support group." Comment: Sequence generation methods were not reported in sufficient detail to perform an adjudication
Allocation concealment (selection bias)	Unclear risk	Method of allocation concealment was not reported in sufficient detail to perform an adjudication
Blinding of participants and personnel (performance bias) All outcomes	High risk	Blinding of participants and/or the investigators was not reported. The methods of intervention and control treatment were physically different, and therefore masking of treatment allocation for participants and investigators was unlikely
Blinding of outcome assessment (detection bias) All outcomes	High risk	Quote: "The patients completed three psychological tests." Comment: The outcome related to the oxygen concentration was considered objective. The Minnesota Multiphasic Personality Inventory (MMPI), BDI, the Pleasant Events Schedule (PES) and the Unpleasant Events Schedule (UES) were self-reported measurements. As such, the outcome assessment was conducted by participants who could be aware of the treatment received. We judged the outcome assessment to be at high risk of bias for these outcome measures
Incomplete outcome data (attrition bias) All outcomes	High risk	Quote: "Three patients (1 in the exercise training, 2 in the support group) were unable to remain in treatment due to time pressure related to employment. One patient in the support group refused to complete the baseline psychological assessment. Thus, 10 patients in the exercise training group and 7 patients in the support group completed the study." Comment: 1/11 in the intervention group and 3/10 in the support group were lost to the follow-up for reasons possibly related to the treatment
Selective reporting (reporting bias)	High risk	There was no published protocol for this study. This study did not report many patient-centred outcomes that might be expected for a study of this type (i.e. life participation, fatigue, dialysis withdrawal, adverse events, death)
Other bias	Low risk	No evidence of other sources of bias

Cukor 2014

Methods	• Study design: cross-over RCT • Time frame: not reported • Follow-up period: 6 months
Participants	• Country: USA • Setting: multicentre (2 dialysis units; Brooklyn, New York) • Inclusion criteria: ESKD treatment with HD for at least 6 months and elevated depressive affect (as evidenced on BDI-II score < 10)

Cukor 2014 *(Continued)*

- Number (analysed/randomised): treatment group (33/38); control group (26/27)
- Mean age ± SD (years): not reported
- Sex (M/F): 18/47
- Antidepressant medication: only two participants were being treated with antidepressants (whole cohort)
- Exclusion criteria: Current hospitalisation; altered mental status (Mini-Mental Status Examination score < 23); psychosis; current substance abuse; current ongoing psychotherapy; a change in psychotropic medication in the last 6 months; lack of English proficiency to participate in talk therapy

Interventions	Treatment group • CBT for 3 months Control group • Usual care including psychological and psychopharmacological treatment. However, they did not receive any formal CBT as described in intervention protocol for first 3 months Co-interventions • Not reported
Outcomes	• Depression * BDI-II: absence of depression (scores of 0 to 9), mild depression (10 to 19), moderate depression (20 to 29), relatively severe depression (30 to 39), and severe depression (40 to 63) * DSM-IV ☐ SCID- I ☐ SCID-II * HAM-D • HRQoL * KDQOL-SF36 • Haematological and biochemical data * URR * Serum albumin * SCr * IDWG • Fluid compliance • Comorbid personality disorders • Hospitalisation
Notes	• Funding Source: supported by the National Institutes of Health National Institute of Diabetes and Digestive and Kidney Diseases (award number K23DK076980) • Corresponding author: D. Cukor (Daniel.Cukor@Downstate.edu)

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Sequence generation methods were not reported in sufficient detail to perform an adjudication
Allocation concealment (selection bias)	Unclear risk	Method of allocation concealment was not reported in sufficient detail to perform an adjudication
Blinding of participants and personnel (performance bias)	High risk	Participants and investigators were not blinded to treatment assignment. As the intervention and comparator were physically different, it was unlikely that participants and investigators were unaware of treatment allocation

Cukor 2014 *(Continued)*
All outcomes

Blinding of outcome assessment (detection bias) All outcomes	Low risk	Quote: "All assessments were conducted by an independent assessor who was blind to the participant's treatment condition and diagnostic history. [...] The sample's pretreatment mean scores placed participants in the moderately depressed range, as measured by both clinician administered measures (Hamilton Depression Rating Scale [HAM-D]; mean 15.2 [SD 6.4]) and self-report mean depression scores (Beck Depression Inventory II [BDI-II]; mean 23.3 [SD 9.6])." Comment: The assessor who administered all questionnaires was unaware of the treatment allocation group. Haematological and biochemical data were objective measure of the outcome
Incomplete outcome data (attrition bias) All outcomes	High risk	As reported in the flow chart, 6/65 participants dropped out (2 spent too many days in hospital, 1 drop out, 1 transplant, 2 switched dialysis centres), 5 from treatment group and 1 from control group. As there was a differential loss between groups that may have related to the intervention or outcome, this bias domain was adjudicated as high risk
Selective reporting (reporting bias)	Low risk	Study reported many outcomes usual for this type of study. Unclear whether outcomes were reported according to pre-specified protocol
Other bias	Low risk	Study reported statistical methods appropriate for the cross-over study design. Funding was not involved into the analysis. There were no other apparent sources of bias

Duarte 2009

Methods	• Study design: parallel RCT • Time frame: not reported • Follow-up period: 9 months
Participants	• Country: Brazil • Setting: multicentre (2 dialysis units; São Paolo, Brazil) • Inclusion criteria: aged 18 to 80 years, receiving HD 3 times/week (4 h/session) for at least 3 months, and diagnosis of major depressive disorder according to the MINI criteria • Number (analysed/randomised): treatment group (36/46); control group (38/44) • Mean age ± SD (years): treatment group (52.4 ± 15.9); control group (54.0 ± 12.7) • Sex (M/F): treatment group (15/26); control group (20/24) • Antidepressant medication: treatment group (4/41); control group (5/44) • Exclusion criteria: Having a living-donor kidney transplant scheduled within the next several months; current hospitalisation; psychiatric comorbidity (axis I of the DSM-IV) diagnosed by MINI (anxiety disorders (panic disorder, obsessive-compulsive disorder, posttraumatic stress disorder, generalised anxiety disorder, social phobia), psychotic syndrome, and anti-social personality disorder); cognitive impairment (deficiency of memory or unable to understand the questionnaires) or mental retardation; current substance abuse; unstable clinical condition; patients with anxiety symptoms, without the above mentioned diagnoses, were not excluded from the study
Interventions	Treatment group • CBT for 3 months on the basis of a structured treatment program including 12 weekly sessions Control group • Brief individualised psychological consultation, routinely available at the dialysis units Co-interventions

Duarte 2009 *(Continued)*

	• Not reported
Outcomes	• Depression * BDI-II: scores range from 0 to 63, with higher scores indicating a greater level of depressive symptoms (10 to 16 = mild, 17 to 29 = moderate, and > 30 = severe depressive symptoms) ☐ Cognitive sub scale ☐ Somatic sub scale ☐ Overall score • Major depression * MINI ☐ Major depression module • Suicides * MINI ☐ Risk of suicide module • HRQoL * KDQOL-SF36 ☐ Burden of renal disease ☐ Cognitive function ☐ Quality of social interaction ☐ Sleep ☐ Overall health ☐ Mental component summary ☐ Physical component summary ☐ Symptom/social problem ☐ Effect of kidney disease ☐ Work status ☐ Sexual function ☐ Social support ☐ Dialysis staff encouragement ☐ Patient satisfaction • Death (all causes)
Notes	• Funding source: Fundação de Amparo à Pesquisa do Estado de São Paulo (04/08710-8) • Contact author: P.S. Duarte (psduarte@nefro.epm.br)

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	List for patient allocation was prepared by the research coordination centre. Sequence generation methods were not reported in sufficient detail to perform an adjudication
Allocation concealment (selection bias)	Unclear risk	Quote: "The envelopes with the code were sealed and kept at the study site and were consecutively opened when a new patient was selected for inclusion." Comment: The methods did not report whether envelopes were opaque and/or consecutively numbered. Method of allocation concealment was not reported in sufficient detail to perform an adjudication
Blinding of participants and personnel (performance bias) All outcomes	High risk	Blinding of participants and/or the investigators was not reported. The interventions were physically different. Therefore it was unlikely that participants and investigators were blinded to treatment allocation

Duarte 2009 *(Continued)*

Blinding of outcome assessment (detection bias) All outcomes	Low risk	Quote: "The questionnaires were administered and rated by a trained psychologist who was blinded to the treatment group allocation." Comment: The risk of bias for outcome assessment was therefore considered to be low risk for the depression and health related quality of life outcomes. All-cause death was an objective outcome which was considered to be low risk of bias for outcome assessment despite non-blinding of participants and investigator.
Incomplete outcome data (attrition bias) All outcomes	High risk	16 patients (18%) loss to follow up and excluded from analysis. 10/46 were lost to follow-up from the CBT group (3 transplant; 2 withdrawn; 1 excluded; 4 deaths) and 6/44 were lost to follow-up from the control group (4 deaths; 1 transplant; 1 withdrawn). As there was differential loss between the two groups that may have related to the treatment or outcome measurement, this risk domain was adjudicated as high risk of bias
Selective reporting (reporting bias)	Low risk	Study reported many outcomes usual for this type of study. Unclear whether outcomes were reported according to pre-specified protocol
Other bias	Low risk	Randomisation was not performed using random block size. There was no evidence of substantial imbalance at baseline. No interim analyses were reported

Dziubek 2016

Methods	• Study design: quasi RCT (cluster randomised uncontrolled trial) • Time frame: not reported • Follow-up period: 6 months
Participants	• Country: Poland • Setting: single centre (Department of Nephrology and Transplantation Medicine in Wroclaw) • Inclusion criteria: patients with ESKD, HD therapy for at least 6 months prior to the start of research, patient's informed consent to participate in the study and lack of medical contraindications to exercise training confirmed by physician • Number (analysed/randomised): treatment group (20/21); control group (8/16) • BDI score at baseline: treatment group (16.1 ± 9.9; data referred to 20 participants); control group (14.0 ± 8.1; data referred to 8 participants) • Mean age ± SD (years): treatment group (66.3 ± 13.1; data referred to 20 participants); control group (56.4 ± 13.6; data referred to 8 participants) • Sex (M/F): treatment group (9/11; data referred to 20 participants); control group (5/3; data referred to 8 participants) • Antidepressant medication: not reported • Exclusion criteria: poorly controlled hypertension; severe symptomatic arrhythmia (causing hypotonia); acute coronary syndrome in the last 4 weeks; unstable angina; heart failure (> II in NYHA grading); hyperkalaemia (> 6 mmol/L); hypokalaemia (< 3.5 mmol/L); severe anaemia (HCT < 25%); uncontrolled renal osteodystrophy or osteoporosis confirmed by DEXA; musculoskeletal deformation, acute illness (recent fever, pain/fever of unknown origin)
Interventions	Treatment group • Endurance training, 3 times/week for 6 months Control group • Resistance training, 3 time/week for 6 months Co-interventions

Dziubek 2016 *(Continued)*

	• Not reported

Outcomes	• Depression
	  * BDI-II: absence of depression (scores of 0 to 9), mild depression (10 to 19), moderate depression (20 to 29), relatively severe depression (30 to 39), and severe depression (40 to 63)
	  ☐ Cognitive-affective area
	  ☐ Somatic problems accompanying mood disorders
	• Anxiety
	  * STAI: the criterion for dividing patients into subgroups of low and high level of anxiety for the STAI (X1) was a score of 44, and for STAI (X2) a score of 46. The summed up results for each of the two parts of the questionnaire range from 20 points – mild anxiety, to 80 points – very strong anxiety
	• Change in the depression and anxiety score
	• Death

Notes	• Funding Source: grant from National Science Centre Poland. The funding agency had no role in the study design; collection, analysis, and interpretation of data; or the decision to submit this original work for publication • Trial registration identification number: not reported • Corresponding author: wioletta.dziubek@awf.wroc.pl and Aksamitna1974@wp.pl

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Sequence generation methods were not reported in sufficient detail to perform an adjudication
Allocation concealment (selection bias)	Unclear risk	Method of allocation concealment was not reported in sufficient detail to perform an adjudication
Blinding of participants and personnel (performance bias) All outcomes	High risk	Blinding of participants and/or the investigators was not reported. The interventions were physically different. Therefore it was unlikely that participants and investigators were blinded to treatment allocation
Blinding of outcome assessment (detection bias) All outcomes	High risk	Quote: "Each patient filled in a personal questionnaire once at the start of the training, and the Beck Depression Inventory (BDI) and the State-Trait Anxiety Inventory (STAI) twice, at the start of the training and after 6 months. [...] The questionnaire was self-administered, however, an assistant was available to answer any questions or explain how to fill in the form." Comment: BDI and the STAI were self-reported measurements. As such, the outcome assessment was conducted by participants who could be aware of the treatment received. We judged the outcome assessment to be at high risk of bias for these outcome measures
Incomplete outcome data (attrition bias) All outcomes	High risk	Quote: "A total of 28 patients completed the study." Comment: 1/21 participants in endurance training group and 8/16 in resistance training group were lost to the follow-up for reasons that appeared unrelated to treatment. There was differential loss between the two groups
Selective reporting (reporting bias)	High risk	This study did not report many patient-centred outcomes that might be expected for a study of this type (i.e. life participation, fatigue, dialysis withdrawal, adverse events, hospitalisation)
Other bias	Low risk	No evidence of other sources of bias

Erdley 2014

Methods	• Study design: parallel RCT • Time frame: recruitment from 1 January 2012 to 31 January 2012; trial was initiated on 1 February 2012 and ended on 1 May 2012 • Follow-up period: 6 weeks
Participants	• Country: USA • Setting: single centre (Geisinger Medical Center outpatient dialysis unit) • Inclusion criteria: (1) had been diagnosed with ESKD; (2) currently receiving outpatient HD at Geisinger Medical Center at a minimum of 3 months; (3) ≥ 60 years; (4) consented to allow the research team to access disease-severity indicators from their medical records; and (5) consented to receiving 6 weeks of Problem-Solving Therapy or usual care, combined with a follow-up 60-minute qualitative interview • Number (analysed/randomised): treatment group (15/17); control group (18/18) • Mean age ± SD (years): treatment group (72.2 ± 5.6); control group (75.3 ± 8.28) • Sex (M/F): treatment group (10/5); control group (11/7) • Antidepressant medication: sertraline, lorazepam, citalopram • Exclusion criteria: chart diagnosis of cognitive disorder, dementia or Alzheimer-related diseases; psychotic disorder, or mild cognitive impairment; already receiving psychological counselling
Interventions	Treatment group • Problem-solving therapy; 6 weekly sessions Control group • Usual care Co-interventions • Not reported
Outcomes	• Depression * BDI-II: absence of depression (scores of 0 to 9), mild depression (10 to 19), moderate depression (20 to 29), relatively severe depression (30 to 39), and severe depression (40 to 63) * Patient Health Questionnaire-9 (PHQ-9) (cutoff at least 10 = depression) • Changes in HRQoL * KDQOL-SF36 ☐ Mental component summary ☐ Physical component summary • Problem-solving ability * Jaloweic Coping Scale (JCS) ☐ Confrontive ☐ Evasive ☐ Optimistic ☐ Fatalistic ☐ Palliative ☐ Supportant ☐ Reliant ☐ Emotive * Social Problem Solving Inventory, Revised Short Form (SPSI-R) ☐ Positive problem orientation ☐ Negative problem orientation ☐ Rational problem solving ☐ Impulsivity/Carelessness style ☐ Avoidance style

Erdley 2014 *(Continued)*

- Death (all causes)
- Withdrawal from the intervention

Notes	• Funding Source: not reported • Trial registration identification number: not reported • Corresponding author: S. Erdley (shiloherdley@yahoo.com)

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "The actual treatment condition given to an in-centre dialysis patient was determined by a random scheme produced by computer software that incorporated a standard procedure for generating random numbers with an allocation ratio of 1:1—that is, to either the Problem-Solving Therapy + usual care group (n=15) or the usual care only control group (n = 18)." Comment: The computer generation is considered a low risk of bias
Allocation concealment (selection bias)	Unclear risk	Quote: "The generation of the allocation sequence and the assignment of participants were performed by the Haemodialysis Center secretary." Comment: Method of allocation concealment was not reported in sufficient detail to perform an adjudication
Blinding of participants and personnel (performance bias) All outcomes	High risk	Quote: "This pilot study used an unblinded design, and participants were informed of their allocation sequence upon completing their baseline measures." Comment: The methods of intervention and control treatment were physically different, participants and investigators were aware on the treatment allocation group
Blinding of outcome assessment (detection bias) All outcomes	High risk	Quote: "The Beck Depression Inventory (BDI) was used to measure depressive symptoms. The Beck Depression Inventory (BDI) is a 21-item self-administered questionnaire. [...] The Patient-Health Questionnaire (PHQ-9) was used to measure depressive symptoms. The Patient-Health Questionnaire (PHQ-9) is a self-administered version. [...] Secondary outcomes of health related quality of life were assessed by means of the Kidney Disease Quality of Life (KDQOL-36). [...] The Jaloweic Coping Scale (JCS) was used to measure individual coping skills ability. [...] The Social Problem Solving Inventory, Revised Short Form (SPSI-R) was used to examine subject-perceived social-problem ability across 5 dimensions. The Social Problem Solving Inventory, Revised Short Form (SPSI-R) is a 25-item self-report measure." Comment: The BDI, the Patient-Health Questionnaire (PHQ-9) and the Social Problem Solving Inventory, Revised Short Form (SPSI-R) were completed by participants. Participants were aware of the intervention they received. Therefore, the outcome assessment for depression and social problem solving was not blinded. It was not reported who completed the quality of life assessment measure. Therefore it was unclear whether the completion of this outcome was blinded
Incomplete outcome data (attrition bias) All outcomes	Low risk	Quote: "Figure 3 shows numbers of recruitment, exclusions, refusal, and dropouts throughout the study. Post randomisation, one participant in the intervention group withdrew due to illness and a second participant died shortly after completing pretest measures." Comment: 2/17 in the intervention group and 0/18 in the control group were lost to the follow-up for reasons that appeared unrelated to treatment

Erdley 2014 *(Continued)*

Selective reporting (reporting bias)	Low risk	There was no published protocol for this study. This study report many patient-centred outcomes that might be expected for a study of this type
Other bias	Low risk	No evidence of other sources of bias

Espahbodi 2015

Methods	• Study design: parallel RCT • Time frame: 2009 (the month was not reported) • Follow-up period: 1 month
Participants	• Country: Iran • Setting: single centre (Imam Khomeini Hospital in Sari, Iran) • Inclusion criteria: Patients with ESKD being treated with HD • Number (analysed/randomised): Psycho education (27/30); control group (28/30) • (HADS score at baseline treatment group (10.22 ± 3.40); control group (10.07 ± 3.39) • Mean age ± SD (years): treatment group (49.14 ± 14.54); control group (52.29 ± 15.58) • Sex (M/F): treatment group (13/14); control group (14/14) • Antidepressant medication: not reported • Exclusion criteria: Experiencing new stressful events during the time of study based on the Holmes-Rahe list of stressful life events; any change in dialysis schedule; starting any other psychiatric treatment during the study; known history of previous psychiatric disorder; having a new stressor during previous 6 months except for those related to kidney disease; failure to attend in all educational sessions
Interventions	Treatment group • Psycho education 3 x 1 hour sessions Control group • No intervention Co-interventions • Not reported

Outcomes	• Depression
	  * HADS: patients with scores between 11 to 21 are considered clinically disordered; the scores between 8 and 10 are considered borderline or abnormal and scores of 0 to 7 are considered normal
	• Anxiety
	  * HADS: patients with scores between 11 to 21 are considered clinically disordered; the scores between 8 and 10 are considered borderline or abnormal and scores of 0 to 7 are considered normal

Notes	• Funding source: Mazandaran University of Medical Sciences • Trial registration identification number: not reported • Corresponding author: A. B. Shafaat (arefeh.shafaat@yahoo.com)

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "The patients were divided into two groups by a random allocation after being somewhat matched according to intervening factors such as age,

Espahbodi 2015 *(Continued)*

		gender, marital status, education level, duration of dialysis and number of dialysis per week." Comment: Sequence generation methods were not reported in sufficient detail to perform an adjudication
Allocation concealment (selection bias)	Unclear risk	Method of allocation concealment was not reported in sufficient detail to perform an adjudication
Blinding of participants and personnel (performance bias) All outcomes	High risk	Blinding of participants and/or the investigators was not reported. The interventions were physically different. Therefore it was unlikely that participants and investigators were blinded to treatment allocation
Blinding of outcome assessment (detection bias) All outcomes	High risk	Quote: "Hospital Anxiety Depression Scale (HADS) questionnaire was completed in both groups before the intervention (by patient and oversight of a psychiatrist)." Comment: The HADS was a self-reported measurement. As such, the outcome assessment was conducted by participants who could be aware of the treatment received. We judged the outcome assessment to be at high risk of bias for these outcome measures
Incomplete outcome data (attrition bias) All outcomes	Low risk	Quote: "Two patients were excluded from the dialysis group with psycho education. This happened due to a change in dialysis schedules. Besides, one patient was excluded from this group because of having a new stressor during the study. Similarly, in control group (the dialysis group without psycho education) two patients were excluded, one due to changes in dialysis schedule and another due to having a new stressor. Therefore, this study was followed by 27 patients in the dialysis group with psycho education and 28 patients in the control group." Comment: 3/30 in the intervention group (2 changed the dialysis shift, 1 new stressor) and 2/30 in the control group (1 changed the dialysis shift, 1 new stressor) were lost to the follow-up for reasons that appeared unrelated to treatment
Selective reporting (reporting bias)	High risk	There was no published protocol for this study. This study did not report many patient-centred outcomes that might be expected for a study of this type (i.e. life participation, fatigue, dialysis withdrawal, adverse events, death)
Other bias	Unclear risk	It was not clear if there was evidence of imbalance at baseline. Not reported in sufficient detail to perform an adjudication

Frey 1999

Methods	• Study design: parallel RCT • Time frame: not reported • Follow-up period: 12 weeks
Participants	• Country: USA • Setting: single centre (Fresenius Medical Care (FMC), Kansas City Dialysis Center) • Inclusion criteria: patients with ESKD undergoing HD 3 times/week who met the following criteria: aged 25 to 65 years; without diabetes; no current physical activity; blood pressure of 160/95 mm Hg or less at the second hour of HD; average IDWG not greater than 3.5 kg between HD treatments; no unstable angina pectoris • Number (analysed/randomised): treatment group (5/5); control group (6/6)

Frey 1999 *(Continued)*

- Mean age ± SD (years): treatment group (40 ± 11); control group (53 ± 13)
- Sex (M/F): treatment group (3/2); control group (3/3)
- Antidepressant medication: not reported as depression was not an inclusion criterion
- Exclusion criteria: not reported

Interventions	Treatment group • Exercise patients cycled on stationary bicycle ergometers, 3 days/week Control group • No exercise Co-interventions • Not reported
Outcomes	• Haematological and biochemical data * Kilocalorie Intake * Protein Intake * Prealbumin * Predialysis and postdialysis serum albumin * Transferrin * Kt/V • Hospitalisation
Notes	• Funding source: not reported • There was no reported registration of the trial within a trial registry, as trial registration was not required in 1999 • Corresponding author: not reported

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "Eleven patients were randomly assigned to two groups." Comment: Sequence generation methods were not reported in sufficient detail to perform an adjudication
Allocation concealment (selection bias)	Unclear risk	Method of allocation concealment was not reported in sufficient detail to perform an adjudication
Blinding of participants and personnel (performance bias) All outcomes	High risk	Blinding of participants and/or the investigators was not reported. The methods of intervention and control treatment were physically different, participants and investigators could be aware on the treatment allocation group
Blinding of outcome assessment (detection bias) All outcomes	Low risk	The outcomes were considered objective as they related to laboratory data. Therefore, the trial was at low risk of bias for outcome assessment
Incomplete outcome data (attrition bias) All outcomes	Low risk	Quote: "Eleven patients completed the study, with five participants in the exercise group exercising at the suggested heart rate and six participants in the non-exercise group remaining sedentary." Comment: All participants completed the study

Frey 1999 *(Continued)*

Selective reporting (reporting bias)	High risk	There was no published protocol for this study. This study did not report many patient-centred outcomes that might be expected for a study of this type (i.e. life participation, fatigue, dialysis withdrawal, adverse events, depression)
Other bias	Unclear risk	It was not clear if there was evidence of imbalance at baseline. Not reported in sufficient detail to perform an adjudication

Frih 2017

Methods	• Study design: parallel RCT • Time frame: not reported • Follow-up period: 24 weeks
Participants	• Country: Tunisia • Setting: single centre (Department of Nephrology and Internal Medicine, Fattouma Bourguiba Hospital, Monastir, Tunisia) • Inclusion criteria: Elderly male patients undergoing HD; absence of chronic respiratory and cardiac diseases; and absence of neurological or musculoskeletal disorders • Number (analysed/randomised): treatment group (28/28); control group (25/25) • HADS score at baseline: treatment group (14.9 ± 2.1); control group (15.1 ± 2.1) • Mean age ± SD (years): treatment group (65.4 ± 3.2); control group (64.5 ± 4.2) • Sex (M/F): treatment group (28/0); control group (25/0) • Antidepressant medication: not reported • Exclusion criteria: chronic respiratory and cardiac diseases; neurological or musculoskeletal disorders
Interventions	Treatment group • Listening to Holy Qur'an recitation • Endurance–resistance training Control group • Endurance–resistance training Co-interventions • All patients received four interdialytic training sessions weekly for a period of 24 weeks (a total of 72 sessions)

Outcomes	• Functional capacity
	  * Timed Up and Go test (TUG)
	  * Six-Minute Walk Test (6MWT)
	• HRQoL
	  * Short-Form Health Survey (SF-36)
	  ☐ Physical functioning
	  ☐ Role functioning/physical
	  ☐ Bodily pain
	  ☐ General health
	  ☐ Vitality
	  ☐ Social functioning
	  ☐ Role functioning/emotional
	  ☐ Mental health

Frih 2017 *(Continued)*

- Depression
  * HADS: patients with scores between 11 to 21 are considered clinically disordered; the scores between 8 and 10 are considered borderline or abnormal and scores of 0 to 7 are considered normal
- Anxiety
  * HADS
- Dialysis adequacy
  * Kt/V

Notes	• Funding source: not reported • Trial registration identification number: not reported • Corresponding author: B. Frih; (frih.bechir@gmail.com)

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "The participants were randomised into the intervention group or the control group using a computer randomisation list." Comment: Computer randomisation list is considered as low risk of bias
Allocation concealment (selection bias)	Unclear risk	Method of allocation concealment was not reported in sufficient detail to perform an adjudication
Blinding of participants and personnel (performance bias) All outcomes	High risk	Blinding of participants and/or the investigators was not reported. The methods of intervention and control treatment were physically different, participants and investigators could be aware on the treatment allocation group
Blinding of outcome assessment (detection bias) All outcomes	High risk	Quote: "The dialysis adequacy was calculated for each patient according to the formula. [...] The surveys were completed independently during dialysis by those patients capable of doing so. Patients unable to complete them independently because of vision or language problems were assisted by the study staff. [...] All data were collected through face-to-face interviews by educated nurses in the Nephrology Department." Comment: The outcome related to Kt/V and functional capacity were considered objective. The Hospital Anxiety and Depression Scale (HADS) and the Short-Form Health Survey (SF-36) were self-reported measurements. As such, the outcome assessment was conducted by participants/investigators who could be aware of the treatment assigned. We judged the outcome assessment to be at high risk of bias for these outcome measures
Incomplete outcome data (attrition bias) All outcomes	Low risk	As reported in table 1, all participants completed the study
Selective reporting (reporting bias)	High risk	There was no published protocol for this study. This study did not report many patient-centred outcomes that might be expected for a study of this type (i.e. life participation, fatigue, dialysis withdrawal, adverse events, death)
Other bias	Unclear risk	It was not clear if there was evidence of imbalance at baseline. Not reported in sufficient detail to perform an adjudication

HED-SMART 2011

Methods	• Study design: parallel RCT

HED-SMART 2011 *(Continued)*

	• Time frame: January 2009 to June 2012 • Follow-up period: 9 months
Participants	• Country: Singapore • Setting: multicentre (14 National Kidney Foundation (NKF) dialysis centres, Singapore) • Inclusion criteria: CKD patients who have been receiving HD for at least 6 months; aged 21 and over; patients willing to attend all sessions of the self-management programme • Number (analysed/randomised): treatment group (101/101; ITT - 75 participants per protocol); control group (134/134 ITT - 118 participants per protocol) • Mean age ± SD (years): treatment group (53.1 ± 10.5); control group (53.9 ± 10.4) • Sex (M/F): treatment group (54/47); control group (83/51) • Antidepressant medication: not reported • Exclusion criteria: newly established on HD (< 6 months); unable to give informed consent; unable to understand spoken English and/or Mandarin, Malay, Tamil dialects to allow effective communication with the intervention facilitator and/or research assistants; a diagnosis of functional psychosis or organic brain disorder; impaired cognition; major visual or hearing impairments, or other sensory or motor impairments that may prohibit completion of the scheduled assessments; unable to participate in a group program (e.g. housebound), limited life expectancy due to co-morbid illness such as malignancy
Interventions	Treatment group • Self-management intervention Control group • Usual care Co-interventions • Consenting adults maintained on HD for a minimum of 6 months

Outcomes	• Clinical status
	  * IDWG
	  * BP
	• Biochemical markers
	  * Phosphate
	  * Calcium x phosphate product
	  * Potassium
	  * Urea
	  * Creatinine
	  * Haemoglobin
	  * Intact parathyroid hormone
	  * Albumin
	  * URR
	  * Kt/V
	• Adherence (attendance for dialysis)
	  * Skipping and shortening behaviours
	  * Health services utilization (number of admissions, emergency room visits
	• Comorbid illness
	  * End Stage Renal Disease Severity Index (ESRD-SI)
	  * Charlson Comorbid Index (CCI)

HED-SMART 2011 *(Continued)*

- HRQoL
  - KDQoL-SF
    - ☐ Symptoms
    - ☐ Effects of kidney disease on daily life
    - ☐ Burden of kidney disease
    - ☐ Cognitive function
    - ☐ Work status
    - ☐ Sexual function
    - ☐ Quality of social interaction
    - ☐ Sleep
    - ☐ Physical functioning
    - ☐ Role limitations due to physical and emotional health
    - ☐ Mental health
    - ☐ Bodily pain
    - ☐ General health
    - ☐ Vitality
    - ☐ Social functioning
  - World Health Organization Quality of Life questionnaire (WHOQOL-BREF)
    - ☐ Physical health
    - ☐ Psychological health
    - ☐ Social relationships
    - ☐ Environment
    - ☐ Overall QoL/Health facet
- Anxiety
  - HADS
- Depression
  - HADS: patients with scores between 11 to 21 are considered clinically disordered; the scores between 8 and 10 are considered borderline or abnormal and scores of 0 to 7 are considered normal
- Self-efficacy
  - The dialysis specific Self-Efficacy Scale
    - ☐ Managing dialysis
    - ☐ Diet
    - ☐ Fluid intake
    - ☐ Medication
  - The Health Education Impact Questionnaire (HEIQ)
    - ☐ Health directed behaviour
    - ☐ Positive and active engagement in life
    - ☐ Emotional well-being
    - ☐ Self-monitoring and insight
    - ☐ Constructive attitudes and approaches
    - ☐ Skill and technique acquisition
    - ☐ Social integration and support
    - ☐ Health service navigation

HED-SMART 2011 *(Continued)*

- Adherence
  - The Renal Adherence Attitudes Questionnaire (RAAQ)
    - ☐ Social restrictions
    - ☐ Well-being
    - ☐ Self-care/support and
    - ☐ Acceptance
  - The Renal Adherence Behaviour Questionnaire (RABQ)
    - ☐ Compliance to fluid restrictions
    - ☐ Compliance regarding potassium and phosphate restrictions
    - ☐ Compliance regarding self-care
    - ☐ Compliance regarding sodium intake
    - ☐ Compliance in times of particular difficulty
- Medication
  - Necessity sub scale
    - ☐ Beliefs about the necessity of prescribed medication
  - Concerns sub scale
    - ☐ Concerns about prescribed medication based on beliefs about the danger of dependence and long-term toxicity and the disruptive effects of medication
  - Medication Adherence Report Scale (MARS)
    - ☐ Respondents to rate the frequency with which they engage in non-adherent behaviours (e.g. deciding to miss a dose, forgetting to take a dose)
- Diet
  - Frequency of non-adherent behaviours to dietary recommendations
  - Fluid intake
- Qualitative assessment
  - Participants' attitudes towards the program
  - Patients' satisfaction with content, delivery and duration and their progress with regards to self-management
- Withdrawn
- Cardiovascular death

Notes	• Funding source: NKF Singapore Research Fund (NKFRC2008/07/24) and Ministry of Education-NUS Academic Research Fund (FY2007-FRC5-006). The funding sources had no role in the study design or intervention, recruitment of patients, data collection, analysis, or interpretation of the results, writing of the manuscript, or decision to submit the manuscript for publication • Trial registration identification number: ISRTN31434033 • Corresponding author: K. Griva; Email: psygk@nus.edu.sg and konstadina.griva@ntu.edu.sg

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "To minimize contamination, the unit of randomisation was the dialysis shift within each of the participating dialysis centres, using computerized randomisation (1:1 allocation ratio)." Comment: It was unclear if it was a computer random number generator. Sequence generation methods were not reported in sufficient detail to perform an adjudication
Allocation concealment (selection bias)	Unclear risk	Quote: "Allocation of randomisation was concealed from study participants until baseline assessment was completed." Comment: Method of allocation concealment was not reported in sufficient detail to perform an adjudication

HED-SMART 2011 *(Continued)*

Blinding of participants and personnel (performance bias) All outcomes	High risk	Quote: "The was a parallel-group, blinded, cluster randomised controlled trial. [...] Research assessors and all other staff remained blind to allocation at all assessment points." Comment: Blinding of participants was not reported. The methods of intervention and control treatment were physically different. Participants could be aware on the treatment allocation group
Blinding of outcome assessment (detection bias) All outcomes	High risk	Depression was assessed using the HADS. The HADS was a self-reported measurement. Participants could be aware of the treatment assigned. We judged the outcome assessment to be at high risk of bias for this outcome measures
Incomplete outcome data (attrition bias) All outcomes	Low risk	Quote: "Primary analyses were based on the intention-to-treat population (all randomly assigned participants, including those without post baseline observations). Missing values were imputed using the last-observation-carried-forward method." Comment: As reported in Figure 1, ITT analysis was performed
Selective reporting (reporting bias)	Low risk	There was a published protocol for this study. This study report many patient-centred outcomes that might be expected for a study of this type
Other bias	Low risk	No evidence of other sources of bias

Heshmatifar 2015

Methods	• Study design: parallel RCT • Time frame: 2013 (month was not reported) • Follow-up period: 1 month
Participants	• Country: Iran • Setting: single centre (HD section of Vase'ee Hospital of Sabzevar, Iran) • Inclusion criteria: aged 18 to 65 years; undergoing HD for at least 6 months; availability of medical files in the dialysis centre of the hospital (no guest or temporary dialysis patients); undergoing dialysis 3 times/week; and absence of any mental/muscular disorders or severe physical disabilities (patients did not have a history of depression at baseline) • Number (analysed/randomised): treatment group (33/33); control group (32/32) • Mean age ± SD (years): treatment group (48.57 ± 9.18); control group (49.93 ± 8.17) • Sex (M/F): treatment group (27/6); control group (24/8) • Antidepressant medication: none • Exclusion criteria: unwillingness to continue the study; use of medicines affecting one's mental health; prior history of depression or hospitalisation due to mental disorders before CKD and HD; history of accidents or unpleasant events over the past 6 months; kidney transplant or peritoneal dialysis; death
Interventions	Treatment group • Benson relaxation technique: 2 times/day for 20 minutes Control group • Usual care Co-interventions • Not reported

Heshmatifar 2015 *(Continued)*

Outcomes	• Depression * BDI-II: absence of depression (scores of 0 to 9), mild depression (10 to 19), moderate depression (20 to 29), relatively severe depression (30 to 39), severe depression (40 to 63) ☐ Emotional symptoms ☐ Physical symptoms • Death (all causes)
Notes	• Funding source: Research Council of Sabzevar University of Medical Sciences • Corresponding author: N.Heshmatifar (nheshmatifar@yahoo.com)

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "This randomised, controlled, clinical trial was performed on 70 haemodialysis patients." Comment: Sequence generation methods were not reported in sufficient detail to perform an adjudication
Allocation concealment (selection bias)	Unclear risk	Method of allocation concealment was not reported in sufficient detail to perform an adjudication
Blinding of participants and personnel (performance bias) All outcomes	High risk	Blinding of participants and/or the investigators was not reported. The methods of intervention and control treatment were physically different, participants and investigators could be aware on the treatment allocation group
Blinding of outcome assessment (detection bias) All outcomes	High risk	Depression was assessed using the BDI-II. The BDI-II was a self-reported measurement. As such, the outcome assessment was conducted by participants who could be aware of the treatment assigned. We judged the outcome assessment to be at high risk of bias for these outcome measures
Incomplete outcome data (attrition bias) All outcomes	Low risk	Quote: "The study started with 65 subjects including 33 cases in the intervention group and 32 cases in the control group." Comment: all patients were included into the analysis
Selective reporting (reporting bias)	High risk	There was no published protocol for this study. This study did not report many patient-centred outcomes that might be expected for a study of this type (i.e. fatigue, dialysis withdrawal, adverse events)
Other bias	Low risk	No evidence of other sources of bias

Hmwe 2015

Methods	• Study design: parallel RCT • Time frame: January to March 2014 • Follow-up period: 4 weeks
Participants	• Country: Malaysia • Setting: multicentre (3 HD centres located in Selangor state, Malaysia) • Inclusion criteria: received HD 3 times/week; patients who had four complete limbs; patients who had intact cognitive functions to respond to questionnaires • Number (analysed/randomised): treatment group (54/54); control group (54/54)

Hmwe 2015 *(Continued)*

- DASS score at baseline: treatment group (34.37 ± 22.61); control group (28.52 ± 18.91)
- Mean age ± SD (years): treatment group (56.96 ± 11.91); control group (59.15 ± 10.87)
- Sex (M/F): treatment group (30/24); control group (32/22)
- Antidepressant medication: not reported
- Exclusion criteria: below knee or below elbow amputation; those with impaired cognitive functions

Interventions	Treatment group • Acupressure applied 3 times/week for 4 weeks Control group • Usual care Co-interventions • Routine HD treatment

Outcomes	• Depression
	  * DASS-21: cutoff at least 10 (= depression)
	• Anxiety
	  * DASS-21
	• Stress
	  * DASS-21
	• General psychological distress
	  * General Health Questionnaire-28 (GHQ-28)
	  ☐ Somatic symptoms
	  ☐ Anxiety/insomnia
	  ☐ Social dysfunction
	  ☐ Severe depression
	• Adverse events
	• Hospitalisation
	• Withdrawal from intervention

Notes	• Funding source: Postgraduate Research Grant (PPP) 2/2013 (P0041/2013B) from University of Malaya, Malaysia. • Trial registration identification number: not reported • Corresponding author: N.T.T. Hmwe (aprial.thin@gmail.com)

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "A total of 108 patients with haemodialysis were randomly recruited into the acupressure group (n = 54) and the control group (n = 54). Random sequence allocation was performed using a computer random number generator." Comment: Computer random number generator is considered as low risk of bias
Allocation concealment (selection bias)	Unclear risk	Quote: "Blinding and allocation concealment were not applied in this study" Comment: Method of allocation concealment was not reported in sufficient detail to perform an adjudication

Hmwe 2015 *(Continued)*

Blinding of participants and personnel (performance bias) All outcomes	High risk	Quote: "Open-label randomised controlled trial." Comment: An open-label trial is considered as high risk of bias
Blinding of outcome assessment (detection bias) All outcomes	High risk	Quote: "Questionnaires were subsequently administered by the primary investigator and the staff nurses from the respective haemodialysis centres. Patients responded to the questionnaires during haemodialysis treatment." Comment: The DASS-21 and General Health Questionnaire-28 were self-reported measurements. As such, the outcome assessment was conducted by participants/investigators who could be aware of the treatment assigned. We judged the outcome assessment to be at high risk of bias for these outcome measures
Incomplete outcome data (attrition bias) All outcomes	Low risk	Quote: "A total of 102 (94.5%) out of 108 patients completed the study, with 6 (5.6%) declining to complete the study. In the acupressure group, three patients discontinued their participation in the final week. The reasons for the discontinuation of the intervention were intra-dialytic hypotension (n = 2) and hospital admission due to hypoglycaemic coma (n = 1). Three patients who stopped the intervention early responded to the post-test questionnaires, thus the baseline data and outcome data were retained. However, in the control group, three patients did not respond to the post-test questionnaires, thus the outcome data were imputed from their baseline data (pretest data) with the assumption that there was no difference in pre-test and post-test. The flow diagram for enrolment, randomised allocation, follow-up and final analysis is shown in Figure 2." Comment: As reported in Figure 2, intention-to-treat analysis was performed: in the end, 108 patients were analysed. However, 3/54 in the intervention group (2 intra-dialytic hypotension, 1 hospital admission) and 3/54 in the control group (reasons were not reported) were lost-to-follow-up (< 10% loss-to-follow-up; there was not a differential loss between groups)
Selective reporting (reporting bias)	High risk	There was no published protocol for this study. This study did not report many patient-centred outcomes that might be expected for a study of this type (i.e. fatigue, dialysis withdrawal, life participation, death)
Other bias	Low risk	No evidence of other sources of bias

iDiD 2016

Methods	• Study design: parallel RCT • Time frame: From February 2015 to January 2016; follow-up data was collected between June 2015 and May 2016 • Follow-up period: 12 weeks
Participants	• Country: The UK • Setting: multicentre (HD units, Guy's and St Thomas NHS Trust (GSTT); London, UK) • Inclusion criteria: aged ≥ 18 years old; received in-centre HD; had comorbid psychological distress (defined as mild to moderately severe symptoms of depression and/or anxiety which included a score ranging from 5 to 19 on the Patient Health Questionnaire (PHQ-9) and/or a score ranging from 5 to 14 on the Generalised Anxiety Disorder questionnaire (GAD-7)); patients needed to speak English well and have a basic understanding of the Internet and an email address • Number (analysed/randomised): treatment group (16/18); control group (7/7) • Mean age ± SD (years): treatment group (49 ± 11.44); control group (47 ± 14.25) • Sex (M/F): treatment group (10/8); control group (5/2)

iDiD 2016 *(Continued)*

- Antidepressant medication: not reported
- Exclusion criteria: receiving treatment for psychological distress (active psychotherapy or commenced pharmacotherapy within the last 3 months); had a severe mental health disorder (e.g. psychosis); had current suicidal ideation

Interventions	Treatment group • CBT • Therapist support calls x 3 (supported) Control group: • CBT (unsupported) Co-interventions • All patients had access to the iDiD online intervention. iDiD includes a 7 session CBT protocol
Outcomes	• Depression * Patient Health Questionnaire (PHQ-9) (cutoff at least 10 = depression) • Anxiety * Generalised Anxiety Disorder (GAD-7) • HRQoL * EuroQoL scale (EQ-5D) ☐ Mobility ☐ Self-care ☐ Usual activities ☐ Pain/discomfort ☐ Anxiety and depression • Illness perceptions * Brief Illness Perception Questionnaire • Adverse events • Death (all causes) • Hospitalisation • Suicidal intention * Mobility * Self-care * Usual activities * Pain/discomfort * Anxiety and depression
Notes	• Funding source: NHS ethical approval for this feasibility study was granted in December 2014. This work was funded by Guy's and St Thomas' charity (GSTT, grant number: EFT130206). The views expressed in this article are those of the authors and not necessarily those of the GSTT charity. The founders had no role in the design and conduct of the study; the collection, management, analysis, and interpretation of the data; and the preparation, review, or approval of the manuscript • Corresponding author: J.L. Hudson (joanna.hudson@kcl.ac.uk)

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "Simple randomisation occurred via Lifeguide which is a software used to program online interventions. An automated random number generator with a 1:1 ratio was used to randomise patients to either therapist supported online cognitive-behavioural therapy (CBT) or online cognitive-behavioural therapy (CBT) only."

iDiD 2016 *(Continued)*

		Comment: Computer random number generator is considered as low risk of bias
Allocation concealment (selection bias)	Unclear risk	Method of allocation concealment was not reported in sufficient detail to perform an adjudication
Blinding of participants and personnel (performance bias) All outcomes	High risk	Quote: "The patient was informed of their group allocation via the online cognitive-behavioural therapy (CBT) program. The patient and trial coordinator also received an automated email. [...] The nature of the trial meant patients were unblinded to allocated treatments." Comment: The methods of intervention and control treatment were physically different, participants and investigators were aware on the treatment allocation group
Blinding of outcome assessment (detection bias) All outcomes	High risk	Quote: "Patients completed self-report outcomes at baseline and 12 weeks post-randomisation." Comment: The Patient Health Questionnaire (PHQ-9), the Generalised Anxiety Disorder (GAD-7), the EuroQoL scale (EQ-5D) and the Brief Illness Perception Questionnaire were self-reported measurements. As such, the outcome assessment was conducted by participants/investigators who were aware of the treatment assigned. We judged the outcome assessment to be at high risk of bias for these outcome measures
Incomplete outcome data (attrition bias) All outcomes	High risk	Quote: "Twenty-five patients were randomised to the supported (N =18) or unsupported arm (N =7); 92% were retained at follow-up." Comment: As reported in Figure 2, 2/18 in the intervention group (1 death, 1 did not like web site) and 0/7 in the control group were lost to the follow-up (> 10% loss to follow-up; there was a differential loss between groups)
Selective reporting (reporting bias)	Low risk	Protocol was published. This study reported many patient-centred outcomes that might be expected for a study of this type (i.e. death, depression, adverse events, life participation)
Other bias	Low risk	There was no evidence of imbalance at baseline. Funding was not involved into the analysis. There were no other apparent sources of bias

Kargar Jahromi 2016

Methods	• Study design: parallel RCT • Time frame: September to March 2014 • Follow-up period: 30 days
Participants	• Country: Iran • Setting: single centre (dialysis ward at Motahhari hospital of Jahrom, Iran) • Inclusion criteria: patients treated with HD; aged 18 to 65 years; not having cognitive and psychological disorders; understanding Persian language with at least primary education; reaching ESKD and being constantly under treatment; undergoing at least 6 months HD 3 times/week for 3 to 4; no kidney transplantation and immigration during intervention, and no formal training in relation to dialysis • Number (analysed/randomised): treatment group (27/30); control group (27/30) • DASS score at baseline: treatment group (16.60 ± 1.50); control group (16.72 ± 1.83) • Mean age ± SD: 69.13 ± 11.82 years • Sex (M/F): treatment group (44%/56%); control group (60%/40%) • Antidepressant medication: none

Kargar Jahromi 2016 *(Continued)*

- Exclusion criteria: history of serious or adverse experiences in the last 6 months; being treated with antidepressant medications; hospitalisation due to acute disease; unwillingness to continue to participate in the study

Interventions	Treatment group • Telephone follow-up 30 days after dialysis shift, in addition to conventional treatment Control group • Usual care Co-interventions • Not reported
Outcomes	• Depression * DASS-21: (cutoff at least 10 = depression) ☐ Hopelessness ☐ Low self-esteem ☐ Low positive affect • Anxiety * DASS-21 ☐ Autonomic arousal ☐ Muscle-skeletal symptoms ☐ Situational anxiety ☐ Subjective experience of anxious arousal • Stress * DASS-21 ☐ Tension ☐ Agitation ☐ Negative affect • Death (all causes) • Withdrawal from dialysis
Notes	• Funding source: not reported • Trial registration identification number: not reported • Corresponding author: F. Poorgholami (farzadpoorgholami1393@gmail.com)

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "The subjects of the study who were selected based on double blind randomised clinical trial consisted of 60 patients with advanced chronic renal disease treated with haemodialysis." Comment: Sequence generation methods were not reported in sufficient detail to perform an adjudication
Allocation concealment (selection bias)	Unclear risk	Method of allocation concealment was not reported in sufficient detail to perform an adjudication
Blinding of participants and personnel (performance bias) All outcomes	Low risk	Quote: "Double blind randomised clinical trial." Comment: A double blind study is considered as low risk of bias

Kargar Jahromi 2016 *(Continued)*

Blinding of outcome assessment (detection bias) All outcomes	High risk	Depression was assessed using the DASS-21. The DASS-21 was a self-reported measurement. As such, the outcome assessment was conducted by participants who could be aware of the treatment assigned. We judged the outcome assessment to be at high risk of bias for these outcome measures
Incomplete outcome data (attrition bias) All outcomes	Low risk	Quote: "In total, 54 patients completed the study. Despite the attempt of researchers to prevent attrition of samples through attending in the field and telephone follow up, but some of the patients did not complete the study. During the research, three patients in the control group and three patients in the intervention group (one patient because of death, two due to major complications, one patient due to inaccessibility by the researcher, and two patients because of declining to do haemodialysis) were excluded from the study." Comment: 3/30 in the intervention group and 3/30 in the control group were lost to the follow-up for reasons that appeared unrelated to treatment (10% loss to follow-up; there was not a differential loss between groups)
Selective reporting (reporting bias)	High risk	There was no published protocol for this study. This study did not report many patient-centred outcomes that might be expected for a study of this type (i.e. fatigue, dialysis withdrawal, life participation, adverse events)
Other bias	Low risk	No evidence of other sources of bias

Kouidi 1997

Methods	• Study design: parallel RCT • Time frame: not reported • Follow-up period: 6 months
Participants	• Country: Greece • Setting: single centre (Renal Unit of the AHEPA Hospital of Thessaloniki) • Inclusion criteria: patients with ESKD undergoing HD; aged 21 to 65 years • Number (analysed/randomised): treatment group (20/24); control group (11/12) • BDI score at baseline: treatment group (21.0 ± 10.4); control group (21.3 ± 11.9) • Mean age ± SD (years): treatment group (49.6 ± 12.1); control group (52.8 ± 10.2) • Sex (M/F): treatment group (11/9); control group (4/7) • Antidepressant medication: none of the participant was on antidepressants or other psychotropic agents • Exclusion criteria: not reported
Interventions	Treatment group • Three weekly sessions of exercise training for 6 months Control group • Sedentary control status Co-interventions • Not reported
Outcomes	• Depression * BDI-II: depressed (0 to 9), mildly depressed (10 to 15), moderately depressed (16 to 23), severely depressed (≥ 24)

Kouidi 1997 *(Continued)*

- HRQoL
  - Quality of Life Index (QLI)
    - ☐ Patient activity
    - ☐ Daily living
    - ☐ Health
    - ☐ Support
    - ☐ Outlook
- Personality parameters
  - Eysenck Personality Questionnaire (EPQ)
    - ☐ Psychoticism
    - ☐ Neuroticism
    - ☐ Extroversion
    - ☐ Lie
- Exercise performance
  - Exercise time
  - Aerobic capacity
- Adverse events
- Haematological and biochemical data
  - HCT
  - Urea
  - Creatinine
  - Potassium
  - Sodium
  - Calcium
  - Phosphate

Notes	• Funding source: not reported • There was no reported registration of the trial within a trial registry, as trial registration was not required in 1997 • Corresponding author: mot reported

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "After the initial evaluation, 24 patients (group A) were randomly assigned to participate in a 6-months exercise renal rehabilitation program (ERRP) at the Sports Medicine Laboratory, whereas the other 12 patients (group B) served as control subjects." Comment: Sequence generation methods were not reported in sufficient detail to perform an adjudication
Allocation concealment (selection bias)	Unclear risk	Method of allocation concealment was not reported in sufficient detail to perform an adjudication
Blinding of participants and personnel (performance bias) All outcomes	High risk	Blinding of participants and/or the investigators was not reported. The methods of intervention and control treatment were physically different. Participants and investigators could be aware of the treatment allocation group
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Quote: "A formal psychosocial assessment, which included affective Beck Depression Inventory (BDI-II), Quality of Life Index (QLI), and Eysenck Personality Questionnaire (EPQ) parameters, was performed with validated questionnaires at the beginning and at the end of the exercise renal rehabilitation program. [...] Psychological tests were administered to all participants at the on-

Kouidi 1997 *(Continued)*

		set and at the end of the study by the same physician, who was not familiar with the patients, nor with the cardiovascular test or the rehabilitation program." Comment: The physician who administered all questionnaires was unaware of the treatment allocation group
Incomplete outcome data (attrition bias) All outcomes	High risk	Quote: "Four patients of group A and one of group B withdrew from the study before the 6-months testing." Comment: 4/24 in the intervention group and 1/12 in the control group were lost to the follow-up (> 10% loss to follow-up; there was a differential loss between groups)
Selective reporting (reporting bias)	Low risk	There was no published protocol for this study. This study reported many patient-centred outcomes that might be expected for a study of this type (i.e. life participation, quality of life, depression, adverse events)
Other bias	Low risk	No evidence of other sources of bias

Kouidi 2010

Methods	• Study design: parallel RCT • Time frame: not reported • Follow-up period: 1 year
Participants	• Country: Greece • Setting: single centre (Renal Unit of the AHEPA Hospital of Thessaloniki) • Inclusion criteria: no history of clinical signs or symptoms of psychiatric, neurological, cardiologic, or pulmonary disorders; absence of diabetes mellitus; no significant electrolytic instability or undisciplined patients; no musculoskeletal limitation or other medical problems contraindicating participation in an exercise training program • Number (analysed/randomised): treatment group (23/24); control group (15/20) • BDI score at baseline: treatment group (22.29 ± 6.71); control group (22.30 ± 6.81) • Mean age ± SD (years): treatment group (46.3 ± 11.2); control group (45.8 ± 10.9) • Sex (M/F): treatment group (14/10); control group (12/8) • Antidepressant medication: none of the patients was on antidepressants or other psychotropic agents • Exclusion criteria: not reported
Interventions	Treatment group • 60 and 90 minutes of exercise during the first 2 hours of dialysis for 1 year Control group • Sedentary control status Co-interventions • Not reported

Outcomes	• Depression
	  * BDI-II: not depressed (0 to 9), mildly depressed (10 to 15), moderately depressed (16 to 23), severely depressed (≥ 24)
	  * HADS
	• Anxiety
	  * HADS

Kouidi 2010 *(Continued)*

- Cardiopulmonary exercise testing
  - VO_{2peak}
  - Exercise time
- Heart rate variability indices
  - SDNN (standard deviation of RR intervals)
  - MSSD (mean square successive differences)
  - pNN50 (percentage of RR intervals differing by more than 50 ms from the preceding RR)
  - LF/HF (low frequency power/high frequency power)
- Clinical outcomes
  - Haemoglobin
  - Urea
  - Creatinine
  - Potassium
  - Sodium
  - Calcium
  - Phosphate
- Adverse events

Notes

- Funding source: not reported.
- Trial registration identification number: not reported
- Corresponding author: A.P. Deligiannis (stergios@med.auth.gr)

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "Fifty participants met these criteria and were assigned to either an exercise training (group A) or to a sedentary control group (group B) through complete randomisation." Comment: Sequence generation methods were not reported in sufficient detail to perform an adjudication
Allocation concealment (selection bias)	Unclear risk	Method of allocation concealment was not reported in sufficient detail to perform an adjudication
Blinding of participants and personnel (performance bias) All outcomes	High risk	Blinding of participants and/or the investigators was not reported. The methods of intervention and control treatment were physically different. Participants and investigators could be aware on the treatment allocation group
Blinding of outcome assessment (detection bias) All outcomes	High risk	Quote: "The Beck Depression Inventory (BDI-II) is a self-rating questionnaire for the assessment of the severity of depression. [...] The Hospital Anxiety and Depression Scale (HADS) is a self-administered questionnaire for assessing depression and anxiety of general hospital patients." Comment: The BDI-II and the HADS were completed by participants. Participants were aware of the intervention they received. Therefore, the outcome assessment for depression and anxiety was not blinded
Incomplete outcome data (attrition bias) All outcomes	High risk	Quote: "In 24 patients of group A (one dropped out of the exercise training program), a final similar exercise test was carried out after the completion of the last training session. Five patients of group B were lost to follow-up." Comment: 1/24 in the intervention group and 5/20 in the control group were lost to the follow-up (> 10% loss to follow-up; there was a differential loss between groups)

Kouidi 2010 *(Continued)*

Selective reporting (reporting bias)	Low risk	There was no published protocol for this study. This study reported many patient-centred outcomes that might be expected for a study of this type (i.e. depression; anxiety; adverse events)
Other bias	Low risk	No evidence of other sources of bias

Krespi 2009

Methods	• Study design: parallel RCT • Time frame: not reported • Follow-up period: 9 weeks
Participants	• Country: UK • Setting: multicentre (Liverpool University and 4 satellite units) • Inclusion criteria: Patients with ESKD undergoing HD • Number (analysed/randomised): treatment group (40/not reported); control group 1 (25/not reported); control group 2 (38/not reported) • HADS score at baseline: treatment group (7.18 ± 4.15); control group 1 (7.04 ± 4.25); control group 2 (8.05 ± 4.37) • Mean age ± SD (years): treatment group (26/14); control group 1 (16/9); control group 2 (27/11) • Sex (M/F): treatment group (50.50 ± 15.02); control group 1 (48.36 ± 16.20); control group 2 (51.97 ± 17.45) • Antidepressant medication: not reported • Exclusion criteria: not reported
Interventions	Treatment group • Relaxation training and general visual imagery technique, 3 to 4 times/week for 6 weeks Control group 1 • Active control using separate voice recording Control group 2 • No treatment Co-interventions • Not reported
Outcomes	• QoL * Short-Form 36 (SF-36) ☐ Physical health summary scale ☐ Mental health summary scale • Beliefs about HD treatment * ESRF Beliefs Questionnaire ☐ Negative attitude towards HD ☐ Negative thinking ☐ Estrangement

Krespi 2009 *(Continued)*

- Ways of evaluating life
  - * Life Evaluation Questionnaire for Haemodialysis Patients
    - ☐ Social support perceived
    - ☐ Detected stress
    - ☐ Creative imagery scale
    - ☐ Active coping
    - ☐ Acceptance/negation
    - ☐ Mental disengagement
    - ☐ Positive interpretation and development
    - ☐ "Keep up good luck"
  - * Ladder Scale
- Depression
  - * HADS: patients with scores between 11 to 21 are considered clinically disordered; the scores between 8 and 10 are considered borderline or abnormal and scores of 0 to 7 are considered normal
- Anxiety
  - * HADS
- Death (all causes)

Notes

- Funding source: not reported
- Trial registration identification number: not reported
- Corresponding author: M.R. Krespi (rkrespi@hotmail.com)

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Sequence generation methods were not reported in sufficient detail to perform an adjudication
Allocation concealment (selection bias)	Unclear risk	Method of allocation concealment was not reported in sufficient detail to perform an adjudication
Blinding of participants and personnel (performance bias) All outcomes	High risk	Blinding of participants was not reported. However, the methods of intervention and control treatment were physically different. The participants and investigators could be aware of the treatment allocation group
Blinding of outcome assessment (detection bias) All outcomes	High risk	The outcomes were considered subjective. The HADS and BDI-II were self-reported measurements. As such, the outcome assessment was conducted by participants who were aware of the treatment received. We judged the outcome assessment to be at high risk of bias for these outcome measures
Incomplete outcome data (attrition bias) All outcomes	High risk	Twenty-three patients were reported to have not completed follow-up (10 patients died, one patient had a kidney transplant, and one patient changed dialysis treatment modality; it was not clear the reasons why the remaining participants did not complete study follow-up) 23/153 (15%) participants did not complete the study. It was unclear whether there was differential loss between treatment groups. The proportion lost to follow-up was > 10%. We judged study attrition to be at high risk of bias
Selective reporting (reporting bias)	High risk	There was no published protocol for this study. This study did not report many patient-centred outcomes that might be expected for a study of this type (i.e. life participation, fatigue, dialysis withdrawal, adverse events)
Other bias	Low risk	No evidence of other sources of bias

Leake 1999

Methods	• Study design: parallel 3 x 3 factorial design RCT • Time frame: not reported • Follow-up period: 1 month
Participants	• Country: USA • Setting: single HD treatment centre (University Hospital at the State University of New York in Stony Brook) • Inclusion criteria: in-centre HD patients who had received HD treatment for at least 5 months • Number (analysed/randomised): 41/42 • CES-D score at baseline: treatment group (16.7 ± 3.5); control group 1 (16.8 ± 4.1); control group 2 (15.0 ± 3.6) • Mean age: 49.5 years • Sex (M/F): 26/16 • Antidepressant medication: not reported • Exclusion criteria: not English; patients with cognitive impairment
Interventions	Treatment group • Strategic self-presentation: participants presented themselves in a videotaped interview Control group 1 • Problem disclosure: participants discussed problems with managing their illness Control group 2 • Videotape about adjusting to dialysis Co-interventions • Developed training materials to help beginning patients adjust to their illness
Outcomes	• Depression * CES-D: cutoff score of ≥ 16 = depression ☐ Physical ☐ Psychological • Patients' satisfaction * Likert-style scale • Patients' perception that questions were representative * Likert-style scale • Social desirability and negative affect * Marlowe-Crowne Social Desirability Scale * Positive Affect Schedule * Negative Affect Schedule
Notes	• Funding source: not reported • There was no reported registration of the trial within a trial registry, as trial registration was not required in 1999 • Corresponding author: R. Friend (rfriend@psych.1.psy.sunysb.edu)

Risk of bias

Bias	Authors' judgement	Support for judgement

Leake 1999 *(Continued)*

Random sequence generation (selection bias)	Unclear risk	Quote: "Blocks of patients were first categorised by sex, months on dialysis and whether they had a comorbid diagnosis of diabetes; there were then randomly assigned to a condition." Comment: Sequence generation methods were not reported in sufficient detail to perform an adjudication
Allocation concealment (selection bias)	Unclear risk	Method of allocation concealment was not reported in sufficient detail to perform an adjudication
Blinding of participants and personnel (performance bias) All outcomes	High risk	Blinding of participants and/or the investigators was not reported. The methods of intervention and control treatment were physically different. Participants and investigators could be aware on the treatment allocation group
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Quote: "Patients completed a questionnaire that served as a baseline measure of adjustment. [...] Four female research assistants, who were unaware of the conditions and hypotheses of the study, conducted the interviews. [...] The first author, who was unaware of the condition to which each patient was assigned, administered the questionnaires at the three time points." Comment: The first author administered the questionnaires and he was unaware on the treatment assigned group
Incomplete outcome data (attrition bias) All outcomes	Low risk	Quote: "Data for the 1-month post-treatment assessment were not available for 1 male patient who ceased treatment before the 1-month assessment." Comment: Overall, 1/42 participants was lost to the follow-up (< 10% loss to follow-up, it was not clear if there was a substantial differential loss between groups)
Selective reporting (reporting bias)	High risk	There was no published protocol for this study. This study did not report many patient-centred outcomes that might be expected for a study of this type (i.e. life participation, fatigue, death, dialysis withdrawal, adverse events)
Other bias	Unclear risk	It was not clear if there was evidence of imbalance at baseline. Not reported in sufficient detail to perform an adjudication

Lerma 2017

Methods	• Study design: parallel RCT • Time frame: not reported • Follow-up period: 9 weeks follow-up (5 weeks of intervention)
Participants	• Country: Mexico • Setting: multicentre (2 HD units located in Mexico City) • Inclusion criteria: ESKD patients with mild or moderate depression and anxiety symptoms • Number (analysed/randomised): treatment group (31/38); control group (18/22) • BDI score at baseline: treatment group (13.6 ± 7.6); control group (15.8 ± 10.0) • Mean age ± SD (years): treatment group (41.8 ± 14.7); control group (41.7 ± 15.1) • Sex (M/F): treatment group (15/16); control group (8/10) • Antidepressant medication: not reported • Exclusion criteria: not reported
Interventions	Treatment group

Lerma 2017 *(Continued)*

- CBT

Control group

- Usual care
- Quote: "Patients in the control group were on a waiting list for 9 weeks; after this period, the CBI was offered to these patients for ethical reasons, but this was not considered in the analysis as part of the intervention group."

Co-interventions

- All patients received standard HD sessions, diet prescription, and self-care advice in accordance with international and local clinical guidelines

Outcomes

- Depression
  * BDI-II: absence of depression (scores of 0 to 9), mild depression (10 to 19), moderate depression (20 to 29), relatively severe depression (30 to 39), severe depression (40 to 63)
    - ☐ Somatic sub scale
    - ☐ Cognitive sub scale
- Anxiety
  * Beck Anxiety Inventory (BAI)
    - ☐ Somatic sub scale
    - ☐ Cognitive sub scale
- HRQoL
  * Quality of Life Scale (QoL)
    - ☐ Physical ability
    - ☐ Psychological function
    - ☐ Positive mood state
    - ☐ Negative mood state
    - ☐ Social role
    - ☐ Social well-being
- Cognitive distortion scores
  * Distorted Thought Scale (DTS)
    - ☐ Internal perfectionism
    - ☐ External perfectionism
    - ☐ Catastrophism
    - ☐ Negative self-labelling
    - ☐ Dichotomous thinking
  * Dysfunctional Attitudes Scale (DAS-A)
    - ☐ Perfectionism
    - ☐ Unconditional self-acceptance
    - ☐ Social external acceptance
    - ☐ Self-acceptance
  * Cognition Check List
    - ☐ Related to anxiety
    - ☐ Related to depression
- Death (all causes)

Notes

- Funding source: One of the author was supported by CONACyT- Mexico with a scholarship for graduate studies
- Trial registration identification number: not reported
- Corresponding author: C. Lerma (dr.claudialerma@gmail.com)

Risk of bias

Bias	Authors' judgement	Support for judgement

Lerma 2017 *(Continued)*

Random sequence generation (selection bias)	Unclear risk	Quote: "Participants in the study were randomly assigned to either the intervention or the control group. [...] The assignment to one of the groups was providing using random numbers." Comment: It was not clear if randomisation was provided using a computer. Sequence generation methods were not reported in sufficient detail to perform an adjudication
Allocation concealment (selection bias)	Unclear risk	Method of allocation concealment was not reported in sufficient detail to perform an adjudication
Blinding of participants and personnel (performance bias) All outcomes	High risk	Quote: "A single-blind, randomised controlled design was used to compare patients with ESKD under haemodialysis treatment with and without the cognitive behavioural intervention. [...] The assignment to one of the groups was concealed to the therapist health-related staff, and administrative personnel. After enrolment, patients became aware of their experimental or control allocation because the waiting list group was informed of the wait period in line with ethical requirements." Comment: A single-blind study is considered as high risk of bias
Blinding of outcome assessment (detection bias) All outcomes	High risk	The BDI-II, the Beck Anxiety Inventory (BAI), the Quality of Life Scale score, the Distorted Thought Scale (DTS), the Dysfunctional Attitudes Scale (DAS-A) and the Cognition Check List were self-reported questionnaires. Participants were aware of the intervention they received. We judged the outcome assessment to be at high risk of bias for these outcome measures
Incomplete outcome data (attrition bias) All outcomes	High risk	As reported in Figure 1, 7/38 in the intervention group (2 deaths, 3 transportation troubles, 2 personal reasons) and 4/22 (1 death, 3 personal troubles) in the control group were lost to the follow-up for reasons that appeared unrelated to treatment (> 10% loss to follow-up; there was not a differential loss between groups).
Selective reporting (reporting bias)	Low risk	There was no published protocol for this study. This study reported many patient-centred outcomes that might be expected for a study of this type (i.e. life participation, depression, death)
Other bias	Low risk	No evidence of other sources of bias

Lii 2007

Methods	• Study design: parallel RCT • Time frame: not reported • Follow-up period: 3 months
Participants	• Country: Taiwan • Setting: multicentre (3 HD units of 2 hospitals in northern Taiwan) • Inclusion criteria: aged over 18 years and literate in Mandarin or Taiwanese languages; diagnosed with ESKD and receiving routine HD treatment and consented to participate • BDI score at baseline: treatment group (15.90 ± 9.89); control group (12.18 ± 8.92) • Number (analysed/randomised): treatment group (20/30); control group (28/30) • Mean age ± SD (years): not reported • Sex (M/F): treatment group (10/10); control group (13/15) • Antidepressant medication: not reported

Lii 2007 *(Continued)*

- Exclusion criteria: history of psychiatric disorders or severe systemic diseases, such as migrating cancer, rheumatoid arthritis or severe congestive heart failure and/or quadriplegic

Interventions	Treatment group • CBT and self-efficacy theory. The therapy ran for 2 hours/ week for 2 months, in 2 small-group session (10 to 15/group) Control group • Usual care and a self-care booklet Co-interventions • Not reported
Outcomes	• Self-care self-efficiency * Strategies Used by People to Promote Health (SUPPH) ☐ Coping ☐ Stress reduction ☐ Decision making ☐ Enjoyment of life • Depression * BDI-II: absence of depression (scores of 0 to 9), mild depression (10 to 19), moderate depression (20 to 29), relatively severe depression (30 to 39), severe depression (40 to 63) • HRQoL * Short Form-36 (SF-36) ☐ Physical functioning ☐ Role limitations owing to physical health problems ☐ Bodily pain ☐ Social functioning ☐ General mental health ☐ Role limitations owing to emotional health problems ☐ Vitality ☐ General health perceptions
Notes	• Funding source: not reported • Trial registration identification number: not reported • Corresponding author: S.L. Tsay (sltsay@ntcn.edu.tw)

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "An independent research assistant (unaware of the baseline data) carried out the concealed randomisation procedure using a random computer-generated list." Comment: Random computer-generated list is considered as low risk of bias
Allocation concealment (selection bias)	Unclear risk	Quote: "An independent research assistant (unaware of the baseline data) carried out the concealed randomisation procedure using a random computer-generated list." Comment: Method of allocation concealment was not reported in sufficient detail to perform an adjudication

Lii 2007 *(Continued)*

Blinding of participants and personnel (performance bias) All outcomes	High risk	Blinding of participants and/or the investigators was not reported. The methods of intervention and control treatment were physically different. Participants and investigators could be aware on the treatment allocation group
Blinding of outcome assessment (detection bias) All outcomes	High risk	The outcomes were considered subjective. The Strategies Used by People to Promote Health (SUPPH), the BDI-II and the Short Form-36 (SF-36) were self-reported measurements. As such, the outcome assessment was conducted by participants who could be aware of the treatment received. We judged the outcome assessment to be at high risk of bias for these outcome measures
Incomplete outcome data (attrition bias) All outcomes	High risk	Quote: "Out of 60 original patients randomly assigned into experimental or control groups, 48 completed the study. [...] After intervention for eight weeks, there were 12 patients who dropped out, including 10 in the treatment group and two in the control group. Reasons for dropout included obligations at home, transfers to another haemodialysis unit or time conflicts." Comment: 10/30 in the intervention group and 2/30 in the control group were lost to the follow-up (> 10% loss to follow-up; there was a differential loss between groups)
Selective reporting (reporting bias)	High risk	There was no published protocol for this study. This study did not report many patient-centred outcomes that might be expected for a study of this type (i.e. fatigue, death, dialysis withdrawal, adverse events)
Other bias	Low risk	No evidence of other sources of bias

Mathers 1999

Methods	• Study design: parallel RCT • Time frame: not reported • Follow-up period: 4.5 weeks
Participants	• Country: USA • Setting: single centre (dialysis outpatients at a facility located in the Southern region of the USA) • Inclusion criteria: HD patients, aged ≥ 65 years; had received HD treatments for at least 3 months; received a treatment for at least 2 hours and 45 minutes/day, 3 days/week; had the ability to read at the ninth grade level; and was not legally blind • Number (analysed/randomised): treatment group (3/5); control group (3/5) • Mean age (range): 69.83 years (68 to 75) • Sex (M/F): treatment group (1/2); control group (1/2) • Antidepressant medication: not reported • Exclusion criteria: not reported
Interventions	Treatment group • Psychosocial education: 3 sessions, 2 days/week, taking approximately 20 minutes each Control group • Usual care Co-interventions • Not reported

Mathers 1999 *(Continued)*

Outcomes	• Psychosocial adjustment * Psychosocial Adjustment to Illness Scale, Self-Report (PAIS-SR)
Notes	• Funding source: not reported • There was no reported registration of the trial within a trial registry, as trial registration was not required in 1999 • Corresponding author: not reported

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "Participants were randomly selected and stratified according to gender, with 2 males and 3 females assigned to either an experimental or control group." Comment: Sequence generation methods were not reported in sufficient detail to perform an adjudication
Allocation concealment (selection bias)	Unclear risk	Method of allocation concealment was not reported in sufficient detail to perform an adjudication
Blinding of participants and personnel (performance bias) All outcomes	High risk	Blinding of participants and/or the investigators was not reported. The methods of intervention and control treatment were physically different. Participants and investigators could be aware on the treatment allocation group
Blinding of outcome assessment (detection bias) All outcomes	High risk	The outcomes were considered subjective. The Psychosocial Adjustment to Illness Scale, Self-Report (PAIS-SR) was self-reported measurements. As such, the outcome assessment was conducted by participants who could be aware of the treatment received. We judged the outcome assessment to be at high risk of bias for these outcome measures
Incomplete outcome data (attrition bias) All outcomes	High risk	Quote: "Six out of 10 original patients, 1 male and 2 females in each of the experimental and control group, completed the study." Comment: 2/5 in the intervention group and 2/5 in the control group were lost to the follow-up (> 10% loss to follow-up; there was not a differential loss between groups)
Selective reporting (reporting bias)	High risk	There was no published protocol for this study. This study did not report many patient-centred outcomes that might be expected for a study of this type (i.e. depression, life participation, fatigue, death, dialysis withdrawal, adverse events)
Other bias	Unclear risk	It was not clear if there was evidence of imbalance at baseline. Not reported in sufficient detail to perform an adjudication

Matthews 2001

Methods	• Study design: parallel RCT 2 x 3 factorial design • Time frame: not reported • Follow-up period: 6 weeks
Participants	• Country: USA

Matthews 2001 *(Continued)*

- Setting: single centre (outpatient HD centre at the University of Miami School of Medicine/Jackson Memorial Hospital in Miami, Fl)
- Inclusion criteria: HD patients; at least a minimal English fluency, cognitively capable of proving informed consent
- Number (analysed/randomised): treatment group (varied/31); control group 1 (varied/31); control group 2 (varied/33)
- Mean age: 49 years
- Sex (M/F): 58%/42%
- Antidepressant medication: not reported
- Exclusion criteria: not reported

Interventions	Treatment group • Christian prayer Control group 1 • Positive visualisation Control group 2 • Usual care Co-interventions • Not reported

Outcomes	• Clinical outcomes
	  * Kt/V
	  * Albumin
	  * Systolic BP
	  * Diastolic BP
	  * IDWG
	  * Serum level of inorganic phosphorus
	  * HCT
	  * Number of new medical problems since the study began
	  * Self-reported response to the question "Have you been feeling better, the same, or worse since the study began?"
	• HRQoL
	  * Health Status Questionnaire Short Form (SF-36)
	  ☐ General health
	  ☐ Social functioning
	  ☐ Bodily pain
	  ☐ Vitality
	• Depression
	  * BDI-II: minimal (scores 0 to 9), mild (scores 10 to 16), moderate (scores 17 to 29), severe (scores 30 to 63)
	• Psychological symptoms
	  * Brief Symptom Inventory (BSI)
	  ☐ Somatization
	  ☐ Depression
	  ☐ Anxiety
	  ☐ Hostility

Matthews 2001 *(Continued)*

- Believe in prayer or positive visualisation
  - * Believe in Prayer/Positive Visualisation Questionnaire
    - ☐ Belief in prayer
    - ☐ Belief in positive visualisation
    - ☐ Level of spirituality and religiosity
- Hospitalisation

Notes	• Number of subjects varied because some subjects were not available at the time of data collection due to their medical condition • Funding source: not reported • There was no reported registration of the trial within a trial registry, as trial registration was not required in 2001 • Corresponding author: W.J. Matthews (shamrock@educ.umass.edu)

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "A volunteer, blinded to the purpose and the hypothesis of the study, randomly assigned each subject to one of the six treatment condition." Comment: Sequence generation methods were not reported in sufficient detail to perform an adjudication
Allocation concealment (selection bias)	Unclear risk	Method of allocation concealment was not reported in sufficient detail to perform an adjudication
Blinding of participants and personnel (performance bias) All outcomes	High risk	Blinding of participants and/or the investigators was not reported. The methods of intervention and control treatment were physically different. Participants and investigators could be aware on the treatment allocation group
Blinding of outcome assessment (detection bias) All outcomes	High risk	Quote: "A total of 10 self-reported dependent measures were analysed." Comment: Laboratory data were considered as objective data. However, all questionnaires were self-reported measurements. As such, the outcome assessment was conducted by participants who could be aware of the treatment received. We judged the outcome assessment to be at high risk of bias for these outcome measures
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	As reported in Tables 2 and 3, the number of subjects vary because some subjects were not available at the time of data collection due to their medical condition. The overall number of patients who were lost to the follow-up and the potential differential loss between groups were unclear
Selective reporting (reporting bias)	High risk	There was no published protocol for this study. This study did not report many patient-centred outcomes that might be expected for a study of this type (i.e. fatigue, death, dialysis withdrawal, adverse events)
Other bias	Unclear risk	It was not clear if there was evidence of imbalance at baseline. Not reported in sufficient detail to perform an adjudication

Ouzouni 2009

Methods	• Study design: parallel RCT • Time frame: not reported

Ouzouni 2009 *(Continued)*

	• Follow-up period: 10 months
Participants	• Country: Greece • Setting: single centre (Renal Unit of the AHEPA Hospital of Thessaloniki) • Inclusion criteria: patients with ESKD on maintenance HD 3 days/week, 4 hours/session, for at least 6 months prior to the study; volunteered to participate in the study • Number (analysed/randomised): treatment group (19/20); control group (14/15) • BDI score at baseline: treatment group (19.3 ± 4.9); control group (19.2 ± 3.3) • Mean age ± SD (years): treatment group (47.5 ± 15.7); control group (50.5 ± 11.7) • Sex (M/F): treatment group (14/5); control group (13/1) • Antidepressant medication: none of the patients was on antidepressants or other psychotropic agents • Exclusion criteria: unstable hypertension; heart failure (NYHA class > II), cardiac arrhythmias (> III according to Lown); recent myocardial infarction or unstable angina; diabetes mellitus; active liver disease or orthopaedic problems limiting exercise
Interventions	Treatment group • 10-month supervised exercise-training programme during their HD sessions Control group • Usual care Co-interventions • The subjects remained in a stable medication regimen, diet and dialysis schedule during the study. The dialysis prescription was planned to remain constant by using the same model of filter and a constant composition of the dialysis solution and by keeping the HD session time constant throughout the study. The level of the haemoglobin for all patients during the study was kept stable 11 ± 2 by changing the dose of erythropoietin whenever necessary
Outcomes	• Spiroergometric study * Vo_{2peak} * Maximum heart rate (HR_{max}) * Maximum blood pressure (SBP_{max} and DBP_{max}) * Double product (HR_{max} X SBP_{max}) * Exercise time * Maximum pulmonary ventilation (VE_{max}) * Metabolic equivalents (METs) • Depression * BDI-II: absence of depression (scores of 0 to 9), mild depression (10 to 19), moderate depression (20 to 29), relatively severe depression (30 to 39), severe depression (40 to 63)

Ouzouni 2009 *(Continued)*

- HRQoL
  - * Quality of Life Index (QLI)
    - ☐ Patient's activity
    - ☐ Daily living
    - ☐ Health
    - ☐ Support
    - ☐ Outlook
  - * Living Questionnaire of Minnesota
  - * Life Satisfaction Index
    - ☐ Physical health
    - ☐ Mental health
    - ☐ Sexual life
    - ☐ Support from family and friends
    - ☐ Hobbies
    - ☐ Appearance of QoL
    - ☐ Global evaluation for QoL
  - * Short Form-36 questionnaire (SF-36)
    - ☐ Physical component scale
    - ☐ Mental component scale
- Personality
  - * Eysenck Personality Questionnaire
    - ☐ Personality
    - ☐ Extroversion
    - ☐ Neuroticism
    - ☐ Psychoticism

Notes	• Funding source: not reported • Trial registration identification number: not reported • Corresponding author: A. Deligiannis (stergios@med.auth.gr)

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "They were randomised to either a 10-months supervised exercise-training programme during their haemodialysis sessions (group A – 20 patients) or control status (group B – 15 patients)." Comment: Sequence generation methods were not reported in sufficient detail to perform an adjudication
Allocation concealment (selection bias)	Unclear risk	Method of allocation concealment was not reported in sufficient detail to perform an adjudication
Blinding of participants and personnel (performance bias) All outcomes	High risk	Blinding of participants and/or the investigators was not reported. The methods of intervention and control treatment were physically different. Participants and investigators could be aware on the treatment allocation group
Blinding of outcome assessment (detection bias) All outcomes	High risk	Quote: "All patients were requested to complete the following five different questionnaires." Comment: Laboratory and spiroergometry data were considered as objective data. However, all questionnaires were self-reported measurements. As such, the outcome assessment was conducted by participants who could be aware

Ouzouni 2009 *(Continued)*

		of the treatment received. We judged the outcome assessment to be at high risk of bias for these outcome measures
Incomplete outcome data (attrition bias) All outcomes	Low risk	Quote: "After the randomisation two patients, one of each group, dropped out of the study. One patient in group A stopped training because of medical problems unrelated to exercise, while a patient in group B refused to repeat the functional test at the end of the study." Comment: 1/20 in the intervention group and 1/15 in the control group were lost to the follow-up for reasons that were unrelated to the treatment (<10% loss to follow-up; there was not a differential loss between groups)
Selective reporting (reporting bias)	High risk	There was no published protocol for this study. This study did not report many patient-centred outcomes that might be expected for a study of this type (i.e. fatigue, death, dialysis withdrawal, adverse events)
Other bias	Low risk	No evidence of other sources of bias

Sertoz 2009

Methods	• Study design: parallel RCT • Time frame: not reported • Follow-up period: 4 months
Participants	• Country: Turkey • Setting: single dialysis centre • Inclusion criteria: patients with ESKD on maintenance HD • Number (analysed/randomised): treatment group (15/15); control group (not reported/16) • BDI score at baseline: treatment group (10.7 ± 7.2); control group (16.7 ± 10.1) • Mean age ± SD: 51 ± 15.6 years • Sex (M/F): 18/13 • Antidepressant medication: not reported • Exclusion criteria: serious co-morbid conditions such as severe cardiac, respiratory and hepatic failure; currently under psychiatric treatment; having a living place that was too far from the centre to attend the weekly Sunday rehearsals
Interventions	Treatment group • Participants were engaged in a theatre play Control group • Waiting list for the next rehearsal (usual care) Co-interventions • Not reported

Outcomes	• Depression
	  * BDI-II: absence of depression (scores of 0 to 9), mild depression (10 to 19), moderate depression (20 to 29), relatively severe depression (30 to 39), severe depression (40 to 63)
	• Anxiety
	  * Beck Anxiety Inventory (BAI)

Sertoz 2009 *(Continued)*

- HRQoL
  - World Health Organization Quality of Life Scale short form (WHOQOL-BREF)
    - ☐ Physical
    - ☐ Psychological
    - ☐ Social
    - ☐ Environmental
- Self-esteem
  - Rosenberg Self-Esteem Scale (RSES)
    - ☐ Physical
    - ☐ Psychological
    - ☐ Social
    - ☐ Environmental

Notes	• Funding source: not reported • Trial registration identification number: not reported • Corresponding author: O. O. Seroz (onensertoz@gmail.com)

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "These were then randomly assigned to two groups." Comment: Sequence generation methods were not reported in sufficient detail to perform an adjudication
Allocation concealment (selection bias)	Unclear risk	Method of allocation concealment was not reported in sufficient detail to perform an adjudication
Blinding of participants and personnel (performance bias) All outcomes	High risk	Blinding of participants and/or the investigators was not reported. The methods of intervention and control treatment were physically different. Participants and investigators could be aware on the treatment allocation group
Blinding of outcome assessment (detection bias) All outcomes	High risk	Quote: "Both Beck Depression Inventory (BDI-II) and Beck Anxiety Inventory (BAI) are self-report questionnaires consisting of 21 items." Comment: All questionnaires were self-reported measurements. As such, the outcome assessment was conducted by participants who could be aware of the treatment received. We judged the outcome assessment to be at high risk of bias for these outcome measures
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Table 3 reported that 15 participants in the intervention group completed the study (0/15 lost to follow-up). However, the number of participants who completed the study in the control group (group B) was not reported
Selective reporting (reporting bias)	High risk	There was no published protocol for this study. This study did not report many patient-centred outcomes that might be expected for a study of this type (i.e. fatigue, death, dialysis withdrawal, adverse events)
Other bias	Unclear risk	It was not clear if there was evidence of imbalance at baseline. Not reported in sufficient detail to perform an adjudication

Sofia 2013

Methods	• Study design: parallel RCT

Sofia 2013 *(Continued)*

	• Time frame: not reported • Follow-up period: 21 days
Participants	• Country: Indonesia • Setting: not reported • Inclusion criteria: HD patients with depression • Number (analysed/randomised): not reported • Mean age ± SD (years): not reported • Sex (M/F): not reported • Antidepressant medication: not reported • Exclusion criteria: not reported
Interventions	Treatment group • Relaxation training: Latihan Pasrah Diri Control group • Usual care Co-interventions • Not reported
Outcomes	• HRQoL * KDQOL-SF36
Notes	• Conference abstract • Funding source: not reported • Trial registration identification number: not reported • Corresponding author: not reported.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Sequence generation methods were not reported in sufficient detail to perform an adjudication
Allocation concealment (selection bias)	Unclear risk	Method of allocation concealment was not reported in sufficient detail to perform an adjudication
Blinding of participants and personnel (performance bias) All outcomes	High risk	Blinding of participants and/or the investigators was not reported. The methods of intervention and control treatment were physically different. Participants and investigators could be aware on the treatment allocation group
Blinding of outcome assessment (detection bias) All outcomes	High risk	KDQOL-SF was a self-reported measurement. As such, the outcome assessment was conducted by participants who could be aware of the treatment received. We judged the outcome assessment to be at high risk of bias for these outcome measures
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Not reported in sufficient detail to perform an adjudication
Selective reporting (reporting bias)	Unclear risk	Not reported in sufficient detail to perform an adjudication

Sofia 2013 *(Continued)*

Other bias	Unclear risk	Not reported in sufficient detail to perform an adjudication

Thomas 2017

Methods	• Study design: parallel RCT • Time frame: March to July 2016 • Follow-up period: 8 weeks
Participants	• Country: Canada • Setting: single centre (Jewish General Hospital haemodialysis unit, Montreal, Canada) • Inclusion criteria: spoke English or French and had depression and/or anxiety symptoms as indicated by scores of ≥ 6 on the Patient Health Questionnaire (PHQ-9) and/or General Anxiety Disorder-7 (GAD-7) scales • Number (analysed/randomised): treatment group (17/21); control group (15/20) • PHQ score at baseline: treatment group (12.7 ± 4.2); control group (11.9 ± 5.8) • Mean age ± SD (years): treatment group (66 ± 13); control group (64 ± 14) • Sex (M/F): treatment group (14/7); control group (13/7) • Antidepressant medication: treatment group (4/21; 19%); control group (7/20; 35%) • Exclusion criteria: significant cognitive impairment (determined by an abnormal score on the Mini-Cog); current psychosis; acute suicidal ideation with intent
Interventions	Treatment group • Meditation techniques Control group • Usual care Co-interventions • Both control and intervention groups received Psychoeducational literature on anxiety and depression

Outcomes	• Enrolment rates
	• Intervention completion rates
	• Intervention tolerability
	• Depression
	  * Patient Health Questionnaire (PHQ-9): cutoff at least 10 = depression
	• Anxiety
	  * General Anxiety Disorder-7 (GAD-7)
	• Hospitalisation
	• Adverse events

Notes	• Funding source: N.H. has research contracts funded by F.Hoffman-La Roche Ltd., and Lundbeck Canada Inc. • Corresponding author: S. R. Jewish (soham.rej@mail.mcgill.ca)

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "The interventionists, who were not involved in the recruitment process and patient assessment, randomised the participant codes to the in-

Thomas 2017 *(Continued)*

		tervention group or the control group, using a simple 1:1 computer-generated sequence." Comment: Computer-generated sequence is considered as low risk of bias
Allocation concealment (selection bias)	Unclear risk	Method of allocation concealment was not reported in sufficient detail to perform an adjudication
Blinding of participants and personnel (performance bias) All outcomes	High risk	Blinding of participants was not reported. The methods of intervention and control treatment were physically different. Participants could be aware on the treatment allocation group
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Quote: "Both the assessor and the statistical associate were blinded to randomisation allocation. [...] Participants completed questionnaires with an independent assessor who then assigned each of them an anonymous code." Comment: The outcome assessment was conducted by the assessor who was unaware of the treatment received. We judged the outcome assessment to be at low risk of bias for these outcome measures
Incomplete outcome data (attrition bias) All outcomes	High risk	Quote: "Of the participants randomised to the intervention group, 71% completed the study." Comment: As reported in Figure 1, 4/21 in the intervention group and 5/20 in the control group did not complete the post-questionnaire. Moreover, in the intervention group 6/21 patients did not complete the intervention assigned (> 10% loss to follow-up; there was a differential loss between groups)
Selective reporting (reporting bias)	High risk	There was no published protocol for this study. This study did not report many patient-centred outcomes that might be expected for a study of this type (i.e. fatigue, death, dialysis withdrawal, life participation)
Other bias	Unclear risk	It was not clear if funding was involved into the analysis. There was no evidence of substantial imbalance at baseline. No interim analyses were reported

Tsai 2015

Methods	• Study design: parallel RCT • Time frame: not reported • Follow-up period: 4 weeks
Participants	• Country: Taiwan • Setting: single centre (54-bed dialysis centre within a university-affiliated medical centre in Taiwan) • Inclusion criteria: patients with CKD aged ≥ 18 years without hearing impairment; eligible participants had to be receiving HD in 2 or 3-hour sessions weekly undergoing regular maintenance HD for > 3 months • Number (analysed/randomised): treatment group (32/32); control group (25/32) • BDI score at baseline: treatment group (8.78 ± 6.06); control group (11.04 ± 8.74) • Mean age ± SD (years): treatment group (64.94 ± 9.51); control group (61.08 ± 11.18) • Sex (M/F): treatment group (16/16); control group (12/13) • Antidepressant medication: not reported • Exclusion criteria: bedridden or hospitalised CKD patients
Interventions	Treatment group

Tsai 2015 *(Continued)*

	• Nurse-led breathing training Control group • Waiting-list (control) Co-interventions • Not reported

Outcomes	• Depression
	  * BDI-II: absence of depression (scores of 0 to 9), mild depression (10 to 19), moderate depression (20 to 29), relatively severe depression (30 to 39), and severe depression (40 to 63)
	• HRQoL
	  * Medical Outcome Studies 36-Item Short Form Health Survey (SF-36)
	  ☐ Physical functioning
	  ☐ Bodily pain
	  ☐ General health
	  ☐ Vitality
	  ☐ Mental health
	  ☐ Role limitation due to physical health problems (role–physical)
	  ☐ Role limitation due to emotional problems (role–emotional)
	  ☐ Social functioning
	• Sleep quality
	  * Pittsburgh Sleep Quality Index (PSQI)
	  ☐ Sleep quality
	  ☐ Frequency of sleep disturbances
	  ☐ Sleep onset latency
	  ☐ Sleep duration
	  ☐ Wake-up time
	• Hospitalisation

Notes	• Funding source: not reported • Trial registration identification number: not reported • Corresponding author: P.S. Tsai (ptsai@tmu.edu.tw)

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "The random allocation sequence was generated using free online software providing randomly permuted blocks and random block sizes". Comment: Investigators describes a random component in the sequence generation that could be considered as low risk of bias
Allocation concealment (selection bias)	Low risk	Quote: "Another independent research assistant who did not participate in participant enrolment, data collection, or data analyses generated the allocation sequence. The allocation sequence was concealed in sequentially numbered, opaque, sealed envelopes that were safeguarded by the primary investigator (one of us, P-ST) until it was time to assign the participants to groups. The dialysis nurse who delivered the intervention ensured that each envelope was still sealed, wrote a participant's name." Comment: investigators could not foresee assignment and it could be considered as low risk of bias

Tsai 2015 *(Continued)*

Blinding of participants and personnel (performance bias) All outcomes	High risk	Blinding of participants and/or the investigators was not reported. The methods of intervention and control treatment were physically different. Participants and investigators could be aware on the treatment allocation group
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Quote: "This was an outcome assessor–blind, randomisation controlled trial. [...] An independent research assistant (one of us, S-HT) who was not involved in implementing the intervention and who was blinded to participants' group allocation performed the outcome assessment." Comment: The outcome assessment was conducted by the assessor who was unaware of the treatment received. We judged the outcome assessment to be at low risk of bias for these outcome measures
Incomplete outcome data (attrition bias) All outcomes	High risk	Quote: "Sixty-four participants were randomised equally to either the intervention or the control group. Three participants in the control group subsequently withdrew because of hospitalisation; and four participants in the control group refused to complete post-test questionnaires at Week 6. Only the 57 participants who completed the posttest questionnaires were included in the data analysis." Comment: As reported in the flow chart, 0/32 in nurse-led breathing training group and 7/32 in control group were lost to follow up (> 10% loss to follow up, there was a differential loss between groups)
Selective reporting (reporting bias)	High risk	There was no published protocol for this study. This study did not report many patient-centred outcomes that might be expected for a study of this type (i.e. fatigue, death, dialysis withdrawal, adverse events)
Other bias	Low risk	No evidence of other sources of bias

Vogt 2016

Methods	• Study design: parallel RCT • Time frame: not reported • Follow-up period: 4 months follow-up (6 weeks of intervention)
Participants	• Country: The UK • Setting: multicentre; four dialysis clinics in the UK • Inclusion criteria: consenting ESKD patients who met the cut-off for depression and other eligibility criteria (not reported) • Number (analysed/randomised): treatment group (not reported/4); control group (not reported/5) • Mean age ± SD (years): not reported • Sex (M/F): not reported • Antidepressant medication: not reported • Exclusion criteria: not reported
Interventions	Treatment group • Acceptance and Commitment Therapy (telephone-supported self-help based on ACT) + usual care Control group • Usual care Co-interventions

Vogt 2016 *(Continued)*

	• Not reported

Outcomes	• HRQoL
	  * EuroQol (EQ-5D-5L)
	• Depression
	  * Patient Health Questionnaire (PHQ-9): cutoff at least 10 = depression
	• Acceptance and Action Questionnaire II
	• Valued Living Questionnaire (VLQ)

Notes	• Abstract-only publication • Funding source: not reported • Trial registration identification number: not reported • Corresponding author: not reported

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Sequence generation methods were not reported in sufficient detail to perform an adjudication
Allocation concealment (selection bias)	Unclear risk	Method of allocation concealment was not reported in sufficient detail to perform an adjudication
Blinding of participants and personnel (performance bias) All outcomes	High risk	Blinding of participants and/or the investigators was not reported. The methods of intervention and control treatment were physically different. Participants and investigators could be aware on the treatment allocation group
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Not reported in sufficient detail to perform an adjudication
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Not reported in sufficient detail to perform an adjudication
Selective reporting (reporting bias)	Unclear risk	Not reported in sufficient detail to perform an adjudication
Other bias	Unclear risk	Not reported in sufficient detail to perform an adjudication

AIS - Acceptance of Illness Scale; BDI - Beck Depression Index; BP - blood pressure; CBT - cognitive-behavioural therapy; CES-D - Center for Epidemiological Studies Depression; CKD - chronic kidney disease; DASS - Depression Anxiety Stress Scales; DBP - diastolic blood pressure; DSM - Diagnostic and Statistical Manual of Mental Disorders; ESKD - end-stage kidney disease; HCT - hematocrit; HD - haemodialysis; HADS - Hospital Anxiety Depression Scale; HAM-D - Hamilton Depression Rating Scale; HRQoL -health-related quality of life; IDWG - interdialytic weight gain; KDQOL-SF - Kidney Disease and Quality of Life-Short Form; Kt/V - dialyser urea clearance adequacy; M/F - male/female; MHS - Miller Hope Scale; MINI - Mini International Neuropsychiatric Interview; NYHA - New York Heart Association; QoL - quality of life; RCT - randomised controlled trial; SBP - systolic blood pressure; SCID - structured clinical interview for DSM; SD - standard deviation; STAI - State-Trait Anxiety Inventory; SCr - serum creatinine; URR - urea reduction ratio

Characteristics of excluded studies *[ordered by study ID]*

Study	Reason for exclusion
Allmann 1990	Wrong intervention/control: this study evaluated the glucose polymer Polycose among people treated with HD (not a psychosocial intervention)
ASCEND 2016	Wrong intervention/control: a psychosocial intervention was compared with a pharmacological intervention
Binik 1993	Wrong population: participants were identified before dialysis was required to preserve their lives
Briggs 2004	Wrong intervention: this study evaluated advanced care planning (not a psychosocial intervention; subject of another Cochrane review)
Burkhalter 2015	Wrong population: kidney transplant recipients more than 1 year post-transplant
dos Rios Santos 2013	Wrong intervention/control: examined sleep and autonomic sleep function before and after HD (not a psychosocial intervention)
Hosseini 2012	Wrong intervention/control: psychosocial intervention was compared with a pharmacological intervention
IRCT2017020311885N8	Wrong intervention/control: evaluated trans-cranial stimulation (physical intervention)
Kao 2012	Wrong population: participants with CKD who did not receive dialysis treatment were randomised
NCT1225458	Wrong intervention/control: evaluated additional clinical assessments (not a psychosocial intervention)
Sangill 2006	Wrong intervention/control: evaluated glucose added to the dialysis fluid (not a psychosocial intervention)
SMILE 2010	Wrong intervention/control: evaluated the effects of feedback to renal providers or nurse management of patients to treat symptoms related to ESKD (not psychosocial interventions)
Watson 2015	Wrong population: participants were in pre-dialysis CKD (stages 3 and 4)
Zhao 2017	Wrong intervention/control: psychosocial intervention was compared with a pharmacological intervention

CKD - chronic kidney disease; ESKD - end-stage kidney disease; HD - haemodialysis

Characteristics of ongoing studies *[ordered by study ID]*

DOHP 2016

Trial name or title	Design and protocol for the Dialysis Optimal Health Program (DOHP) randomised controlled trial
Methods	The study design is a prospective randomised controlled trial. Ninety-six adult patients initiating HD or PD will be randomly allocated to either the intervention (DOHP) or usual care group.
Participants	Inclusion criteria • Diagnosis of near ESKD confirmed by medical records; expected to commence maintenance dialysis for the first time in the next 3 months or commencement of dialysis in the past 3 months; aged 18 or above and able to converse in English without an interpreter; Individuals who are seeking a mental health professional or taking psychotropic medications will be included Exclusion criteria

DOHP 2016 *(Continued)*

	• Presence of developmental disability or amnestics syndrome impairing their ability to learn from the intervention; participants returning to dialysis following a failed kidney transplant; and co-morbid serious illness as defined by the treating physician
Interventions	Treatment group • Participants receiving the intervention will receive nine (8 + 1 booster session) sequential sessions based on a structured information/workbook, psychosocial and educational supports and skills building Control group • Usual care

Outcomes	• Depression
	  * HADS
	• Anxiety
	  * HADS
	• HRQoL
	  * KDQOL instrument
	• Self-efficacy
	  * General Self-Efficacy Scale
	• Clinical indices
	  * Albumin
	  * Haemoglobin

Starting date	March 2015
Contact information	Chantal F. Ski; Email: Chantal.Ski@acu.edu.au.
Notes	Setting: Nephrology unit of St Vincent's Hospital, Melbourne, Australia. Trial Registration number: ACTRN12615000810516.

NCT02011139

Trial name or title	Cognitive-behavioural (CBT) in ESRD patients with depression
Methods	Patients in HD were divided in CBT group and control group
Participants	Inclusion criteria • Patients with ESKD on HD more than 3 months; patients with BDI-II score ≥ 15 points; adult with age ≥ 20 years old; both genders; patients who were able to understand and willing to sign the written informed consent Exclusion criteria • Patients on HD due to AKI; patients who are on admission; undergoing chemotherapy or radiation therapy due to progressive malignant disease; patients who are planning kidney transplantation within few months; with cognitive dysfunction, mental retardation, and drug addict; unavailable for adequate communication with researchers; patients who changed anti-depressive agent or dose within 2 months before/after the trial.
Interventions	Treatment group • 12 sessions of cognitive-behavioural group therapy in the first 12 weeks Control group

NCT02011139 *(Continued)*

	• Usual care

Outcomes	• Depression
	  * BDI-II
	  * Hamilton Depression Rating Scale (HAMD-17)
	  * Diagnosis of major depressive disorder (DSM-IV)
	• Anxiety
	  * BAI
	• Stress
	  * Perceived Stress Scale
	• HRQoL
	  * KDQOL
	  * WHO Quality of Life-BREF (WHOQOL-BREF)
	• Anxiety
	  * BAI
	• Stress
	  * Perceived Stress Scale
	• HRQoL
	  * KDQOL
	  * WHO Quality of Life-BREF (WHOQOL-BREF)
	• Temperament and Character
	  * Temperament and Character Inventory (TCI)
	• Biomarker related with depression
	  * Serotonin
	• Additional anti-depressant use after trial

Starting date	October 2013
Contact information	C. S. Lim; Email: cslimjy@snu.ac.kr
Notes	Setting: Seoul National University Boramae Hospital, Seoul, Korea. Trial registration number: NCT02011139.

NCT03162770

Trial name or title	Mindfulness meditation practice during haemodialysis
Methods	Fifty patients will be randomly separated in two groups, twenty five each group, half of them in the control group and the other half in the intervention group
Participants	Inclusion criteria • HD patients of the Einstein Dialysis Center; 18 years to 100 years (adult, senior); both genders Exclusion criteria • Participants who refused to signed the informed consent
Interventions	Treatment group • The intervention group will be enrolled in the meditation protocol, for 12 weeks, 3 days a week during the HD session Control group • The control group will be wait-listed

NCT03162770 *(Continued)*

	Then after the evaluations, the control group will receive the intervention of meditation, while the intervention group will not receive any intervention

Outcomes	• Depression, stress, QoL, sleep disorders, biochemical parameters
	  * Mindful Attention Awareness Scale (MAAS)
	• HRQoL
	  * KDQOL
	• Depression
	  * BDI
	• Sleep
	  * PSQI
	• Stress
	  * Perceived Stress Scale (PSS)
	• Depression and stress
	  * Self-Compassion Scale (SCS)
	• Assessment of comorbidities
	  * Index of coexistent diseases (ICED)

Starting date	March 2018
Contact information	Erika Bevilaqua Rangel; Email: not reported
Notes	Setting: Hospital Israelita Albert Einstein. Brazil. Trial registration number: NCT03162770

NCT03330938

Trial name or title	Decreasing depression and anxiety and their effect on QoL of ESRD patients (end-stage renal disease) (ESRD)
Methods	Depressed patients with ESKD were randomised to the cognitive-behavioural intervention and resilience group (intervention group) or cognitive-behavioural Intervention without resilience
Participants	Inclusion criteria • Participants older 18 and younger than 61 years; both genders; depression score in the BDI > 30 points; anxiety score in the BAI > 40 points; have not been hospitalised over the last 6 months; signing of informed consent Exclusion criteria • Patients who were not be able to communicate in the Spanish language; presence of psychiatric comorbidity (suicide ideation or depressive or anxious)
Interventions	Treatment group • CBT and resilience 8 sessions total, once a week for eight weeks, 2 hours long each, consistent of 6 sessions of CBT plus 2 sessions to improve resilience strengths Control group • CBT 8 sessions total, once a week, 2 hours long each. CBT without resilience strengthening
Outcomes	• HRQoL * KDQOL 36
Starting date	December 2017

NCT03330938 *(Continued)*

Contact information	Cristina Jazmín Gonzalez Flores; Email: crisjaz_10@hotmail.com
Notes	Setting: Hospital Civil de Guadalajara, Jalisco, Mexico. Trial registration number: NCT03330938

NCT03406845

Trial name or title	Mindfulness and HEP in dialysis patients with depression and anxiety
Methods	HD patients with depression were randomly assigned in chair-side mindfulness intervention or Health Enhancement Plan (HEP) group
Participants	Inclusion criteria • 18 years to 100 years (adult, senior); both genders; currently receiving maintenance HD; with depression (Patient Health Questionnaire (PHQ-9) score ≥ 6) and/or anxiety (General Anxiety Disorder-7 (GAD- 7) score ≥ 6); normal cognition or mild cognitive impairment will be addressed on a normal screening result on the 3-minute Mini-Cog Test; patients should have sufficient hearing to follow verbal instructions; be able to sit for 20 to 25 minutes without discomfort; have adequate understanding of English and/or French Exclusion criteria • Mild, moderate, or severe dementia ("abnormal" result on the 3-minute Mini-Cog Test); acute psychotic symptoms; acute suicidal ideation/intent; patients currently receiving active psychotherapy
Interventions	Treatment group • Chair-side mindfulness intervention consists of individually conducted meditative practices, lasting 20 minutes/session, 3 times/week for 8 weeks. The interventions will be conducted during their dialysis sessions. The mindfulness meditation sessions include well-described meditations such as the body scan (being aware of bodily sensation), gentle arm movements, guided and silent breath meditations Control group • Health Enhancement Plan (HEP): meditation-based intervention trials, controlling for several non-specific factors found in a mindfulness meditation group. Participants will learn about health promotion, healthy diet, music, exercise as well as implementing positive health-enhancing life changes both in-session and during at-home practice with the support of a group facilitator, but do not learn mindfulness techniques

Outcomes	• Depression
	  * Patient Health Questionnaire (PHQ-9)
	• Anxiety
	  * General Anxiety Questionnaire (GAD-7)
	• Stress
	  * Perceived Stress Scale (PSS)
	• Perceived Improvement
	  * Perceived Improvement Questionnaire (PIQ)
	• Insomnia
	  * Athens Insomnia Scale (AIS)
	• HRQoL
	  * Patient's assessment on QoL (EuroQOL)
	• Edmonton symptom
	  * Edmonton Symptom Assessment Scale (ESAS)

NCT03406845 *(Continued)*

	• Social difficulties * Social Difficulties Inventory (SDI) • Inflammatory markers • Heart rate variability (HRV) • Circadian rhythm and sleep quality
Starting date	May 2018
Contact information	Marouane Nassim; Email: marouane.nassim@mail.mcgill.ca
Notes	Setting: McGill University Health Center, Toronto. Trial registration number: NCT03406845.

van der Borg 2016

Trial name or title	Protocol of a mixed method, randomised controlled study to assess the efficacy of a psychosocial intervention to reduce fatigue in patients with End-stage renal disease (ESRD)
Methods	This study follows a mixed-methods design in which both quantitative and qualitative data will be collected. A multi-centre, RCT with repeated measures will be conducted to quantitatively assess the efficacy of the psychosocial intervention in reducing fatigue and improving QoL in ESKD patients. Additional secondary outcomes and medical parameters will be assessed. Outcomes will be compared to patients receiving usual care. A sample of 74 severely fatigued dialysis patients will be recruited from 10 dialysis centres. Patients will be randomly assigned to the intervention or control group. Outcomes will be assessed at baseline, post intervention/16 weeks, and at three and six-month follow-ups. A qualitative process evaluation will be conducted parallel to/following the effectiveness RCT. Interviews and focus groups will be conducted to gain insight into patients' and social workers' perspectives on outcomes and implementation procedures. Implementation fidelity will be assessed by audio-taped and written registrations. Participatory methods ensure the continuous input of experiential knowledge, improving the quality of study procedures and the applicability of outcomes.
Participants	Inclusion criteria • Adult patients (age ≥ 18 years), male or female, who undergo day dialysis (HD), PD, at home, a hospital or a dialysis centre); experiencing (severe) fatigue (score CIS-fatigue scale ≥ 35); being able to walk/move for at least 10 min with or without a supporting device such as a walking stick; having a sufficient understanding of the Dutch language in order to participate in counselling, (group) interviews and fill out the questionnaires adequately Exclusion criteria • Dialysis during the night (since it is assumed that patients on day dialysis experience more severe fatigue compared to patients on night dialysis); participation in other studies or treatments aimed at reducing fatigue; treatment by a psychologist or psychiatrist (for severe psychiatric problems such as depression, psychosis, personality disorders or schizophrenia); alcohol or drug addiction.
Interventions	Treatment group • Usual treatment and psychosocial counselling by a social worker in the dialysis department, for 16 weeks Control group • Usual care
Outcomes	• Fatigue * Checklist Individual Strength (CIS-fatigue)

van der Borg 2016 *(Continued)*

- HRQoL
  - Quality of life Kidney Disease and Quality of Life Short Form (KDQOL-SF)
- Social support
  - Social Support Inventory (SSL-I + SSL-D)
  - Subscale Utrechtse Coping Lijst (UCL)
- Illness cognitions
  - Illness Cognition Questionnaire (ICQ)
- Illness perceptions
  - Illness Perception Questionnaire (IPQ-R)
- Coping
  - Cognitive Emotion Regulation Questionnaire (CERQ)
- Catastrophizing thoughts
  - Fatigue Catastrophizing Scale (J-FCS)
- Mastery
  - Mastery Scale
- Depression
  - Depression Patient Health Questionnaire (PHQ-9)

Starting date	Not reported
Contact information	W. van der Borg; Email: w.vanderborg@vumc.nl
Notes	Setting: Department of Medical Humanities, VU University Medical Center/EMGO, Amsterdam, The Netherlands. Trial registration number: NTR5366

WICKD 2019

Trial name or title	Wellbeing intervention for chronic kidney disease (WICKD): a randomised controlled trial study protocol
Methods	This is a 3-arm, wait list, single-blind randomised controlled trial testing the efficacy of the Stay Strong App in improving psychological distress, depressive symptoms, QoL and treatment adherence among Indigenous clients undergoing HD in Alice Springs and Darwin with follow-up over two periods of 3 months (total of 6 months observation). The study compares the efficacy of MCP using the AIMhi Stay Strong App with two control groups (control app intervention and treatment as usual).
Participants	Inclusion criteria • Aboriginal and/or Torres Strait Islander person and aged ≥18 years, currently receiving maintenance HD in Alice Springs or Darwin and having been receiving this treatment for more than 6 months Exclusion criteria • < 18 years, guardianship order in place, or unable to give informed consent (e.g. cognitively or visually impaired)
Interventions	Treatment group • Early treatment with motivational care planning (MCP) using the Stay Strong App (62 participants); participants received MCP at baseline Control group 1 • Contact control/delayed treatment with the Stay Strong App (62 participants); participants received MCP after 3 months

WICKD 2019 *(Continued)*

	Control group 2 • Treatment as usual/delayed treatment with the Stay Strong App (32 participants) (usual care)
Outcomes	• Psychological distress * The Kessler Distress Scale (K10) • Depression * The adapted Patient Health Questionnaire (PHQ-9) • QoL * The EuroQoL instrument (EQ-5D) ☐ Mobility ☐ Self-care ☐ Usual activities ☐ Pain and discomfort ☐ Anxiety and depression • Adherence to dialysis treatment planning through file audit • Cost effectiveness * Costs of dialysis * Costs of inpatient hospitalisations * ED presentations * Estimation of outpatient health care use
Starting date	February 2017
Contact information	Kylie M. Dingwall; kylie.dingwall@menzies.edu.au
Notes	Protocol. Setting: Alice Springs and Charles Darwin University, Australia. Trial registration number: ACTRN12617000249358

AKI - acute kidney injury; BAI - Beck Anxiety Inventory; BDI-II - Beck Depression Inventory-II; CBT - cognitive behaviour therapy; ESKD - end-stage kidney disease; HADS - Hospital Anxiety and Depression Scale; HD - haemodialysis; HRQoL - health-related quality of life; KDQOL - Kidney Disease Quality of Life; PD - peritoneal dialysis; PSQI - Pittsburgh Sleep Quality Index; QoL - quality of life

DATA AND ANALYSES

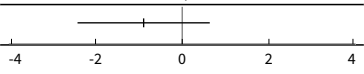
Comparison 1. Acupressure versus usual care

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Major depression	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
2 Depression	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
3 Health-related quality of life	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
4 Anxiety	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
5 Stress	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
6 Withdrawal from intervention	1		Risk Ratio (IV, Random, 95% CI)	Totals not selected

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
7 Hospitalisation	1		Risk Ratio (IV, Random, 95% CI)	Totals not selected

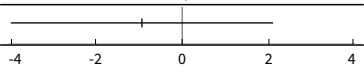
Analysis 1.1. Comparison 1 Acupressure versus usual care, Outcome 1 Major depression.

Study or subgroup	Acupressure N	Acupressure Mean(SD)	Usual care N	Usual care Mean(SD)	Mean Difference Random, 95% CI	Mean Difference Random, 95% CI
Hmwe 2015	54	2.8 (3.9)	54	3.7 (4.2)		-0.89[-2.42,0.64]



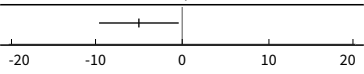
Analysis 1.2. Comparison 1 Acupressure versus usual care, Outcome 2 Depression.

Study or subgroup	Acupressure N	Acupressure Mean(SD)	Usual care N	Usual care Mean(SD)	Mean Difference Random, 95% CI	Mean Difference Random, 95% CI
Hmwe 2015	54	9.5 (7.6)	54	10.4 (8.4)		-0.93[-3.95,2.09]



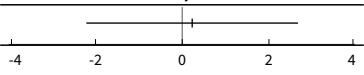
Analysis 1.3. Comparison 1 Acupressure versus usual care, Outcome 3 Health-related quality of life.

Study or subgroup	Acupressure N	Acupressure Mean(SD)	Usual care N	Usual care Mean(SD)	Mean Difference Random, 95% CI	Mean Difference Random, 95% CI
Hmwe 2015	54	19 (11.9)	54	24 (12.5)		-5[-9.59,-0.41]



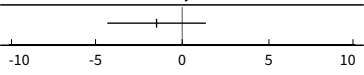
Analysis 1.4. Comparison 1 Acupressure versus usual care, Outcome 4 Anxiety.

Study or subgroup	Acupressure N	Acupressure Mean(SD)	Usual care N	Usual care Mean(SD)	Mean Difference Random, 95% CI	Mean Difference Random, 95% CI
Hmwe 2015	54	7.9 (7.1)	54	7.7 (5.8)		0.23[-2.21,2.67]



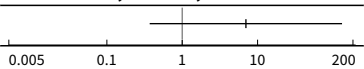
Analysis 1.5. Comparison 1 Acupressure versus usual care, Outcome 5 Stress.

Study or subgroup	Acupressure N	Acupressure Mean(SD)	Usual care N	Usual care Mean(SD)	Mean Difference Random, 95% CI	Mean Difference Random, 95% CI
Hmwe 2015	54	9.6 (7.5)	54	11.1 (7.6)		-1.48[-4.32,1.36]



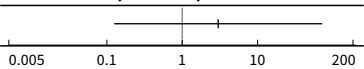
Analysis 1.6. Comparison 1 Acupressure versus usual care, Outcome 6 Withdrawal from intervention.

Study or subgroup	Acupressure n/N	Usual care n/N	Risk Ratio IV, Random, 95% CI	Risk Ratio IV, Random, 95% CI
Hmwe 2015	3/54	0/54		7[0.37,132.35]



Analysis 1.7. Comparison 1 Acupressure versus usual care, Outcome 7 Hospitalisation.

Study or subgroup	Acupressure n/N	Usual care n/N	Risk Ratio IV, Random, 95% CI	Risk Ratio IV, Random, 95% CI
Hmwe 2015	1/54	0/54		3[0.12,72.05]

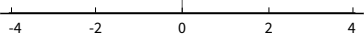


Comparison 2. Cognitive-behavioural therapy versus usual care

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Major depression	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
2 Depression (any severity)	1		Risk Ratio (IV, Random, 95% CI)	Totals not selected
3 Depression	4	230	Mean Difference (IV, Random, 95% CI)	-6.10 [-8.63, -3.57]
4 Health-related quality of life	4	230	Std. Mean Difference (IV, Random, 95% CI)	0.51 [0.19, 0.83]
5 Anxiety	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
6 Suicide	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
7 Self-efficacy	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
8 Distorted thinking	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
9 Death (any cause)	2	145	Risk Ratio (IV, Random, 95% CI)	1.09 [0.35, 3.45]

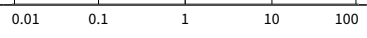
Analysis 2.1. Comparison 2 Cognitive-behavioural therapy versus usual care, Outcome 1 Major depression.

Study or subgroup	CBT N	CBT Mean(SD)	Usual care N	Usual care Mean(SD)	Mean Difference Random, 95% CI	Mean Difference Random, 95% CI
Duarte 2009	36	2 (3.1)	38	3.5 (2.9)		-1.5[-2.87,-0.13]



Analysis 2.2. Comparison 2 Cognitive-behavioural therapy versus usual care, Outcome 2 Depression (any severity).

Study or subgroup	CBT n/N	Usual care n/N	Risk Ratio IV, Random, 95% CI	Risk Ratio IV, Random, 95% CI
Cukor 2014	2/19	5/8		0.17[0.04,0.69]



Analysis 2.3. Comparison 2 Cognitive-behavioural therapy versus usual care, Outcome 3 Depression.

Study or subgroup	CBT N	CBT Mean(SD)	Control N	Control Mean(SD)	Mean Difference Random, 95% CI	Weight	Mean Difference Random, 95% CI
Lii 2007	20	12.9 (6.6)	28	21.4 (15.1)		16.09%	-8.54[-14.84,-2.24]
Lerma 2017	31	7.1 (7.2)	18	14.7 (9.7)		24.13%	-7.6[-12.75,-2.45]
Cukor 2014	33	11.7 (9.8)	26	14.5 (8.5)		29.26%	-2.8[-7.47,1.87]
Duarte 2009	36	10.8 (8.8)	38	17.6 (11.2)		30.53%	-6.8[-11.38,-2.22]
Total ***	**120**		**110**			**100%**	**-6.1[-8.63,-3.57]**

Heterogeneity: $Tau^2=0$; $Chi^2=2.91$, df=3(P=0.41); $I^2=0\%$

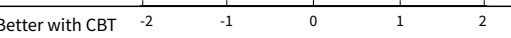
Test for overall effect: Z=4.73(P<0.0001)

Analysis 2.4. Comparison 2 Cognitive-behavioural therapy versus usual care, Outcome 4 Health-related quality of life.

Study or subgroup	CBT N	CBT Mean(SD)	Usual care N	Usual care Mean(SD)	Std. Mean Difference Random, 95% CI	Weight	Std. Mean Difference Random, 95% CI
Lerma 2017	31	112.5 (23.8)	18	91.3 (22.5)		20.92%	0.89[0.28,1.5]
Lii 2007	20	42.9 (5.9)	28	40.5 (9.8)		22.67%	0.28[-0.29,0.86]
Cukor 2014	33	115.3 (25.5)	26	110.6 (25.1)		26.54%	0.18[-0.33,0.7]
Duarte 2009	36	65.3 (19)	38	50 (23.5)		29.86%	0.71[0.24,1.18]
Total ***	**120**		**110**			**100%**	**0.51[0.19,0.83]**

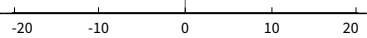
Heterogeneity: $Tau^2=0.03$; $Chi^2=4.34$, df=3(P=0.23); $I^2=30.82\%$

Test for overall effect: Z=3.09(P=0)



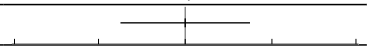
Analysis 2.5. Comparison 2 Cognitive-behavioural therapy versus usual care, Outcome 5 Anxiety.

Study or subgroup	CBT N	CBT Mean(SD)	Usual care N	Usual care Mean(SD)	Mean Difference Random, 95% CI	Mean Difference Random, 95% CI
Lerma 2017	31	7.3 (8)	18	16 (13.8)		-8.7[-15.67,-1.73]



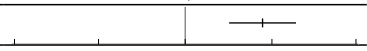
Analysis 2.6. Comparison 2 Cognitive-behavioural therapy versus usual care, Outcome 6 Suicide.

Study or subgroup	CBT N	CBT Mean(SD)	Usual care N	Usual care Mean(SD)	Mean Difference Random, 95% CI	Mean Difference Random, 95% CI
Duarte 2009	36	0.6 (1.2)	38	0.6 (2)		0[-0.75,0.75]



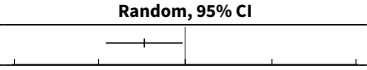
Analysis 2.7. Comparison 2 Cognitive-behavioural therapy versus usual care, Outcome 7 Self-efficacy.

Study or subgroup	CBT N	CBT Mean(SD)	Usual care N	Usual care Mean(SD)	Mean Difference Random, 95% CI	Mean Difference Random, 95% CI
Lii 2007	20	97.6 (13.3)	28	75.3 (20.8)		22.3[12.65,31.95]



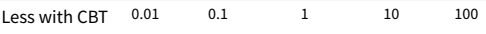
Analysis 2.8. Comparison 2 Cognitive-behavioural therapy versus usual care, Outcome 8 Distorted thinking.

Study or subgroup	CBT N	CBT Mean(SD)	Usual care N	Usual care Mean(SD)	Mean Difference Random, 95% CI	Mean Difference Random, 95% CI
Lerma 2017	31	49.6 (17.9)	18	61.4 (19.7)		-11.8[-22.87,-0.73]



Analysis 2.9. Comparison 2 Cognitive-behavioural therapy versus usual care, Outcome 9 Death (any cause).

Study or subgroup	Experimental n/N	Control n/N	Risk Ratio IV, Random, 95% CI	Weight	Risk Ratio IV, Random, 95% CI
Lerma 2017	2/38	1/22		24.08%	1.16[0.11,12.05]
Duarte 2009	4/41	4/44		75.92%	1.07[0.29,4.01]
Total (95% CI)	**79**	**66**		**100%**	**1.09[0.35,3.45]**
Total events: 6 (Experimental), 5 (Control)					
Heterogeneity: Tau²=0; Chi²=0, df=1(P=0.96); I²=0%					
Test for overall effect: Z=0.15(P=0.88)					

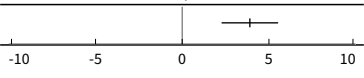


Comparison 3. Cognitive-behavioural therapy (CBT) versus education

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Depression	1		Mean Difference (IV, Random, 95% CI)	Totals not selected

Analysis 3.1. Comparison 3 Cognitive-behavioural therapy (CBT) versus education, Outcome 1 Depression.

Study or subgroup	CBT		Education		Mean Difference	Mean Difference
	N	Mean(SD)	N	Mean(SD)	Random, 95% CI	Random, 95% CI
Al Saraireh 2018	51	15 (5.5)	54	11.1 (2.3)		3.9[2.27,5.53]

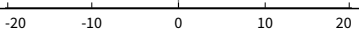


Comparison 4. Counselling versus usual care

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Depression	3	99	Mean Difference (IV, Random, 95% CI)	-3.84 [-6.14, -1.54]
2 Health-related quality of life	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
3 Coping	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
4 Withdrawal from intervention	1		Risk Ratio (IV, Random, 95% CI)	Totals not selected
5 Death (any cause)	2	270	Risk Ratio (IV, Random, 95% CI)	1.69 [0.32, 8.81]

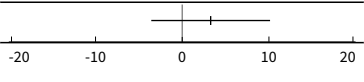
Analysis 4.1. Comparison 4 Counselling versus usual care, Outcome 1 Depression.

Study or subgroup	Counselling		Usual care		Mean Difference	Weight	Mean Difference
	N	Mean(SD)	N	Mean(SD)	Random, 95% CI		Random, 95% CI
Bahmani 2016	9	8.8 (8.8)	11	18.5 (10.5)		6.87%	-9.79[-18.22,-1.36]
Erdley 2014	15	9.3 (3.2)	18	11.3 (7.4)		26.03%	-1.95[-5.73,1.83]
Beder 1999	23	-6.4 (2.4)	23	-2.4 (2.3)		67.1%	-3.96[-5.31,-2.61]
Total ***	**47**		**52**			**100%**	**-3.84[-6.14,-1.54]**
Heterogeneity: Tau²=1.58; Chi²=2.9, df=2(P=0.23); I²=31.11%							
Test for overall effect: Z=3.27(P=0)							



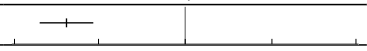
Analysis 4.2. Comparison 4 Counselling versus usual care, Outcome 2 Health-related quality of life.

Study or subgroup	Counselling		Usual care		Mean Difference	Mean Difference
	N	Mean(SD)	N	Mean(SD)	Random, 95% CI	Random, 95% CI
Erdley 2014	15	37.1 (11.1)	18	33.8 (8.5)		3.28[-3.57,10.13]



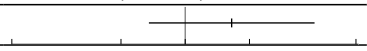
Analysis 4.3. Comparison 4 Counselling versus usual care, Outcome 3 Coping.

Study or subgroup	Counselling N	Counselling Mean(SD)	Usual care N	Usual care Mean(SD)	Mean Difference Random, 95% CI	Mean Difference Random, 95% CI
Beder 1999	23	-17.5 (7)	23	-3.8 (3)		-13.7[-16.79,-10.6]



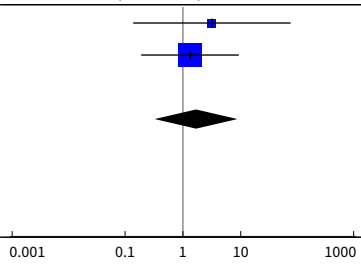
Analysis 4.4. Comparison 4 Counselling versus usual care, Outcome 4 Withdrawal from intervention.

Study or subgroup	Counselling n/N	Usual care n/N	Risk Ratio IV, Random, 95% CI	Risk Ratio IV, Random, 95% CI
Erdley 2014	2/17	0/18		5.28[0.27,102.58]



Analysis 4.5. Comparison 4 Counselling versus usual care, Outcome 5 Death (any cause).

Study or subgroup	Counselling n/N	Usual care n/N	Risk Ratio IV, Random, 95% CI	Weight	Risk Ratio IV, Random, 95% CI
Erdley 2014	1/17	0/18		27.75%	3.17[0.14,72.8]
HED-SMART 2011	2/101	2/134		72.25%	1.33[0.19,9.26]
Total (95% CI)	**118**	**152**		**100%**	**1.69[0.32,8.81]**
Total events: 3 (Counselling), 2 (Usual care)					
Heterogeneity: Tau^2=0; Chi^2=0.21, df=1(P=0.64); I^2=0%					
Test for overall effect: Z=0.62(P=0.53)					

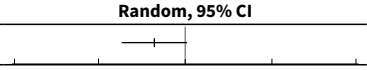


Comparison 5. Education versus usual care

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Depression	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
2 Anxiety	1		Mean Difference (IV, Random, 95% CI)	Totals not selected

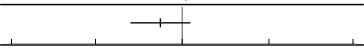
Analysis 5.1. Comparison 5 Education versus usual care, Outcome 1 Depression.

Study or subgroup	Education N	Education Mean(SD)	Usual care N	Usual care Mean(SD)	Mean Difference Random, 95% CI	Mean Difference Random, 95% CI
Espahbodi 2015	27	8.3 (3.7)	28	10.1 (3.4)		-1.78[-3.66,0.1]



Analysis 5.2. Comparison 5 Education versus usual care, Outcome 2 Anxiety.

Study or subgroup	Education N	Education Mean(SD)	Usual care N	Usual care Mean(SD)	Mean Difference Random, 95% CI	Mean Difference Random, 95% CI
Espahbodi 2015	27	8.8 (3.3)	28	10 (3.3)		-1.26[-2.99,0.47]



Comparison 6. Exercise versus usual care

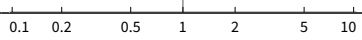
Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Major depression	3	108	Risk Ratio (IV, Random, 95% CI)	0.47 [0.27, 0.81]
2 Depression (any severity)	3	108	Risk Ratio (IV, Random, 95% CI)	0.69 [0.54, 0.87]
3 Depression	3	108	Mean Difference (IV, Random, 95% CI)	-7.61 [-9.59, -5.63]
4 Health-related quality of life	2	64	Mean Difference (IV, Random, 95% CI)	3.06 [2.29, 3.83]
5 Anxiety	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
6 Hospitalisation	1		Risk Ratio (IV, Random, 95% CI)	Totals not selected

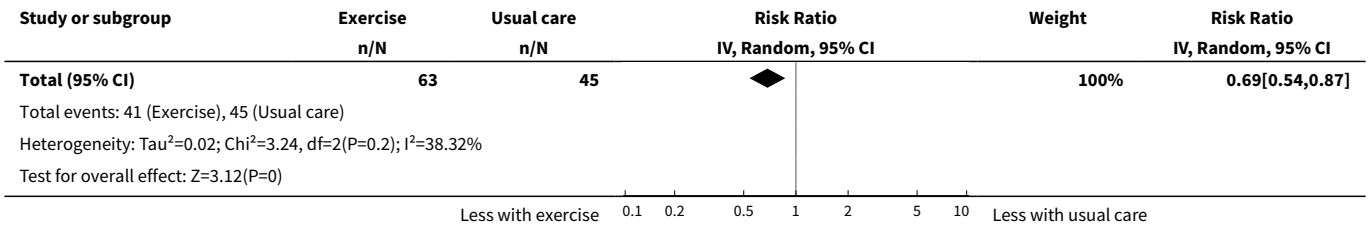
Analysis 6.1. Comparison 6 Exercise versus usual care, Outcome 1 Major depression.

Study or subgroup	Exercise n/N	Usual care n/N	Risk Ratio IV, Random, 95% CI	Weight	Risk Ratio IV, Random, 95% CI
Ouzouni 2009	3/19	11/14		18.97%	0.2[0.07,0.59]
Kouidi 1997	7/20	8/11		32.32%	0.48[0.24,0.97]
Kouidi 2010	13/24	17/20		48.71%	0.64[0.42,0.96]
Total (95% CI)	**63**	**45**		**100%**	**0.47[0.27,0.81]**
Total events: 23 (Exercise), 36 (Usual care)					
Heterogeneity: Tau^2=0.12; Chi^2=3.98, df=2(P=0.14); I^2=49.7%					
Test for overall effect: Z=2.69(P=0.01)					

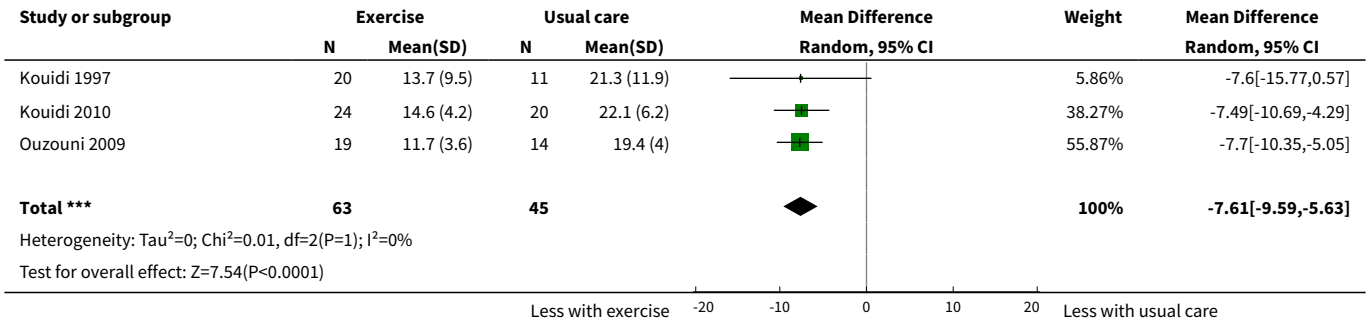
Analysis 6.2. Comparison 6 Exercise versus usual care, Outcome 2 Depression (any severity).

Study or subgroup	Exercise n/N	Usual care n/N	Risk Ratio IV, Random, 95% CI	Weight	Risk Ratio IV, Random, 95% CI
Kouidi 1997	10/20	11/11		21.37%	0.52[0.33,0.81]
Ouzouni 2009	12/19	14/14		29.51%	0.65[0.45,0.92]
Kouidi 2010	19/24	20/20		49.12%	0.8[0.64,0.99]

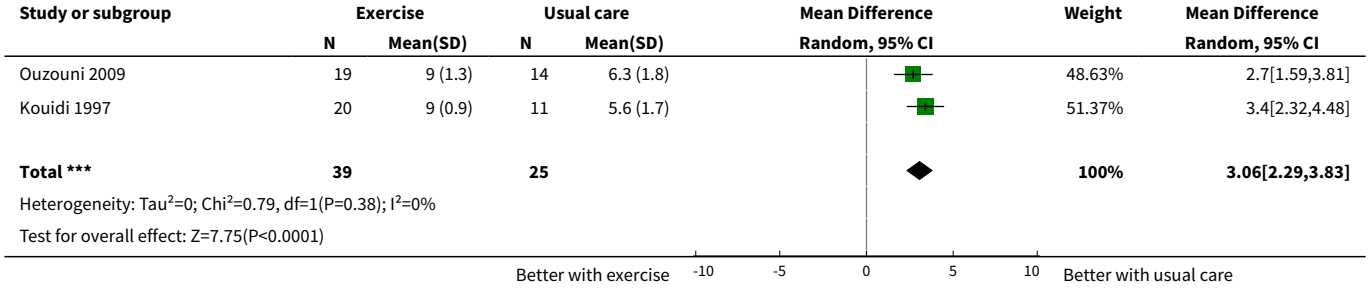




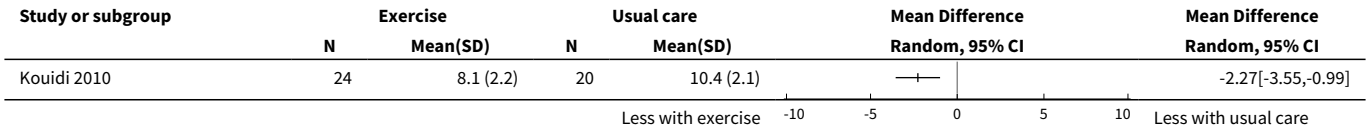
Analysis 6.3. Comparison 6 Exercise versus usual care, Outcome 3 Depression.



Analysis 6.4. Comparison 6 Exercise versus usual care, Outcome 4 Health-related quality of life.

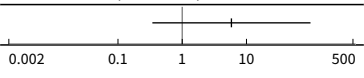


Analysis 6.5. Comparison 6 Exercise versus usual care, Outcome 5 Anxiety.



Analysis 6.6. Comparison 6 Exercise versus usual care, Outcome 6 Hospitalisation.

Study or subgroup	Exercise n/N	Usual care n/N	Risk Ratio IV, Random, 95% CI	Risk Ratio IV, Random, 95% CI
Frey 1999	2/5	0/6		5.83[0.34,99.23]

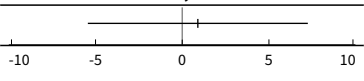


Comparison 7. Exercise versus exercise

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Depression	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
2 Death (any cause)	1		Risk Ratio (IV, Random, 95% CI)	Totals not selected

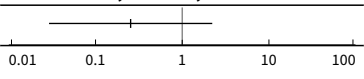
Analysis 7.1. Comparison 7 Exercise versus exercise, Outcome 1 Depression.

Study or subgroup	Endurance N	Endurance Mean(SD)	Resistance N	Resistance Mean(SD)	Mean Difference Random, 95% CI	Mean Difference Random, 95% CI
Dziubek 2016	20	11.9 (10.5)	8	11 (6.3)		0.9[-5.44,7.24]



Analysis 7.2. Comparison 7 Exercise versus exercise, Outcome 2 Death (any cause).

Study or subgroup	Endurance n/N	Resistance n/N	Risk Ratio IV, Random, 95% CI	Risk Ratio IV, Random, 95% CI
Dziubek 2016	1/21	3/16		0.25[0.03,2.22]

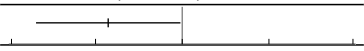


Comparison 8. Exercise versus support group

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Major depression	1		Risk Ratio (IV, Random, 95% CI)	Totals not selected
2 Depression	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
3 Health-related quality of life	1		Mean Difference (IV, Random, 95% CI)	Totals not selected

Analysis 8.1. Comparison 8 Exercise versus support group, Outcome 1 Major depression.

Study or subgroup	Exercise n/N	Support n/N	Risk Ratio IV, Random, 95% CI	Risk Ratio IV, Random, 95% CI
Carney 1987	1/10	5/7		0.14[0.02,0.95]

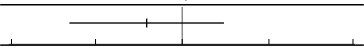


Analysis 8.2. Comparison 8 Exercise versus support group, Outcome 2 Depression.

Study or subgroup	Exercise N	Exercise Mean(SD)	Support N	Support Mean(SD)	Mean Difference Random, 95% CI	Mean Difference Random, 95% CI
Carney 1987	10	-4.3 (3.5)	7	2.5 (2)		-6.8[-9.46,-4.14]

Analysis 8.3. Comparison 8 Exercise versus support group, Outcome 3 Health-related quality of life.

Study or subgroup	Exercise N	Exercise Mean(SD)	Support N	Support Mean(SD)	Mean Difference Random, 95% CI	Mean Difference Random, 95% CI
Carney 1987	10	4.3 (10.3)	7	24.8 (59.5)		-20.5[-65.07,24.07]

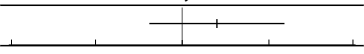


Comparison 9. Meditation versus usual care

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Depression	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
2 Anxiety	1		Mean Difference (IV, Random, 95% CI)	Totals not selected

Analysis 9.1. Comparison 9 Meditation versus usual care, Outcome 1 Depression.

Study or subgroup	Meditation N	Meditation Mean(SD)	Usual care N	Usual care Mean(SD)	Mean Difference Random, 95% CI	Mean Difference Random, 95% CI
Thomas 2017	17	10.3 (5)	15	8.3 (6.1)		2[-1.9,5.9]



Analysis 9.2. Comparison 9 Meditation versus usual care, Outcome 2 Anxiety.

Study or subgroup	Meditation N	Meditation Mean(SD)	Usual care N	Usual care Mean(SD)	Mean Difference Random, 95% CI	Mean Difference Random, 95% CI
Thomas 2017	17	6 (4.3)	15	4.1 (4.9)		1.9[-1.31,5.11]

Less with meditation -10 -5 0 5 10 Less with usual care

Comparison 10. Relaxation techniques versus usual care

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Depression	2	122	Mean Difference (IV, Random, 95% CI)	-5.77 [-8.76, -2.78]
2 Health-related quality of life	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
3 Hospitalisation	1		Risk Ratio (IV, Random, 95% CI)	Totals not selected

Analysis 10.1. Comparison 10 Relaxation techniques versus usual care, Outcome 1 Depression.

Study or subgroup	Relaxation N	Relaxation Mean(SD)	Usual care N	Usual care Mean(SD)	Mean Difference Random, 95% CI	Weight	Mean Difference Random, 95% CI
Heshmatifar 2015	33	23.3 (9.2)	32	30.8 (9.6)		42.52%	-7.53[-12.12,-2.94]
Tsai 2015	32	5.1 (5.3)	25	9.6 (8.9)		57.48%	-4.47[-8.42,-0.52]
Total ***	**65**		**57**			**100%**	**-5.77[-8.76,-2.78]**

Heterogeneity: Tau^2=0; Chi^2=0.98, df=1(P=0.32); I^2=0%

Test for overall effect: Z=3.78(P=0)

Less with relaxation -20 -10 0 10 20 Less with usual care

Analysis 10.2. Comparison 10 Relaxation techniques versus usual care, Outcome 2 Health-related quality of life.

Study or subgroup	Relaxation N	Relaxation Mean(SD)	Usual care N	Usual care Mean(SD)	Mean Difference Random, 95% CI	Mean Difference Random, 95% CI
Tsai 2015	32	45.4 (13.6)	25	43.1 (13.5)		2.36[-4.72,9.44]

Better with relaxation -20 -10 0 10 20 Better with usual care

Analysis 10.3. Comparison 10 Relaxation techniques versus usual care, Outcome 3 Hospitalisation.

Study or subgroup	Relaxation n/N	Usual care n/N	Risk Ratio IV, Random, 95% CI	Risk Ratio IV, Random, 95% CI
Tsai 2015	0/32	3/32		0.14[0.01,2.66]

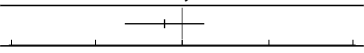
Less with relaxation 0.001 0.1 1 10 1000 Less with usual care

Comparison 11. Spiritual practice versus usual care

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Quality of life	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
2 Depression	2	116	Std. Mean Difference (IV, Random, 95% CI)	1.00 [-3.52, 1.53]
3 Anxiety	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
4 Psychological symptoms	1		Mean Difference (IV, Random, 95% CI)	Totals not selected

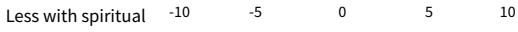
Analysis 11.1. Comparison 11 Spiritual practice versus usual care, Outcome 1 Quality of life.

Study or subgroup	Spiritual N	Spiritual Mean(SD)	Usual care N	Usual care Mean(SD)	Mean Difference Random, 95% CI	Mean Difference Random, 95% CI
Matthews 2001	28	14.2 (3.9)	32	15.2 (5.1)		-1.02[-3.31,1.27]



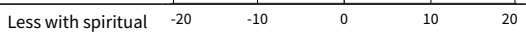
Analysis 11.2. Comparison 11 Spiritual practice versus usual care, Outcome 2 Depression.

Study or subgroup	Spiritual N	Spiritual Mean(SD)	Usual care N	Usual care Mean(SD)	Std. Mean Difference Random, 95% CI	Weight	Std. Mean Difference Random, 95% CI
Babamohamadi 2017	27	14.5 (4.8)	27	31.6 (9.2)		49.54%	-2.3[-2.99,-1.6]
Matthews 2001	30	56.5 (11.3)	32	53.5 (10.1)		50.46%	0.28[-0.22,0.78]
Total ***	**57**		**59**			**100%**	**-1[-3.52,1.53]**
Heterogeneity: Tau^2=3.22; Chi^2=34.53, df=1(P<0.0001); I^2=97.1%							
Test for overall effect: Z=0.77(P=0.44)							



Analysis 11.3. Comparison 11 Spiritual practice versus usual care, Outcome 3 Anxiety.

Study or subgroup	Spiritual N	Spiritual Mean(SD)	Usual care N	Usual care Mean(SD)	Mean Difference Random, 95% CI	Mean Difference Random, 95% CI
Matthews 2001	30	49.1 (9.9)	32	49.3 (11.4)		-0.18[-5.48,5.12]



Analysis 11.4. Comparison 11 Spiritual practice versus usual care, Outcome 4 Psychological symptoms.

Study or subgroup	Spiritual		Usual care		Mean Difference	Mean Difference
	N	Mean(SD)	N	Mean(SD)	Random, 95% CI	Random, 95% CI
Matthews 2001	31	5.6 (4.6)	33	4.8 (5)		0.82[-1.54,3.18]

Less with spiritual -10 -5 0 5 10 Less with usual care

Comparison 12. Spiritual practice versus exercise

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Depression	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
2 Quality of life (mental component summary)	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
3 Quality of life (physical component summary)	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
4 Anxiety	1		Mean Difference (IV, Random, 95% CI)	Totals not selected

Analysis 12.1. Comparison 12 Spiritual practice versus exercise, Outcome 1 Depression.

Study or subgroup	Spiritual		Excericse		Mean Difference	Mean Difference
	N	Mean(SD)	N	Mean(SD)	Random, 95% CI	Random, 95% CI
Frih 2017	28	9.4 (1.9)	25	11.3 (2)		-1.9[-2.95,-0.85]

Less with spiritual -4 -2 0 2 4 Less with excercise

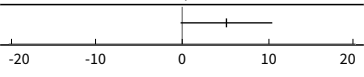
Analysis 12.2. Comparison 12 Spiritual practice versus exercise, Outcome 2 Quality of life (mental component summary).

Study or subgroup	Spiritual		Excericse		Mean Difference	Mean Difference
	N	Mean(SD)	N	Mean(SD)	Random, 95% CI	Random, 95% CI
Frih 2017	28	76.3 (10.2)	25	60.7 (11.1)		15.6[9.84,21.36]

Better with exercise -50 -25 0 25 50 Better with spiritual

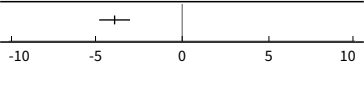
Analysis 12.3. Comparison 12 Spiritual practice versus exercise, Outcome 3 Quality of life (physical component summary).

Study or subgroup	Spiritual		Excericse		Mean Difference	Mean Difference
	N	Mean(SD)	N	Mean(SD)	Random, 95% CI	Random, 95% CI
Frih 2017	28	70 (7.1)	25	64.9 (11.7)		5.1[-0.19,10.39]



Analysis 12.4. Comparison 12 Spiritual practice versus exercise, Outcome 4 Anxiety.

Study or subgroup	Spiritual		Excericse		Mean Difference	Mean Difference
	N	Mean(SD)	N	Mean(SD)	Random, 95% CI	Random, 95% CI
Frih 2017	28	9.3 (2.1)	25	13.2 (1.1)		-3.9[-4.79,-3.01]

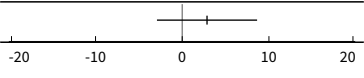


Comparison 13. Spiritual practice versus visualisation

Outcome or subgroup title	No. of studies	No. of partici-pants	Statistical method	Effect size
1 Depression	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
2 Health-related quality of life	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
3 Anxiety	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
4 Psychological symptoms	1		Mean Difference (IV, Random, 95% CI)	Totals not selected

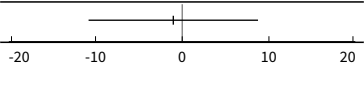
Analysis 13.1. Comparison 13 Spiritual practice versus visualisation, Outcome 1 Depression.

Study or subgroup	Spiritual practice		Visualisation		Mean Difference	Mean Difference
	N	Mean(SD)	N	Mean(SD)	Random, 95% CI	Random, 95% CI
Matthews 2001	30	56.5 (11.3)	30	53.7 (11.6)		2.86[-2.91,8.63]



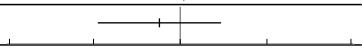
Analysis 13.2. Comparison 13 Spiritual practice versus visualisation, Outcome 2 Health-related quality of life.

Study or subgroup	Spiritual practice		Visualisation		Mean Difference	Mean Difference
	N	Mean(SD)	N	Mean(SD)	Random, 95% CI	Random, 95% CI
Matthews 2001	28	14.2 (3.9)	30	15.2 (27)		-1.03[-10.8,8.74]



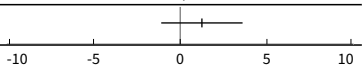
Analysis 13.3. Comparison 13 Spiritual practice versus visualisation, Outcome 3 Anxiety.

Study or subgroup	Spiritual practice		Visualisation		Mean Difference	Mean Difference
	N	Mean(SD)	N	Mean(SD)	Random, 95% CI	Random, 95% CI
Matthews 2001	30	49.1 (9.9)	30	50.3 (1.1)		-1.2[-4.76,2.36]



Analysis 13.4. Comparison 13 Spiritual practice versus visualisation, Outcome 4 Psychological symptoms.

Study or subgroup	Spiritual practice		Visualisation		Mean Difference	Mean Difference
	N	Mean(SD)	N	Mean(SD)	Random, 95% CI	Random, 95% CI
Matthews 2001	31	5.6 (4.6)	31	4.4 (4.8)		1.25[-1.1,3.6]



Comparison 14. Social activity versus usual care

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Depression	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
2 Health-related quality of life	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
3 Anxiety	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
4 Self-esteem	1		Mean Difference (IV, Random, 95% CI)	Totals not selected

Analysis 14.1. Comparison 14 Social activity versus usual care, Outcome 1 Depression.

Study or subgroup	Social activity		Usual care		Mean Difference	Mean Difference
	N	Mean(SD)	N	Mean(SD)	Random, 95% CI	Random, 95% CI
Sertoz 2009	15	7.7 (2.7)	16	10.3 (8.6)		-2.6[-7.03,1.83]

Analysis 14.2. Comparison 14 Social activity versus usual care, Outcome 2 Health-related quality of life.

Study or subgroup	Social activity		Usual care		Mean Difference	Mean Difference
	N	Mean(SD)	N	Mean(SD)	Random, 95% CI	Random, 95% CI
Sertoz 2009	15	13.1 (2.9)	16	14.8 (2.3)		-1.7[-3.55,0.15]

Analysis 14.3. Comparison 14 Social activity versus usual care, Outcome 3 Anxiety.

Study or subgroup	Social activity N	Social activity Mean(SD)	Usual care N	Usual care Mean(SD)	Mean Difference Random, 95% CI	Mean Difference Random, 95% CI
Sertoz 2009	15	12.7 (13)	16	11.1 (11.3)		1.6[-7,10.2]

Less with social activity -20 -10 0 10 20 Less with usual care

Analysis 14.4. Comparison 14 Social activity versus usual care, Outcome 4 Self-esteem.

Study or subgroup	Social activity N	Social activity Mean(SD)	Usual care N	Usual care Mean(SD)	Mean Difference Random, 95% CI	Mean Difference Random, 95% CI
Sertoz 2009	15	0.9 (0.5)	16	1.3 (1.9)		-0.4[-1.36,0.56]

Better with social -4 -2 0 2 4 Better with usual care

Comparison 15. Telephone support versus usual care

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Depression	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
2 Anxiety	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
3 Stress	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
4 Withdrawal from dialysis	1		Risk Ratio (IV, Random, 95% CI)	Totals not selected
5 Death (any cause)	1		Risk Ratio (IV, Random, 95% CI)	Totals not selected

Analysis 15.1. Comparison 15 Telephone support versus usual care, Outcome 1 Depression.

Study or subgroup	Telephone support N	Telephone support Mean(SD)	Usual care N	Usual care Mean(SD)	Mean Difference Random, 95% CI	Mean Difference Random, 95% CI
Kargar Jahromi 2016	27	9 (1.2)	27	16.2 (1.6)		-7.24[-7.99,-6.49]

Less with telephone -10 -5 0 5 10 Less with usual care

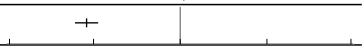
Analysis 15.2. Comparison 15 Telephone support versus usual care, Outcome 2 Anxiety.

Study or subgroup	Telephone support N	Telephone support Mean(SD)	Usual care N	Usual care Mean(SD)	Mean Difference Random, 95% CI	Mean Difference Random, 95% CI
Kargar Jahromi 2016	27	8.7 (0.9)	27	16.7 (2)		-8.04[-8.86,-7.22]

Less with telephone -10 -5 0 5 10 Less with usual care

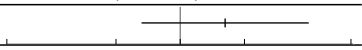
Analysis 15.3. Comparison 15 Telephone support versus usual care, Outcome 3 Stress.

Study or subgroup	Telephone support N	Telephone support Mean(SD)	Usual care N	Usual care Mean(SD)	Mean Difference Random, 95% CI	Mean Difference Random, 95% CI
Kargar Jahromi 2016	27	8.4 (1)	27	13.8 (1.4)		-5.4[-6.07,-4.73]



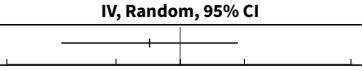
Analysis 15.4. Comparison 15 Telephone support versus usual care, Outcome 4 Withdrawal from dialysis.

Study or subgroup	Telephone support n/N	Usual care n/N	Risk Ratio IV, Random, 95% CI	Risk Ratio IV, Random, 95% CI
Kargar Jahromi 2016	2/30	0/30		5[0.25,99.95]



Analysis 15.5. Comparison 15 Telephone support versus usual care, Outcome 5 Death (any cause).

Study or subgroup	Telephone support n/N	Usual care n/N	Risk Ratio IV, Random, 95% CI	Risk Ratio IV, Random, 95% CI
Kargar Jahromi 2016	0/30	1/30		0.33[0.01,7.87]

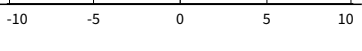


Comparison 16. Telephone support + cognitive behavioural therapy versus cognitive behavioural therapy

Outcome or subgroup title	No. of studies	No. of partici-pants	Statistical method	Effect size
1 Depression	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
2 Quality of life	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
3 Anxiety	1		Mean Difference (IV, Random, 95% CI)	Totals not selected
4 Death (any cause)	1		Risk Ratio (IV, Random, 95% CI)	Totals not selected

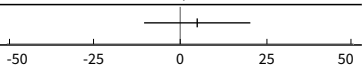
Analysis 16.1. Comparison 16 Telephone support + cognitive behavioural therapy versus cognitive behavioural therapy, Outcome 1 Depression.

Study or subgroup	Telephone+CBT N	Telephone+CBT Mean(SD)	CBT N	CBT Mean(SD)	Mean Difference Random, 95% CI	Mean Difference Random, 95% CI
iDiD 2016	16	7.5 (5.4)	7	7.6 (4.7)		-0.1[-4.47,4.27]



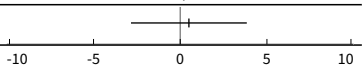
Analysis 16.2. Comparison 16 Telephone support + cognitive behavioural therapy versus cognitive behavioural therapy, Outcome 2 Quality of life.

Study or subgroup	Telephone+CBT		CBT		Mean Difference	Mean Difference
	N	Mean(SD)	N	Mean(SD)	Random, 95% CI	Random, 95% CI
iDiD 2016	13	61.1 (16.2)	5	56.2 (14.3)		4.9[-10.42,20.22]



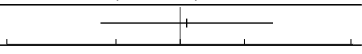
Analysis 16.3. Comparison 16 Telephone support + cognitive behavioural therapy versus cognitive behavioural therapy, Outcome 3 Anxiety.

Study or subgroup	Telephone+CBT		CBT		Mean Difference	Mean Difference
	N	Mean(SD)	N	Mean(SD)	Random, 95% CI	Random, 95% CI
iDiD 2016	16	4.4 (4.1)	7	3.9 (3.6)		0.5[-2.84,3.84]



Analysis 16.4. Comparison 16 Telephone support + cognitive behavioural therapy versus cognitive behavioural therapy, Outcome 4 Death (any cause).

Study or subgroup	Telephone+CBT	CBT	Risk Ratio	Risk Ratio
	n/N	n/N	IV, Random, 95% CI	IV, Random, 95% CI
iDiD 2016	1/18	0/7		1.26[0.06,27.82]



ADDITIONAL TABLES

Table 1. TIDieR framework of interventions descriptions for included studies

Study ID	Intervention	Control	Aim	What	How	Who, where, when	Tailoring/modification	How well: planned	How well: actual
Al Saraireh 2018	**CBT**	**Education**	To assess the level of depression among patients undergoing HD and to compare the effectiveness of CBT versus psycho education	Traditional CBT sessions protocol was compared with psycho educational therapy	Both groups attended seven sessions of one hour. The control group discussed on education about stress management and relaxation, focusing on optimism, deep breathing and problem-solving skills	In private rooms within the dialysis units by two expert researchers, for 7 sessions (3 months)	-	All sessions were administered on one-to-one basis	105 completed the study
Babamohamadi 2017	**Spiritual practice**	**Usual care**	To examine the effect of the Holy Qur'an recitation (music therapy) on depressive symptoms	Holy Qur'an was recited aloud with the voice of Shateri (a well-known actor of the Qur'an)	Listened to the Qur'an recitation (adds religious content to the pleasant, adding further to the relaxation, focus on pleasant sounds, and distraction from negative ruminations) using an MP3 player with headphones	Shateri provided the intervention 3 times a week for 20 min each during 1-month, in the clinic	-	-	54 completed the study
Bahmani 2016	**Counselling**	**Usual care**	To examine a method that considers the needs of patients under special treatment such as dialysis	Combination of treatment including some elements of "existentialism" philosophy and a "cognitive" approach	Discussions on social support, face loneliness, isolation,	Researcher provided the intervention for 12 sessions of 90 min, for 3 months, in the clinic	-	-	20 completed the study

Table 1. TIDieR framework of interventions descriptions for included studies *(Continued)*

					death, losing the opportunity to job, losing education, emotional difficulties and the pain of treatment				
Bargiel-Matusiewicz 2011	**Voice recording**	**Usual care**	To assess the influence of a psychological intervention on the cognitive appraisal	Based on the principles of the Ericksonian therapy and used therapeutic metaphors	Listened to a CD (20 min) with a recorded psychological intervention	Twice a day for 3 weeks. Researchers carried out the intervention in a natural environment	-	-	60 completed the study
Bargiel-Matusiewicz 2011a	**Counselling**	**Usual care**	To assess if psychological intervention improve the level of acceptance of illness	Participants attended in meetings	-	Psychologist provided the intervention for 5 weeks	-	-	The number of subject who completed the study was not clear
Beder 1999	**Counselling**	**Usual care**	To provide existing dialysis programs with a supported model of service	Basic social support consisted of a psycho-educational and support components	Providing information on patients' needs and received additional social support component	Renal social workers provided the intervention in the hospital for 3 months	Helping the patients in mobilizing and assessing and accessing additional supports as needed	-	46 completed the study
Carney 1987	**Exercise**	**Support group**	To assess the effect of exercise training on the psychosocial rehabilitation	5-min sessions on a stationary bicycle ergometer and fast walking interspersed with 5-mi rest periods	All patients were provided with bicycle ergometers for home use	3 time a week at home for 45 to 60 min for 6 months	-	-	17 completed the study

Table 1. TIDieR framework of interventions descriptions for included studies *(Continued)*

					and jogging 1 to 2 laps				
Cukor 2014	**CBT**	**Usual care**	To test the efficacy of an individual chairside CBT	Standard CBT intervention for depression was adapted for HD patients	At the end of the first period, treatments were inverted	Psychologists provided the intervention in chairside, during dialysis, for 3 months	-	-	59 completed the study
Duarte 2009	**CBT**	**Usual care**	To assess the effectiveness of CBT in ESKD patients with a diagnosis of major depression	Educating patients on several aspects of kidney disease, dialysis, depression	Provided self-monitoring of mood status; cognitive restructuring; programming pleasant activities; training on social abilities; exercises	Psychologists provided the intervention (1 hour and 30 min) during dialysis, for 3 months	-	Another psychologist checked written records to monitor the intervention	74 completed the study
Dziubek 2016	**Exercise**	**Exercise**	To evaluate the effects of exercise on depression and anxiety, and compared 2 different types of training in dialysis	Endurance and resistance training were performed	Ergonometer group performed short warm-up, 10 to 15 min of training using a motorized exercise therapy device and 35 to 50 min ride on the cycle ergometer. Resistance group performed strength exercises with weights, balls and Thera Bands and final relaxation	Nephrologist and cardiologist supervised the training performed 3 times a week for 6 months in the clinic	The number of evolutions and load were constant, individually tailored to the patient depending on the tolerance of the exercise	Heart rate, blood pressure and the degree of fatigue were monitored	28 participants completed the study

Table 1. TIDieR framework of interventions descriptions for included studies *(Continued)*

Erdley 2014	**Counselling**	**Usual care**	To assess the efficacy of problem-solving therapy in reducing depressive symptoms.	Providing intervention to manage problems and improve individual coping and problem-solving ability.	Provided orientation to problem solving, evaluating and choosing solutions, and identifying steps to achieve solutions.	Meeting with social workers were provided once weekly in the dialysis unit for 1 hour, for 6 weeks.	-	-	33 completed the study.
Esphabodi 2015	**Education**	**Usual care**	To investigate psychological impacts of psycho education on anxiety and depression	Psycho education sessions	Sessions of anatomy, pathophysiology, variety of treatments, stress management, problem-solving skills, and muscle relaxation	3 sessions of one-hour, in the clinic with a psychiatrist was delivered for 1 month	-	-	55 completed the study
Frey 1999	**Exercise**	**Usual care**	To evaluate the difference in kilocalorie and protein intake in ESKD patients who perform or not perform exercise	Exercise patients cycled on stationary bicycle ergometers	5 minutes warm-up and 5 minutes cool down. Cycling periods were followed by gradually increasing tension	Investigator supervised the intervention for 12 weeks	-	-	All participants completed the study
Frih 2017	**Spiritual practice**	**Exercise**	To determine whether listening to Holy Qur'an recitation improve the effects of exercise on physiological measures	Resistance training consisted of dynamic exercises. Endurance training consisted of ergo cycle exercise. The intervention group listened to the Holy Qur'an	The Holy Qur'an was recited by the reader Al-Dosari, who reads with a relaxing and calming voice. The recitation was played	The reader Al-Dosari recited and participants listened verses 3 times a week during 24 weeks, (20 min), in the clinic	The volume was adjusted according to the patient's comfort	A Borg score of 5 to 6 for dyspnoea or fatigue was set as a target	All participants completed the study

Table 1. TIDieR framework of interventions descriptions for included studies *(Continued)*

					through headphones on MP3				
HED-SMART 2011	**Counselling**	**Usual care**	To determine the efficacy of the intervention on biochemical markers, clinical status, QoL and patient satisfaction	Participants performed the NKF-NUS self-management intervention to take control of their condition	3 main interactive sessions held every two weeks and one booster session Intervention components will include problem solving, overcoming barriers, challenging beliefs, conducting brainstorming sessions, goal setting, and reinforcement. Participants also received an educational booklet	4 sessions (90 min each) were facilitated by two health care professionals	Used feedback, modelling of problem-solving strategies through group support and guidance for individual self-management efforts	Patients were contacted by telephone to assess the progress they were making with their goals	All participants completed the study
Heshmatifar 2015	**Relaxation**	**Usual care**	To assess the efficacy of Benson technique to improve depressive symptoms	The training sessions included discussions about relaxation. The participants were asked to perform the relaxation exercises	Participants performed exercises for 20 minutes. The training method, an educational pamphlet and a CD were handed to subjects to perform the exercises	Researcher provided the intervention in the clinic, for 1 month	-	Subjects' compliance was ensured through text messages	All participants completed the study

Table 1. TIDieR framework of interventions descriptions for included studies *(Continued)*

Hmwe 2015	**Acupressure**	**Usual care**	To evaluate the effects of acupressure on depression, stress, anxiety and general psychological distress	Acupoints for depression, anxiety, and stress was based on the concepts of Chinese medicine	Acupressure is performed by applying consistent fingertip pressure on selected acupoints with rotational movements	Investigator provided acupressure 3 times/ week over 4 weeks, in the clinic	-	A supervisor monitored to ensure that the intervention was performed as the protocol declared	102 the study. 108 were analysed (intention to treat)
iDiD 2016	**Telephone support + CBT**	**CBT**	To explore adherence and examine the efficacy of online CBT sessions and therapist support calls	All patients had access to the iDiD online intervention Patients in the supported arm received three 30 min telephone calls	iDiD sessions were designed to last approximately 60 min. iPads were available at dialysis units. The researcher guided the patient to the most relevant components of sessions	Telephone support was delivered by a trained psychological well-being researcher	For 6 patients was generate an email address and provide brief Internet education, thus these patients received a higher degree of technical support and face to face contact	Patients received reminders. Support calls were audio recorded for supervision and checks	23 completed the study
Kargar Jahromi 2016	**Telephone support**	**Usual care**	To evaluate the effect of nurse-led telephone follow-up on depression, anxiety and stress	The intervention group received telephone follow-up after dialysis and conventional treatment	Key subjects: communication, cognition/development,	Researchers provided every session (30 minutes), for a month	-	The content of the call followed a script	54 completed the study

Table 1. TIDieR framework of interventions descriptions for included studies *(Continued)*

					breathing/circulation, nutrition, elimination, sleep, tissue, pain, sexuality, activity and psychosocial/spirituality/culture			to ensure consistency	
Kouidi 1997	**Exercise**	**Usual care**	To assess the psychosocial effects of exercise training.	The intervention was the exercise training rehabilitation program.	The telemetric spirometer assessed the maximal oxygen consumption during the performance.	Psychologist and trainer supervised the exercise, for 6 months	The intensity and duration of the exercise sessions was gradually increased.	-	31 completed the study.
Kouidi 2010	**Exercise**	**Usual care**	To investigate the effects of exercise on emotional parameters in HD patients	The intervention was the exercise training rehabilitation program	5 min warm-up, 30 to 60 min of cycling, 20 min strengthening time followed by a 5 min cooling off	3 times a week during the first 2 hours of HD session	-	-	38 completed the study
Krespi 2009	**Relaxation**	**Control 1** **Voice control** **Control 2** **Usual care**	To investigate the effects of relaxation	The experimental group received specific visual imagery (using metaphors), delivered by audiotapes	Each tape lasted for 25 minutes, relaxation and imagery took 20 minutes for the techniques and 5 minutes for the specific imaging technique	Researchers provided the intervention 3 to 4 times/week for 6 weeks, during HD	-	The procedures support patients and answer questions	103 completed the study

Table 1. TIDieR framework of interventions descriptions for included studies *(Continued)*

Leake 1999	**Motivational interviewing**	**Control 1** **Motivational interviewing** **Control 2** **Video recording**	To evaluate the therapeutic benefits of strategic self-presentation	Patients participated in a videotaped interview where they portrayed their coping strategies	Patients were asked to provide candid testimonies about their own difficulties on problems with chronic illness	The researchers provided the interview for 1 month	-	Patients were given the opportunity to revise the video tape	41 completed the study
Lerma 2017	**CBT**	**Usual care**	To reduce mild and moderate depression and anxiety symptoms in patients	Intervention consisted of positive self-reinforcement, deep breathing, muscle relaxation, and cognitive restructuring	All components of the programme were adapted to the clinical context of patients with ESRD using images, examples, words, exercises, and everyday scenarios that were relevant to them	The therapist provided the intervention in the clinic during 5 weekly sessions that lasted 2 hours each	Patients who were identified as having severe depression symptoms (BDI > 29 points) were referred for appropriate psychiatric evaluation and care	The therapist recorded comments and received feedback from an expert	49 completed the study
Lii 2007	**CBT**	**Usual care**	To investigate the effects of intervention on depression and QoL	The treatment helped participants to evaluate problem and solve irrational beliefs	Self-management of depression; restructuring beliefs; stress management;	Nurses provided the intervention in the clinic, once a week, for 2 hours	-	-	48 completed the study

Table 1. TIDieR framework of interventions descriptions for included studies *(Continued)*

					and health education				
Mathers 1999	**Education**	**Usual care**	To determine if the psychosocial education sessions had an effect on the adaptation level	7 audiotapes and a companion text module, provided information	Each module consisted in several questions to help participants focus on the topic of the day	Investigators provided 7 sessions, 2 days a week (20 min each), for 4.5 weeks	The investigator was available to answer any questions	-	6 completed the study
Matthews 2001	**Spiritual practice**	**Control 1** **Visualisation** **Control 2** **Usual care**	To explore the effect of intercessory prayer, positive visualisation, and outcome expectancy	Christian prayer group and transpersonal (non-religious) positive visualisation group improved illness	In the intervention group there were 6 intercessors who preyed. In the positive visualisation group, 6 psychology interns focused on patients' problems, using audiotapes	The prayers and the visualisation process took 5 to 15 min/5 days, for 6 weeks	-	An individual checked if the intercessory prayer was performed	The number of subject who completed vary (absent during data collection)
Ouzouni 2009	**Exercise**	**Usual care**	To assess the effects of intradialytic exercise training on HRQoL	Patients in the exercise group followed an exercise rehabilitation programme	Each exercise session included 30 min of cycling and 30 min of strengthening and flexibility exercises (20 min cycling at desired workload and 5 min cool-down)	Physiologists provided the exercised 3 times weekly (90 min each), per 10 months (in the centre)	For the cycling exercise specific devices, which were adjusted to each patient's bed, were used	Their cardiac rhythm and blood pressure were monitored continuously	33 completed the study
Sertoz 2009	**Social activity**	**Usual care**	To investigate the impact of social	Patients were engaged in a play. The play chosen was one by Tuncay	"The Painter", by displaying the social structure and	At the baseline and after 4 months	-	-	The number of subject who

Table 1. TIDieR framework of interventions descriptions for included studies *(Continued)*

			activity on anxiety, depression, self-esteem and QoL	Cucenoglu (drama organisation)	diversity of ideas, maintains the audience's curiosity. The control group participated as the audience				completed the study was not clear
Sofia 2013	**Relaxation**	**Control**	To determine the effect of Latihan Pasrah Diri (LPD) on QoL in HD patients with depression	The intervention group received LPD	LPD was a method combining relaxation and remembrance with a focus on breathing exercises and words contained in the "zirk" (relaxation and repetitive prayer)	21 days	-	-	-
Thomas 2017	**Meditation**	**Usual care**	To determine whether the intervention reduced depression and anxiety symptoms	Chairside meditative practices were performed 4 meditation techniques drawn from mindfulness-based.	Cognitive therapy were practiced in alternating fashion, on the basis of patient preference. In these techniques, the participant is guided to direct their attention toward specific elements of their experience	Interventionists performed 3 times/week, during HD, lasting 10 to 15 min, for 8 weeks	-	Patients were encouraged to practice the techniques at home, but did not have formal logs	32 completed the study

Table 1. TIDieR framework of interventions descriptions for included studies *(Continued)*

Tsai 2015	**Relaxation**	**Control**	To examine the efficacy of a nurse-led, in reducing depressive symptoms and improving sleep	The dialysis nurse administered the audio device–guided breathing training in a quiet room	Patients listened to prerecorded instructions on breathing technique and then practiced the breathing exercise	A trained nurse provided the intervention in the clinic: 8 sessions, twice weekly for 4 weeks	Each patient received an individual coaching session	The nurse supervised to ensure that participants performed them correctly	57 completed the study
Vogt 2016	**Counselling**	**Usual care**	To examine the feasibility and appropriateness of the intervention	Participants received Acceptance and Commitment Therapy (ACT)	The intervention was based on a self-help manual with weekly telephone support	6 weeks.	-	-	-

CBT - cognitive behavioural therapy; ESKD - end-stage kidney disease; HD - haemodialysis

Table 2. Table of studies reporting adverse events

Study ID	Intervention	Control	Adverse events in the intervention arm	Adverse events in the control arm	Comments
HED-SMART 2011	**Counselling**	**Usual care**	Adverse events were reported for the overall population	Adverse events were reported for the overall population	Quote: "Four participants died of cardiovascular causes during the course of the study (2 from each study arm). No other adverse events were reported."
Hmwe 2015	**Acupressure**	**Usual care**	Adverse events were reported for the overall population	Adverse events were reported for the overall population	Quote: "All patients were closely monitored for the occurrence of adverse effects (if any) during the intervention period. [...] In the current study, intra-dialytic hypotension occurred in 11 patients, with 2 of them discontinuing the intervention because hypotensive episodes constantly occurred."
iDiD 2016	**Telephone support + CBT**	**CBT**	No participants experienced an adverse event related to the intervention	No participants experienced an adverse event related to the intervention	Quote: "No trial adverse events occurred.[...] A total of 10 adverse events were detected. None were deemed related to the study. An additional two events occurred that the study team were unaware of and were self-reported by patients. Both included a hospital admission related to a routine renal procedure (e.g. fistula plasty)."
Kouidi 1997	**Exercise**	**Usual care**	No participants experienced an adverse event	No participants experienced an adverse event	Quote: "There were no adverse effects or other complications associated with the training session."
Kouidi 2010	**Exercise**	**Usual care**	No participants experienced an adverse event	No participants experienced an adverse event	Quote: "There were no adverse effects or other complications associated with the training session."
Ouzouni 2009	**Exercise**	**Usual care**	No participants experienced musculoskeletal, cardiovascular and other complication related to exercise training. Other adverse events were not reported	No participants experienced musculoskeletal, cardiovascular and other complication related to exercise training. Other adverse events were not reported	Quote: "There was no musculoskeletal, cardiovascular or other complication related to exercise training during the study."
Thomas 2017	**Meditation**	**Usual care**	No participants experienced an adverse event	No participants experienced an adverse event	Quote: "No adverse events were observed."

CBT - cognitive behavioural therapy

APPENDICES

Appendix 1. Electronic search strategies

DATABASE	Search Terms
CENTRAL	1. MeSH descriptor: [Renal Dialysis] explode all trees 2. MeSH descriptor: [Hemofiltration] explode all trees 3. MeSH descriptor: [Kidney Failure, Chronic] explode all trees 4. dialysis:ti,ab,kw in Trials (Word variations have been searched) 5. haemodialysis or haemodialysis:ti,ab,kw in Trials (Word variations have been searched) 6. hemofiltration or haemofiltration:ti,ab,kw in Trials (Word variations have been searched) 7. hemodiafiltration or haemodiafiltration:ti,ab,kw in Trials (Word variations have been searched) 8. CAPD or CCPD or APD:ti,ab,kw in Trials (Word variations have been searched) 9. "end-stage kidney" or "end-stage renal" or "endstage kidney" or "endstage renal":ti,ab,kw in Trials (Word variations have been searched) 10.eskd or eskf or esrd or esrf:ti,ab,kw in Trials (Word variations have been searched) 11.#1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10 12.MeSH descriptor: [Depression] explode all trees 13.MeSH descriptor: [Depressive Disorder] explode all trees 14.MeSH descriptor: [Adjustment Disorders] explode all trees 15.MeSH descriptor: [Adaptation, Psychological] explode all trees 16.depression or depressed or depressive or anxiety or anxious:ti,ab,kw in Trials (Word variations have been searched) 17.#12 or #13 or #14 or #15 or #16 18.#11 and #17
MEDLINE	1. exp Renal Dialysis/ 2. exp Hemofiltration/ 3. Kidney Failure, Chronic/ 4. dialysis.tw. 5. (haemodialysis or haemodialysis).tw. 6. (hemofiltration or haemofiltration).tw. 7. (hemodiafiltration or haemodiafiltration).tw. 8. (CAPD or CCPD or APD).tw. 9. (end-stage kidney or end-stage renal or endstage kidney or endstage renal).tw. 10.(ESKD or ESKF or ESRD or ESRF).tw. 11.or/1-10 12.Depression/ 13.exp Depressive Disorder/ 14.Adjustment Disorders/ 15.exp Adaptation, Psychological/ 16.(depression or depressed or anxiety or anxious).tw. 17.exp Antidepressive Agents/ 18.or/12-17 19.and/11,18
EMBASE	1. exp Renal Replacement Therapy/ 2. (haemodialysis or haemodialysis).tw. 3. (hemofiltration or haemofiltration).tw. 4. (hemodiafiltration or haemodiafiltration).tw. 5. dialysis.tw. 6. (CAPD or CCPD or APD).tw. 7. Chronic Kidney Disease/ 8. Kidney Failure/ 9. Chronic Kidney Failure/

(Continued)

	10.(end-stage renal or end-stage kidney or endstage renal or endstage kidney).tw. 11.(ESRF or ESKF or ESRD or ESKD).tw. 12.or/1-11 13.exp depression/ 14.and/12-13

Appendix 2. Risk of bias assessment tool

Potential source of bias	Assessment criteria
Random sequence generation Selection bias (biased allocation to interventions) due to inadequate generation of a randomised sequence	*Low risk of bias:* Random number table; computer random number generator; coin tossing; shuffling cards or envelopes; throwing dice; drawing of lots; minimisation (minimisation may be implemented without a random element, and this is considered to be equivalent to being random).
	High risk of bias: Sequence generated by odd or even date of birth; date (or day) of admission; sequence generated by hospital or clinic record number; allocation by judgement of the clinician; by preference of the participant; based on the results of a laboratory test or a series of tests; by availability of the intervention.
	Unclear: Insufficient information about the sequence generation process to permit judgement.
Allocation concealment Selection bias (biased allocation to interventions) due to inadequate concealment of allocations prior to assignment	*Low risk of bias:* Randomisation method described that would not allow investigator/participant to know or influence intervention group before eligible participant entered in the study (e.g. central allocation, including telephone, web-based, and pharmacy-controlled, randomisation; sequentially numbered drug containers of identical appearance; sequentially numbered, opaque, sealed envelopes).
	High risk of bias: Using an open random allocation schedule (e.g. a list of random numbers); assignment envelopes were used without appropriate safeguards (e.g. if envelopes were unsealed or non-opaque or not sequentially numbered); alternation or rotation; date of birth; case record number; any other explicitly unconcealed procedure.
	Unclear: Randomisation stated but no information on method used is available.
Blinding of participants and personnel Performance bias due to knowledge of the allocated interventions by participants and personnel during the study	*Low risk of bias*: No blinding or incomplete blinding, but the review authors judge that the outcome is not likely to be influenced by lack of blinding; blinding of participants and key study personnel ensured, and unlikely that the blinding could have been broken.
	High risk of bias: No blinding or incomplete blinding, and the outcome is likely to be influenced by lack of blinding; blinding of key study participants and personnel attempted, but likely that the blinding could have been broken, and the outcome is likely to be influenced by lack of blinding.
	Unclear: Insufficient information to permit judgement
Blinding of outcome assessment Detection bias due to knowledge of the allocated interventions by outcome assessors.	*Low risk of bias:* No blinding of outcome assessment, but the review authors judge that the outcome measurement is not likely to be influenced by lack of blinding; blinding of outcome assessment ensured, and unlikely that the blinding could have been broken.
	High risk of bias: No blinding of outcome assessment, and the outcome measurement is likely to be influenced by lack of blinding; blinding of outcome assessment, but likely that the blinding could have been broken, and the outcome measurement is likely to be influenced by lack of blinding.
	Unclear: Insufficient information to permit judgement

(Continued)

Incomplete outcome data Attrition bias due to amount, nature or handling of incomplete outcome data.	*Low risk of bias:* No missing outcome data; reasons for missing outcome data unlikely to be related to true outcome (for survival data, censoring unlikely to be introducing bias); missing outcome data balanced in numbers across intervention groups, with similar reasons for missing data across groups; for dichotomous outcome data, the proportion of missing outcomes compared with observed event risk not enough to have a clinically relevant impact on the intervention effect estimate; for continuous outcome data, plausible effect size (difference in means or standardised difference in means) among missing outcomes not enough to have a clinically relevant impact on observed effect size; missing data have been imputed using appropriate methods.
	High risk of bias: Reason for missing outcome data likely to be related to true outcome, with either imbalance in numbers or reasons for missing data across intervention groups; for dichotomous outcome data, the proportion of missing outcomes compared with observed event risk enough to induce clinically relevant bias in intervention effect estimate; for continuous outcome data, plausible effect size (difference in means or standardized difference in means) among missing outcomes enough to induce clinically relevant bias in observed effect size; 'as-treated' analysis done with substantial departure of the intervention received from that assigned at randomisation; potentially inappropriate application of simple imputation.
	Unclear: Insufficient information to permit judgement
Selective reporting Reporting bias due to selective outcome reporting	*Low risk of bias:* The study protocol is available and all of the study's pre-specified (primary and secondary) outcomes that are of interest in the review have been reported in the pre-specified way; the study protocol is not available but it is clear that the published reports include all expected outcomes, including those that were pre-specified (convincing text of this nature may be uncommon).
	High risk of bias: Not all of the study's pre-specified primary outcomes have been reported; one or more primary outcomes is reported using measurements, analysis methods or subsets of the data (e.g. sub-scales) that were not pre-specified; one or more reported primary outcomes were not pre-specified (unless clear justification for their reporting is provided, such as an unexpected adverse effect); one or more outcomes of interest in the review are reported incompletely so that they cannot be entered in a meta-analysis; the study report fails to include results for a key outcome that would be expected to have been reported for such a study.
	Unclear: Insufficient information to permit judgement
Other bias Bias due to problems not covered elsewhere in the table	*Low risk of bias:* The study appears to be free of other sources of bias.
	High risk of bias: Had a potential source of bias related to the specific study design used; stopped early due to some data-dependent process (including a formal-stopping rule); had extreme baseline imbalance; has been claimed to have been fraudulent; had some other problem.
	Unclear: Insufficient information to assess whether an important risk of bias exists; insufficient rationale or evidence that an identified problem will introduce bias.

WHAT'S NEW

Date	Event	Description
16 October 2019	New citation required and conclusions have changed	New studies added
16 October 2019	New search has been performed	Expanded inclusion criteria - including trials of participants with and without depression

HISTORY

Protocol first published: Issue 4, 2003
Review first published: Issue 3, 2005

Date	Event	Description
14 October 2008	Amended	Converted to new review format.
12 May 2005	New citation required and conclusions have changed	Substantive amendment

CONTRIBUTIONS OF AUTHORS

- Writing of protocol and review: PN, SCP, MR, KR, GFMS
- Screening of titles and abstracts: SCP, PN, MR
- Assessment for inclusion: SCP, PN, MR
- Quality assessment: SCP, PN, MR
- Data extraction: SCP, PN, MR
- Data entry into RevMan: SCP, PN
- Data analysis: SCP, PN, VS, KR, GFMS
- Disagreement resolution: SCP, GFMS

DECLARATIONS OF INTEREST

- Giovanni Strippoli has in the past received consulting fees from Diaverum AB.

SOURCES OF SUPPORT

Internal sources

- No sources of support supplied

External sources

- National Kidney Research Fund, UK.

DIFFERENCES BETWEEN PROTOCOL AND REVIEW

- The inclusion criteria for the 2019 Cochrane review update were expanded on discussion with the editorial group to include participants with or without depression at baseline. Furthermore, seven additional studies included in the 2005 review were identified in the updated search and added to the review (Beder 1999; Carney 1987; Frey 1999; Kouidi 1997; Leake 1999; Mathers 1999; Matthews 2001).
- During the process of this review update, 21 studies were removed from the 2005 review as these studies were not relevant for our review.
- We have included Summary of Findings tables for the comparisons of: CBT versus usual care; counselling versus usual care; exercise versus usual care; relaxation techniques versus usual care and spiritual practice versus usual care.

INDEX TERMS

Medical Subject Headings (MeSH)

Depression [*therapy]; Renal Dialysis [*psychology]

MeSH check words

Humans