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Psychosocial group interventions to improve psychological well-being in adults living with HIV (Review)

van der Heijden I, Abrahams N, Sinclair D

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[Intervention Review]

Psychosocial group interventions to improve psychological well-being in adults living with HIV

Ingrid van der Heijden[1], Naeemah Abrahams[1], David Sinclair[2]

[1]Gender and Health Unit, Medical Research Council, Tygerberg, South Africa. [2]Department of Clinical Sciences, Liverpool School of Tropical Medicine, Liverpool, UK

Contact address: Ingrid van der Heijden, Gender and Health Unit, Medical Research Council, Francie van Zijl Drive, Tygerberg, Western Cape, 7505, South Africa. iheijden@mrc.ac.za.

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ABSTRACT

Background

Being diagnosed with human immunodeficiency virus (HIV), and labelled with a chronic, life-threatening, and often stigmatizing disease, can impact on a person's well-being. Psychosocial group interventions aim to improve life-functioning and coping as individuals adjust to the diagnosis.

Objectives

To examine the effectiveness of psychosocial group interventions for improving the psychological well-being of adults living with HIV/AIDS.

Search methods

We searched the following electronic databases up to 14 March 2016: the Cochrane Central Register of Controlled Trials (CENTRAL) published in the Cochrane Library (Issue 2, 2016), PubMed (MEDLINE) (1996 to 14 March 2016), Embase (1996 to 14 March 2016), and Clinical Trials.gov.

Selection criteria

Randomized controlled trials (RCTs) or quasi-RCTs that compared psychosocial group interventions with versus control (standard care or brief educational interventions), with at least three months follow-up post-intervention. We included trials that reported measures of depression, anxiety, stress, or coping using standardized scales.

Data collection and analysis

Two review authors independently screened abstracts, applied the inclusion criteria, and extracted data. We compared continuous outcomes using mean differences (MD) with 95% confidence intervals (95% CIs), and pooled data using a random-effects model. When the included trials used different measurement scales, we pooled data using standardized mean difference (SMD) values. We reported trials that we could not include in the meta analysis narratively in the text. We assessed the certainty of the evidence using the GRADE approach.

Main results

We included 16 trials (19 articles) that enrolled 2520 adults living with HIV. All the interventions were multifaceted and included a mix of psychotherapy, relaxation, group support, and education. The included trials were conducted in the USA (12 trials), Canada (one trial), Switzerland (one trial), Uganda (one trial), and South Africa (one trial), and published between 1996 and 2016. Ten trials recruited men and women, four trials recruited homosexual men, and two trials recruited women only. Interventions were conducted with groups of four to 15 people, for 90 to 135 minutes, every week for up to 12 weeks. All interventions were conducted face-to-face except two, which were delivered by telephone. All were delivered by graduate or postgraduate trained health, psychology, or social care professionals except one that used a lay community health worker and two that used trained mindfulness practitioners.

Group-based psychosocial interventions based on cognitive behavioural therapy (CBT) may have a small effect on measures of depression, and this effect may last for up to 15 months after participation in the group sessions (SMD −0.26, 95% CI −0.42 to −0.10; 1139 participants, 10 trials, *low certainty evidence*). Most trials used the Beck Depression Inventory (BDI), which has a maximum score of 63, and the mean score in the intervention groups was around 1.4 points lower at the end of follow-up. This small benefit was consistent across five trials where participants had a mean depression score in the normal range at baseline, but trials where the mean score was in the depression range at baseline effects were less consistent. Fewer trials reported measures of anxiety, where there may be little or no effect (four trials, 471 participants, *low certainty evidence*), stress, where there may be little or no effect (five trials, 507 participants, *low certainty evidence*), and coping (five trials, 697 participants, *low certainty evidence*).

Group-based interventions based on mindfulness have not demonstrated effects on measures of depression (SMD −0.23, 95% CI −0.49 to 0.03; 233 participants, 2 trials, *very low certainty evidence*), anxiety (SMD −0.16, 95% CI −0.47 to 0.15; 62 participants, 2 trials, *very low certainty evidence*), or stress (MD −2.02, 95% CI −4.23 to 0.19; 137 participants, 2 trials, *very low certainty evidence*). No mindfulness based interventions included in the studies had any valid measurements of coping.

Authors' conclusions

Group-based psychosocial interventions may have a small effect on measures of depression, but the clinical importance of this is unclear. More high quality evidence is needed to assess whether group psychosocial intervention improve psychological well-being in HIV positive adults.

PLAIN LANGUAGE SUMMARY

Does group therapy improve well-being in people living with HIV?

Cochrane researchers conducted a review of the effects of group therapy for people living with human immunodeficiency virus (HIV). After searching for relevant trials up to 14 March 2016, they included 16 trials reported in 19 articles that enrolled 2520 adults living with HIV. The included trials were conducted in the USA (12 trials), Canada (one trial), Switzerland (one trial), Uganda (one trial), and South Africa (one trial), and published between 1996 and 2016. Ten trials recruited men and women, four trials recruited homosexual men, and two trials recruited women only.

What is group therapy and how might if benefit people with HIV?

Group therapy aims to improve the well-being of individuals by delivering psychological therapy in a group format, which can encourage the development of peer support and social networks. Group therapy often also incorporates training in relaxation techniques and coping skills, and education on the illness and its management.

Human immunodeficiency virus (HIV) causes a chronic, life threatening, and often stigmatising disease, which can impact on a person's well-being. Group therapy could help people living with HIV to adapt to knowing they have HIV, or recover from depression, anxiety, and stress.

What the research says

Group-based therapy based on cognitive behavioural therapy may have a small effect on measures of depression, and this effect may last for up to 15 months after participation in the group sessions (*low certainty evidence*). This effect was apparent in groups who did not appear to be depressed on clinical scoring systems before the therapy started. The research also showed there may be little or no effect on measures of anxiety, stress, and coping (*low certainty evidence*).

Group-based interventions based on mindfulness have been studied in two small trials, and have not demonstrated effects on measures of depression, anxiety or stress *(all very low certainty evidence*). No mindfulness based interventions included in the studies had any valid measurements of coping.

Overall, the review suggests that existing interventions have little to no effect in increasing psychological adjustment to living with HIV. More good quality studies are required to inform good practice and evidence.

SUMMARY OF FINDINGS FOR THE MAIN COMPARISON [Explanation]

Group therapy (cognitive behavioural therapy (CBT)) versus control for improving psychological well-being in adults living with HIV

Patient or population: adults living with HIV
Settings: any setting
Intervention: group therapy based on CBT

Outcomes	Illustrative comparative risks (95% CI)*		Number of participants (trials)	Certainty of the evidence (GRADE)	Comments
	Assumed risk	Corresponding risk			
	Control	Group therapy (CBT)			
Depression score Follow-up: 6 to 15 months	The mean scores in the control groups at the end of follow-up ranged from normal to moderately depressed	The mean score in the intervention groups was: **0.26 standard deviations (SDs) lower** (0.42 lower to 0.10 lower)	1139 (10 trials)	⊕⊕◯◯ **low**[1,2,3,4] due to indirectness and risk of bias	There may be a small benefit which lasts for up to 15 months
Anxiety score Follow-up: 6 to 15 months	The mean scores in the control groups at the end of follow-up ranged from normal to clinically anxious	The mean score in the intervention groups was: **0.12 SDs lower** (0.31 lower to 0.06 higher)	471 (4 trials)	⊕⊕◯◯ **low**[2,5,6,7] due to indirectness and risk of bias	There may be little or no effect on mean anxiety scores
Stress score Follow-up: 6 to 15 months	The mean score in the control groups at the end of follow-up were variable	The mean score in the intervention groups was **0.04 SDs lower** (0.23 lower to 0.15 higher)	507 (5 trials)	⊕⊕◯◯ **low**[2,5,6,7] due to indirectness and risk of bias	There may be little or no effect on mean stress scores
Coping score Follow-up: 6 to 15 months	The mean score in the control groups at the end of follow-up were variable	The mean score in the intervention groups was **0.04 SDs higher** (0.11 lower to 0.19 higher)	697 (5 trials)	⊕⊕◯◯ **low**[2,5,6,7] due to indirectness and risk of bias	There may be little or no effect on mean coping scores

Studies used a variety of different scales to measure depression, anxiety and stress. Consequently, trials were pooled using a standardized mean difference. Examples of how large this effect would be on standardized measurement scales are given in the review main text and abstract.
Abbreviations: CBT: cognitive behavioural therapy; CI: confidence interval; SD: standard deviation

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

[1]Downgraded by 1 for serious risk of bias: most of the trials did not adequately described a method of allocation concealment, and so trials are at unclear or high risk of selection bias. Loss of follow-up was generally more than 20% and attrition bias may be present.
[2]No serious inconsistency: statistical heterogeneity between trials was low.
[3]Downgraded by 1 for serious indirectness: most trials were from high-income settings (USA, Canada, and Switzerland), and in five trials the mean depression score at baseline was in the normal (not depressed) range. Only five trials evaluated groups with measurable levels of depression and in these trials the effects were inconsistent.
[4]No serious imprecision: the effect is small but statistically significant. The clinical significance is unclear.
[5]Downgraded by 1 for serious risk of bias: most of the trials did not adequately described methods to prevent selection bias.
[6]Downgraded by 1 for serious indirectness: although effects were not seen in these few trials, we cannot exclude the possibility of effects in some populations.
[7]No serious imprecision: the effect size is close to zero with a narrow 95% CI.

BACKGROUND

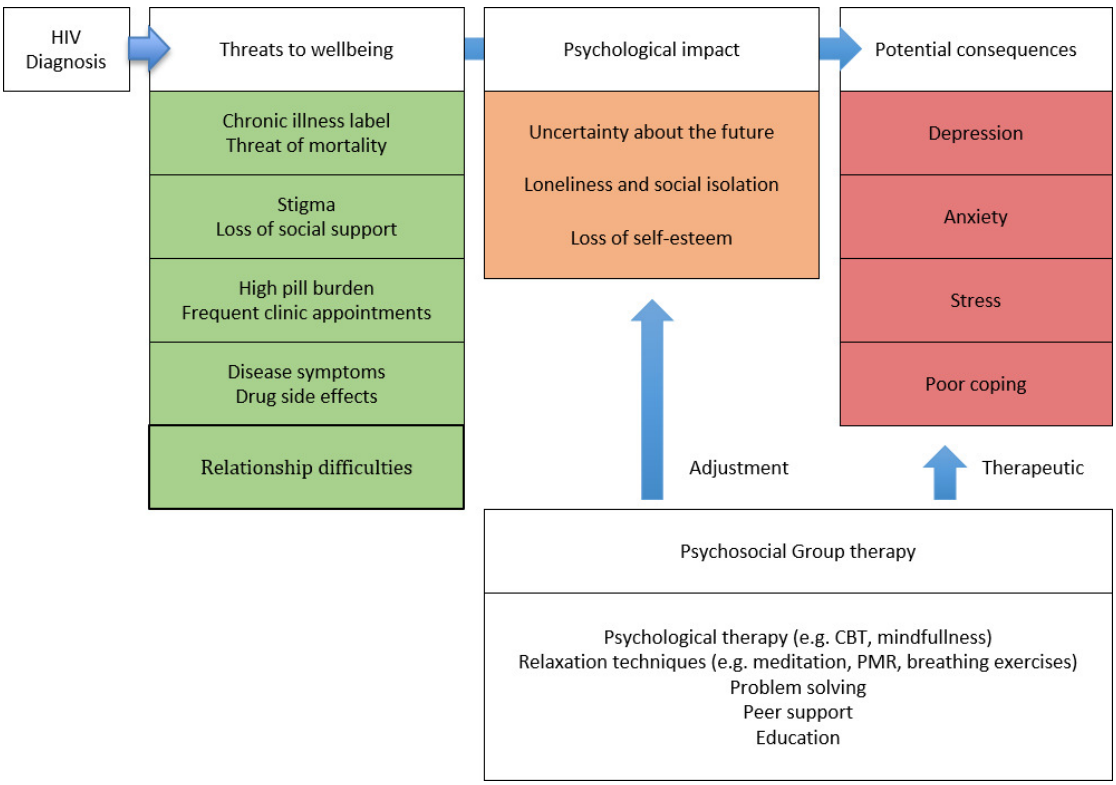
Description of the condition

Infection with the human immunodeficiency virus (HIV) causes a chronic, life-threatening disease, characterized by progressive destruction of the immune system and increasing susceptibility to infection and malignancy. Consequently, despite the availability of highly active antiretroviral therapy (HAART), which has revolutionized treatment, a new diagnosis of HIV carries multiple threats to a person's psychological well-being (Lawless 1996; Hudson 2001; Colbert 2010). Being labelled with a chronic illness, especially one associated with the stigma of HIV, and the accompanying need to take multiple daily medications with unpleasant side effects can lead to uncertainty about the future, relationship difficulties, social isolation, and loss of self esteem. Failure to adjust can in turn lead to clinical depression, anxiety, stress, and poor coping (Vanable 2006). Particularly, the prevalence of depression and suicide in people living with HIV/AIDS is very high (Cooperman 2005; Rezaee 2013; Bhatia 2014; Anagnostopoulos 2015).

Description of the intervention

Psychosocial group interventions, by definition, include some form of psychological therapy such as cognitive behavioural therapy (CBT) delivered in a group format. However, many will also include additional components that may also have effects on psychological well-being, such as: relaxation techniques and stress management; problem solving and coping skills; social or peer support; and education and empowerment (see Figure 1).

Figure 1. Conceptual framework



How the intervention might work

Psychological well-being is usually conceptualized as some combination of positive affective states such as happiness and functioning, with optimal effectiveness in individual and social life (Deci

2008). As summarized by Huppert 2009 (p.137): "Psychological well-being is about lives going well. It is the combination of feeling good and functioning effectively". By definition therefore, people with high psychological well-being report feeling happy, capable, well-supported, and satisfied with life.

Fundamentals to psychological well-being for HIV-positive people are positive coping strategies and perceived social support (Friedland 1996; Côté 2002; Turner-Cobb 2002). As compared to individual therapy, group therapy is believed to confer a wider range of psychosocial benefits. In a well-functioning group, members may give and receive motivational support and encouragement for self-efficacy, and through shared experiences can empower each other to access services, adhere to treatment, and cope with stigma and stress (Kelly 1998; Metcalfe 1998; Moneyham 1998; Gielen 2001; Walker 2002; Peterson 2003). This is contrasted with the problem of stigma inherent in joining groups defined by HIV-status (Roopnaraine 2012). Being in a group helps participants to feel they are not alone in dealing with their problems and also encourages relating to yourself and others in healthier ways. Group formats are also cost effective and resource effective, reaching more patients than individual or one-on-one therapies. This is advantageous, particularly in resource-poor settings.

Why it is important to do this review

A positive diagnosis of HIV means a lifetime of medical treatment, but also dealing with the psychological effects of living with a chronic disease. Psychosocial interventions focus on stress management, coping, and self efficacy and have the potential to have a positive effect on peoples' mental health and treatment adherence. However, the evidence base of what works to improve the psychological well-being of people living with HIV, particularly those in high-risk groups and those living in resource-poor settings, is lacking. In order to inform practice and research, this Cochrane Review can contribute to evidence on what types of psychosocial interventions are most effective to improve psychological well-being for HIV-positive adults. Certainty of the evidence is also important to define future studies, and whether findings are consistent and can be generalized across populations and settings.

OBJECTIVES

To examine the effectiveness of psychosocial group interventions for improving the psychological well-being of adults living with HIV/AIDS.

METHODS

Criteria for considering studies for this review

Types of studies

Randomized controlled trials (RCTs) or quasi-RCTs with at least three months follow-up post-intervention.

Types of participants

HIV-positive adults with and without current psychological illness.

Types of interventions

Any psychosocial intervention delivered in a group format that aims to improve the psychological well-being of people living with HIV. This might include the following types of interventions.

- Interventions conducted in hospitals, clinics, or community settings.
- Interventions delivered face-to-face or via telephone or video link.
- Interventions focused on providing information and psychoeducation, cognitive restructuring, stress appraisal and management, relaxation and mindfulness, adaptive and productive coping, assertiveness training and social support.
- Interventions based on any theoretical approach.

The control intervention may be standard care, a waiting list for future intervention, or a brief educational/psychosocial intervention delivered in-group or individual format.

Types of outcome measures

Primary outcomes

- Improved psychological well-being of HIV-positive people measured by decreases in depression scores using validated scales.

Secondary outcomes

- Measures of anxiety using validated scales.
- Measures of stress using validated scales.
- Measures of coping using validated scales.

All outcomes must be measures at baseline, post-intervention and at a time point at least three months after the intervention.

Search methods for identification of studies

The HIV/AIDS Information Specialist, Joy Oliver, assisted the review author team to identify trials for inclusion in the review.

Electronic searches

We searched the following electronic databases up to 14 March 2016 using the search strategy presented in Appendix 1: the Cochrane Central Register of Controlled Trials (CENTRAL) published in the Cochrane Library (Issue 2, 2016), PubMed (MEDLINE) (1996 to 14 March 2016), and Embase (1996 to 14 March 2016). We also checked Clinical Trials.gov using the search terms in Appendix 2.

Searching other resources

We searched the reference list of all papers that matched our inclusion criteria and contacted the first authors to identify any other trial analyses that were published.

Data collection and analysis

Selection of studies

Two review authors (IVDH and NA) independently screened the abstracts of all citations identified by the literature search to see if any met the inclusion criteria. If an abstract was potentially relevant, or it was unclear whether it was relevant or not, we accessed the full-text paper and read it carefully to see if it the trial met the inclusion criteria. Regarding multiple reports of the same trial, we linked these, collated the data available in the reports, and presented these as one trial. We listed all excluded studies and their reasons for exclusion in the 'Characteristics of excluded studies' table. We constructed a PRISMA study flow diagram to illustrate the study selection process.

Data extraction and management

Two review authors (IVDH and NA) independently extracted data from the included trials using a standardized data extraction form that included the following characteristics: citation of authors and year, the type of trial design, population characteristics and trial setting, eligibility criteria, type of intervention, treatment and control group duration and components, all relevant outcomes with measures (scales), time assessment points, percentage lost to follow-up and results, see Appendix 3.

Assessment of risk of bias in included studies

Two review authors (IVDH and NA) independently assessed the risk of bias of all trials included in the review using the Cochrane 'Risk of bias' assessment tool (Higgins 2008; Higgins 2011). We resolved any discrepancies through discussion and by consulting the third review author, and if necessary we contacted the trial authors for clarification.

We followed the guidance to assess whether the included trials took adequate steps to reduce the risk of bias across the following six domains: sequence generation; allocation concealment; blinding (of participants, personnel, and outcome assessors); incomplete outcome data; selective outcome reporting; and other sources of bias.

For sequence generation and allocation concealment, we reported the methods that the included trials used. For blinding, we described who was blinded and the blinding method. For incomplete outcome data, we reported the percentage of participants lost to follow-up. For selective outcome reporting, we stated any discrepancies between the methods used and the results in terms of the outcomes measured or the outcomes reported. For other biases, we described any other trial features that could have affected the trial result (for example, if the trial was stopped early, or how the use of a wait-list group may bias results because waiting-list controls might be biased because of resentment at not receiving an intervention, changes in disease state over time, and an absence of engagement in care. However, blinding and randomization will balance out this bias risk.

We categorized our risk of bias judgements as either 'low', 'high', or 'unclear'. Where risk of bias was unclear, we attempted to contact the trial authors for clarification and resolved any differences of opinion through discussion.

Measures of treatment effect

We reported results using mean difference (MD) with 95% confidence intervals (95% CI), and used standardized mean difference (SMD) values when we pooled trials using different scales.

Unit of analysis issues

The unit of analysis in all trials was the individual (HIV-positive adult). For complicated designs, such as cluster-RCTs, we planned to use the cluster as the unit of analysis, and planned to account for clustering by adjusting the analysis to the same level as the individual following the guidelines in the *Cochrane Handbook for Systematic Reviews of Interventions* (Higgins 2008; Higgins 2011). When trials had more than two treatment arms we took care to avoid double counting of participants in the control group.

Dealing with missing data

Our primary analysis was a complete-case analysis, which included only the participants with data at each time point.

We considered the potential for bias due to missing data in our GRADE evaluation of the certainty of the evidence, by considering the size of losses to follow-up, and any differential losses between groups.

We contacted trial authors for clarification regarding missing data.

Assessment of heterogeneity

We described clinical heterogeneity between trials by summarizing key characteristics of the trial design, intervention, population, and outcome measures in tables.

We assessed statistical heterogeneity by looking at forest plots to examine the presence of overlapping CIs and using the Chi^2 test using a P value of 0.10 to determine statistical significance. We quantified heterogeneity using the I^2 statistic, which describes the percentage of variability in the effect estimates and we applied the standard categorization of heterogeneity to interpret the statistic i.e. low heterogeneity = I^2 statistic value of 0% to 25%; moderate heterogeneity = I^2 statistic value of 26% to 50% and high heterogeneity = I^2 statistic value of greater than 50%.

Assessment of reporting biases

We planned to use funnel plots to look for evidence of publication bias. However, there were few included trials to facilitate this.

Data synthesis

We summarized and analysed the included trials in Review Manager 5 (RevMan 5) (Review Manager 2014).

We analysed trials with different underlying psychological theories separately, and stratified the primary analysis by time point: baseline, end of the group session, and longest follow-up.

When pooling studies was considered appropriate we used a random-effects approach due to the clinical heterogeneity between trials.

We created a 'Summary of findings' for each comparison including the four main outcomes: depression, anxiety, stress, and coping. For each effect estimate we evaluated our confidence in the effect by considering each of the five GRADE criteria: risk of bias, consistency of effect, imprecision, indirectness, and publication bias. When we found sufficient problems to downgrade the overall certainty of the evidence we justified these decisions using footnotes.

Subgroup analysis and investigation of heterogeneity

We explored possible causes of statistical heterogeneity by conducting sub group analyses by: primary focus of the intervention, outcome scale used, the control intervention, and gender. We only performed these subgroup analyses when there were sufficient trials to make it meaningful.

Sensitivity analysis

We did not plan to perform any sensitivity analysis.

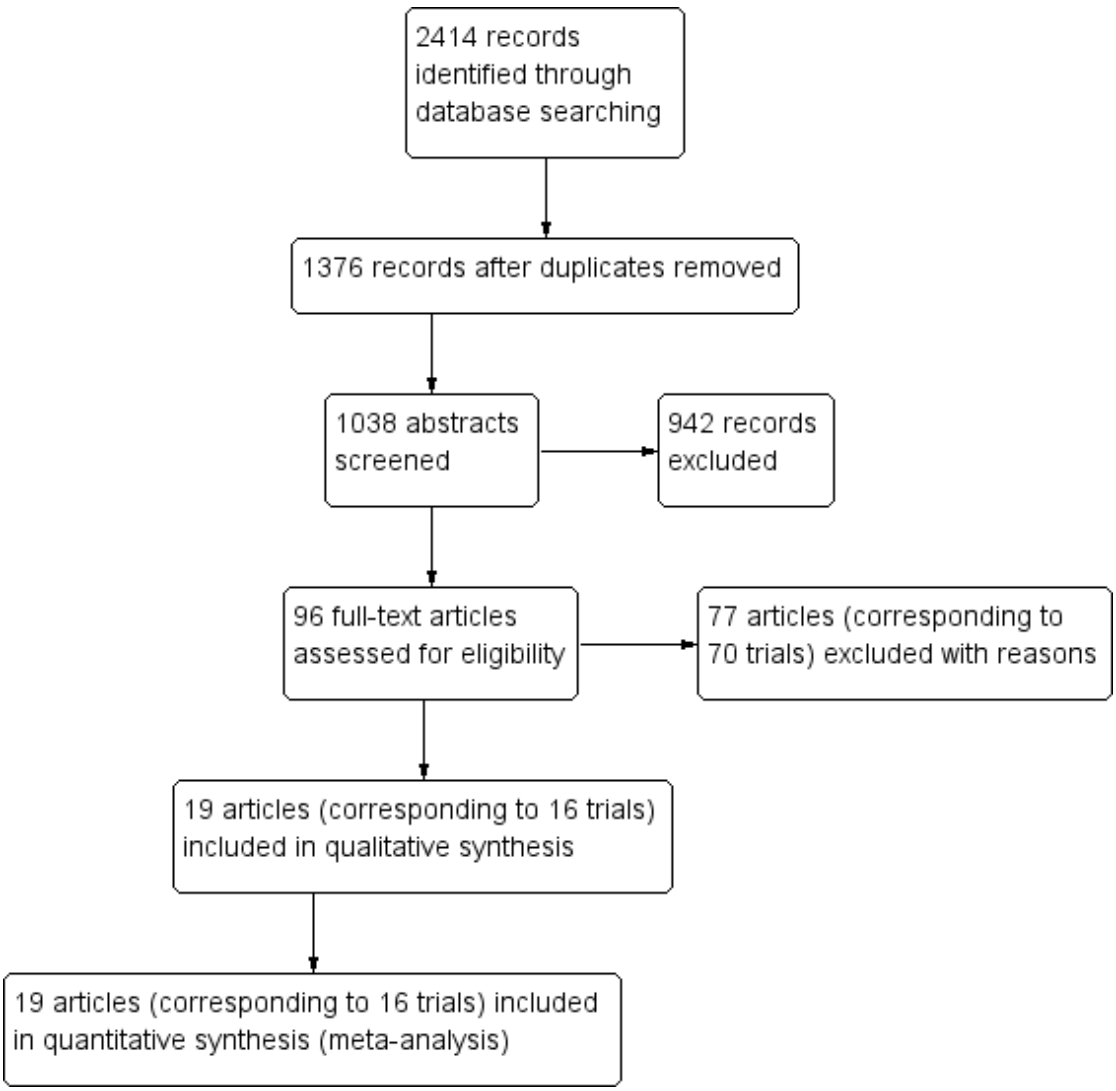
RESULTS

Description of studies

Results of the search

We searched the available literature up to 14 March 2016 and identified 2414 citations from the electronic database searches. After discarding 1376 duplicates, we screened 1038 articles by title and abstract. We selected abstracts that potentially matched our inclusion criteria, and also articles where it was unclear whether or not they fulfilled the inclusion criteria, for full-text assessment. We excluded 942 articles and identified 96 full-text articles for further assessment. After full-text assessment of these articles. we excluded 77 articles. These corresponded to 70 studies after we collated them, which we listed in the 'Characteristics of excluded studies' table. Nineteen articles met the inclusion criteria. We collated multiple reports on the same trial, which gave 16 included trials. We have illustrated the study selection process in Figure 2.

Figure 2. Study flow diagram



Included studies

Sixteen randomized controlled trials (RCTs) that included 2520 HIV-positive adults met the inclusion criteria of this Cochrane Review. Four trials exclusively recruited homosexual men (Chesney 2003; Carrico 2005; Antoni 2006; Gayner 2012), and two trials recruited women only (Antoni 2008; Jones 2010). The remaining trials recruited both men and women, with four specifying they were all on antiretroviral therapy (ART) (Berger 2008; Duncan 2012; Peltzer 2012; Safren 2012), one trial recruited only those with a history of childhood sexual abuse (Sikkema 2013), one recruited injection drug users (Safren 2012), one recruited those over 50 years old (Heckman 2011), and one recruited participants with major depression (Nakimuli-Mpungu 2015). All trials excluded pregnant women (see Table 1).

Twelve trials were conducted in the USA (Chesney 2003; McCain 2003; Carrico 2005; Antoni 2006; Bormann 2006; Heckman 2007; Antoni 2008; Jones 2010; Heckman 2011; Duncan 2012; Safren 2012; Sikkema 2013), Canada (Gayner 2012), and one in Switzerland (Berger 2008), one in Uganda (Nakimuli-Mpungu 2015) and one in South Africa (Peltzer 2012). Recruitment was from hospitals, clinics, drop-in centres, or community settings.

Therapy was conducted with groups of four to 15 people every week for up to 12 weeks. All were face-to-face interventions except

in Heckman 2007 and Heckman 2011 in which they were delivered by telephone. All interventions were delivered by postgraduate trained health, psychology, or social care professionals, except one which used lay health workers (Peltzer 2012). Sessions lasted 90 to 135 minutes, and the period of follow-up varied from three to 15 months. The control groups ranged from wait-list, standard care or treatment as usual, information or education only, or a brief form of the intervention (30 minutes or one day).
We subgrouped the interventions by their underlying psychological theory, although all the interventions were multifaceted.

- Cognitive behavioural therapy (CBT) (13 trials): a psychotherapeutic approach that addresses dysfunctional emotions, maladaptive behaviours, and cognitive processes through a number of goal-oriented, problem-focused, action-orientated procedures. The name refers to therapy based upon a combination of basic behavioral and cognitive principles and research. Most therapists working with patients dealing with anxiety and depression use a blend of cognitive and behavioral therapy. Six trials focused particularly on stress management (McCain 2003; Carrico 2005; Antoni 2006; Antoni 2008; Berger 2008; Sikkema 2013), three on coping (Chesney 2003; Heckman 2007; Heckman 2011), one on self-efficacy (Jones 2010), one on adherence and depression (Safren 2012), one on depression (Nakimuli-Mpungu 2015), and one on adherence (Peltzer 2012).
- Mindfulness Based Stress Reduction (three trials): a structured group programme that employs mindfulness meditation to enhance awareness of irrational thoughts and negative affect (Duncan 2012; Gayner 2012), and includes a spirituality approach that involves repeating a mantram-sacred word or phrase (Bormann 2006).

The trials reported a variety of scales for depression, anxiety, stress, and coping (Table 2; Table 3; Table 4). We pooled these data using standardized mean differences, before presenting a subgroup analysis using the same assessment scale.

Excluded studies

We excluded a total of 70 trials (77 articles) after full-text assessment and listed the reasons for exclusion in the 'Characteristics of excluded studies' table. Some studies were not RCTs or did not report on RCT data, and most studies did not include group interventions; this was not apparent when we only assessed the abstract. Other trials did not have at least a three-month post-intervention follow-up assessment. Safren 2009 invited the control to crossover to the intervention after three months but had no post-intervention three-month follow-up. For example, we excluded Wyatt 2004 as we did not receive any response from the study author about what data they included in the post-intervention period, that is whether the data presented in this trial was the three-month or six-month follow-up data; it remains unclear. Latkin 2003 and Yu 2014 did not have HIV-positive populations. Six trials did not measure our specified outcomes. One trial, Laperriere 2005, presented a subgroup analysis from a larger trial. Prado 2012 had a sample of adolescents and not adults. Sacks 2011 did not report on effects for the group intervention.
We excluded seven trials conducted in Africa: Papas 2011 in Western Kenya measured reductions in alcohol use in people on antiretroviral (ARV) treatment using a CBT intervention so did not include a specified outcomes, Olley 2006 in Nigeria measured psychological distress, risky sexual behaviour, and self-disclosure of HIV using an individual psychoeducation intervention rather than a group intervention, Mundell 2011 measured rates of disclosure and active and avoidant coping in pregnant and recently diagnosed HIV-positive women in South Africa participating in structured up support groups, but this was not an RCT. Petersen 2014's trial on a group-based counselling intervention for depression in South Africa did not have a three-month follow-up postintervention. Petersen 2014 also had a very small sample size. Kunutsor 2011's trial was based in Uganda but was a treatment supporter intervention and not a group intervention, and Jones 2005's trial among HIV positive women in Zambia did not have a control group. Kaaya 2013's trial in Tanzania measured prenatal HIV disclosure and depression, however we excluded it because there was no three-month post-intervention follow-up.

Risk of bias in included studies

For a summary of the 'Risk of bias' assessments see Figure 3 and Figure 4.

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

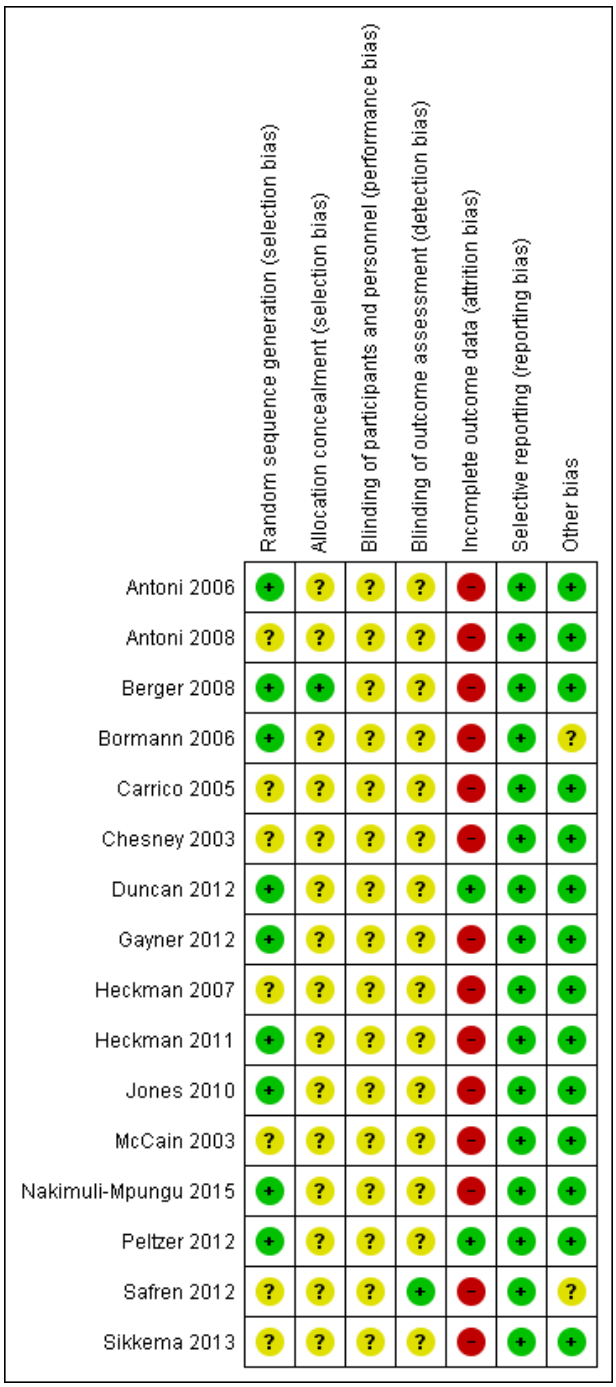
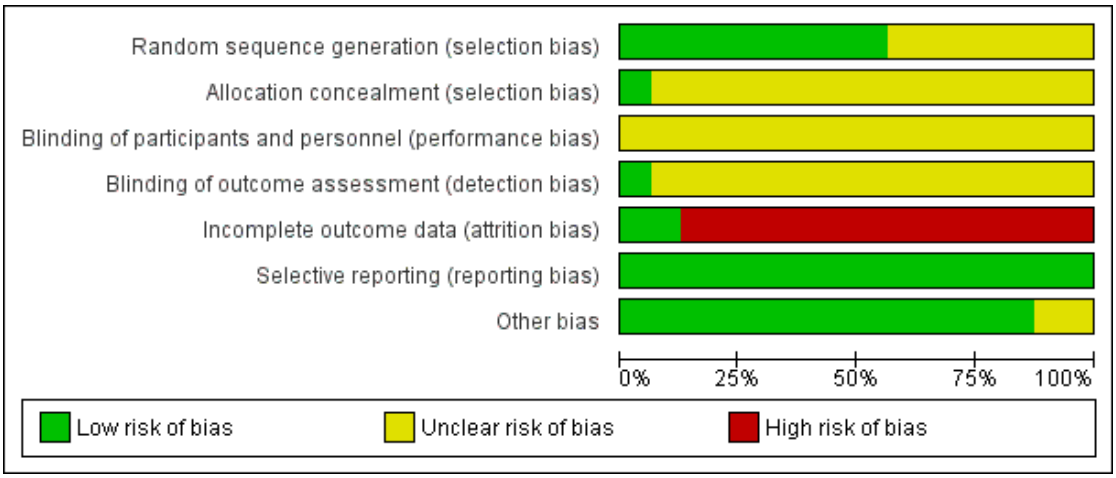


Figure 4. 'Risk of bias' graph: review authors' judgements about each 'Risk of bias' item presented as percentages across all included trials



Allocation

We only included 'randomized' trials. However, only Berger 2008 provided enough detail of the methods to be considered at low risk of selection bias. All other included trials were at unclear risk of selection bias.

Blinding

True blinding of participants to the types of interventions evaluated in this review is rarely possible. Trial authors did not describe blinding sufficiently. However, it is possible to blind those conducting the analysis but only one trial described the methods to achieve this and we judged it to be at low risk of detection bias (Safren 2012). All other trials were at unclear risk of detection bias.

Incomplete outcome data

Fourteen trials reported high levels of loss to follow-up in at least one treatment arm over the duration of the trial (greater than 20%), or differential losses between groups, which had the potential to bias the results. Consequently we only judged two included trials to be at low risk of attrition bias (Duncan 2012; Peltzer 2012).

Selective reporting

We found no evidence of selective reporting and we considered all included trials as at low risk of reporting bias.

Other potential sources of bias

Bormann 2006 and Safren 2012 noted some imbalances in potential confounders between the intervention and control groups at baseline. We judged these trials to be at unclear risk of bias. All other included trials were at low risk of other sources of bias.

Effects of interventions

See: **Summary of findings for the main comparison** 'Summary of findings' table 1; **Summary of findings 2** 'Summary of findings' table 2

See 'Summary of findings' table 1 (Summary of findings for the main comparison) and 'Summary of findings' table 2 (Summary of findings 2). We have presented the findings by intervention type.

Comparison 1: Group therapy (CBT) versus control

See 'Summary of findings' table 1 (Summary of findings for the main comparison).

Thirteen trials evaluated group therapy sessions based on cognitive behavioural therapy (CBT) techniques. Ten trials were delivered face-to-face (Chesney 2003; McCain 2003; Carrico 2005; Antoni 2006; Antoni 2008; Berger 2008; Jones 2010; Peltzer

2012; Nakimuli-Mpungu 2015) and two were delivered by telephone (Heckman 2007; Heckman 2011). The primary focus of CBT was stress reduction or coping (nine trials), self-efficacy (one trial), depression (one trial), adherence (one trial), and adherence and depression (one trial). Eight trials described additional relaxation components such as progressive muscle relaxation (PMR) or meditation, four explicitly described methods to facilitate peer/group support, and six described specific educational components. Most sessions lasted between 50 and 135 minutes, were conducted weekly for between eight and 12 weeks, and included between four and 12 participants (Table 5).

Fourteen trials were from high-income settings (USA, Canada, and Switzerland). Two trials were from low- or middle-income settings: South Africa (Peltzer 2012), and Uganda (Nakimuli-Mpungu 2015). Five trials were conducted among general populations, three trials with homosexual men, one trial with women from minority groups, one trial with women with an abnormal cervical smear, one trial among prior intravenous drug users, one trial among people with a history of being abused, and one trial among people with adherence problems (see Table 1).

Depression scores

Overall, there was a small reduction in mean depression scores at the end of the group sessions (standardized mean difference (SMD) −0.17, 95% confidence interval (CI) −0.29 to −0.05; 1142 participants, 9 trials; *low certainty evidence*; Analysis 1.1), and this appeared to be maintained for up to 15 months after randomization (SMD −0.26, 95% CI −0.42 to −0.10; 1139 participants, 10 trials, *low certainty evidence*; Analysis 1.1).

The most commonly used depression score was Beck Depression Inventory (BDI) (used by six trials), which scores depression out of 63. The overall effect was a reduction of around 1.4 points (mean difference (MD) −1.41, 95% CI −2.61 to −0.21; 753 participants, 6 trials, Analysis 1.2). See Table 2 for a description of the different depression scores that the included trials used.

Mean depression scores at baseline were in the depressive range in five trials. Over the duration of these trials, there was a modest improvement in mean score in both the intervention and control groups, but only two trials showed increased benefit with the intervention (Analysis 1.3). In the remaining five trials mean depression scores were in the normal range at baseline, and there was a small but consistent reduction in mean score with the intervention (Analysis 1.5).

We conducted additional subgrouping by the type of control group used (Analysis 1.4), the primary focus of the intervention (Analysis 1.6), and gender (Analysis 1.7). The most consistent effects on depression were from three trials that focused on stress management interventions (SMD −0.46, 95% CI −0.73 to −0.18; 216 participants, 3 trials).

Anxiety scores

Four trials assessed measures of anxiety, and overall there was no effect apparent at the end of the group sessions (SMD −0.01, 95% CI −0.25 to 0.22; 420 participants, 3 trials, *low certainty evidence*), or at 12 to 15 months after randomization (SMD −0.12, 95% CI −0.31 to 0.06; 471 participants, 4 trials, *low certainty evidence*; Analysis 1.8).

All four trials used different anxiety scales, and only one trial (using the Hospital Anxiety and Depression Scale) reported a statistically significant effect (see Table 3 and Analysis 1.9). This study was conducted in Switzerland among the general population, and baseline and end anxiety scores were in the normal range (Berger 2008). Only the participants recruited by Chesney 2003 appeared to have substantial anxiety at baseline, and although there was a small improvement in both groups over the course of the trial, there were no differences between groups at any time point.

Stress scores

Five trials assessed measures of stress, and overall there was no effect apparent at the end of group sessions (SMD −0.06, 95% CI −0.23 to 0.12; four trials, 533 participants, *low certainty evidence*, Analysis 1.11), or at the end of follow-up (SMD −0.04, 95% CI −0.23 to 0.15; five trials, 507 participants, *low certainty evidence*, Analysis 1.11). Only Antoni 2008, which was conducted among HIV-positive women with a recent abnormal cervical smear, found a statistically significant effect at any time point. For a description of the stress scores used see Table 4 and Analysis 1.12.

Coping scores

Five trials reported some measure of coping with no effects seen at the end of group therapy (SMD 0.02, 95% CI −0.16 to 0.19; 762 participants, 5 trials; *low certainty evidence*, Analysis 1.14), or at the end of follow-up (SMD 0.04, 95% CI −0.11 to 0.19; 697 participants, 5 trials; *low certainty evidence*; Analysis 1.14). In all measures of coping, higher scores reflected increased coping (see Table 6 and Analysis 1.15).

Comparison 2: Group therapy (mindfulness) versus control

Three trials evaluated face-to-face group therapy sessions based on mindfulness stress reduction (Bormann 2006; Duncan 2012; Gayner 2012). The interventions included mindfulness meditation, with one intervention including mantram repetition and one described additional educational components. Group sessions lasted between 135 and 180 minutes, and were conducted weekly for eight to 10 weeks, plus one day retreat, The group size was eight to 18 participants across trials (see Table 7).

All trials were conducted in high-income settings. One trial was conducted among homosexual men in Canada (Gayner 2012), one

trial was among men and women experiencing some side effects or distress in the USA (Duncan 2012), and the other included trial was among men and women (50%) who were homosexual (Bormann 2006) (see Table 1).

Depression scores

Individually, none of these trials reported statistically significant effects on mean depression scores. The pooled effect suggests a modest reduction in mean scores at the end of the group sessions (SMD −0.22, 95% CI −0.48 to 0.04; 242 participants, 3 trials; *very low certainty evidence*, Analysis 2.1), and at six months postrandomization (SMD −0.23, 95% CI −0.49 to 0.03; 233 participants, 3 trials;*very low certainty evidence*; Analysis 2.1), but the 95% CIs were wide and included no effect.

Anxiety scores

Bormann 2006 and Gayner 2012 measured anxiety scores using different measurement scales. There were no statistically significant differences in the mean scores at the end of the group sessions (SMD −0.23, 95% CI −0.53 to 0.07; 178 participants, 2 trials, *very low certainty evidence*; Analysis 2.2), or at six months (SMD −0.16, 95% CI −0.47 to 0.15; 162 participants, 2 trials, *very low certainty evidence*; Analysis 2.2).

Stress scores

Bormann 2006 and Duncan 2012 measured stress scores using the perceived stress score, A small statistically significant difference was present at the end of group sessions (MD −2.29, 95% CI −4.46 to −0.11; 139 participants, 2 trials; *very low certainty evidence*), but not at six months postrandomization (MD −2.02, 95% CI −4.23 to 0.19; 137 participants, 2 trials, *very low certainty evidence*; Analysis 2.3). The effect size was around 2 points on a 40-point scale.

ADDITIONAL SUMMARY OF FINDINGS *[Explanation]*

Group therapy (mindfulness) compared to control for improving psychological well-being in adults living with HIV

Patient or population: adults living with HIV
Settings: any setting
Intervention: group therapy based on mindfulness

Outcomes	Illustrative comparative risks* (95% CI)		Number of participants (trials)	Certainty of the evidence (GRADE)	Comments
	Assumed risk	Corresponding risk			
	Control	Group therapy (Mindfulness)			
Depression score Follow-up: 4 to 6 months	The mean scores in the control groups at the end of follow-up were in the range of normal to mild depression	The mean score in the intervention groups was **0.23 standard deviations (SDs) lower** (0.49 lower to 0.03 higher)	233 (3 trials)	⊕◯◯◯ **very low**[1,2,3,4] due to risk of bias, indirectness, and imprecision	We don't know if there is a benefit on depression scores
Anxiety score Follow-up: 4 to 6 months	The mean scores in the control group at the end of follow-up were in the range of normal to mild anxiety	The mean score in the intervention groups was **0.16 SDs lower** (0.47 lower to 0.15 higher)	162 (2 trials)	⊕◯◯◯ **very low**[1,3,4] due to risk of bias, indirectness, and imprecision	We don't know if there is an effect on mean anxiety scores
Stress score Follow-up: 4 to 6 months	The mean scores in the control group at the end of follow-up were in the range of mild stress	The mean score in the intervention groups was **2.02 points lower** (4.23 lower to 0.19 higher)	137 (2 trials)	⊕◯◯◯ **very low**[1,3,4] due to risk of bias, indirectness, and imprecision	We don't know if there is an effect on mean stress scores
Coping score Follow-up: no coping was measured by mindfulness intervention trials	-	-	0 (0 trials)	-	-

Studies used a variety of different scales to measure depression, anxiety and stress. Consequently, trials were pooled using a standardized mean difference. Examples of how large this effect would be on standardized measurement scales are given in the review main text and abstract.
Abbreviations: CI: confidence interval; OR: odds ratio; SD: standard deviation

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

[1]Downgraded by 1 for serious risk of bias: none of the trials adequately described a method of allocation concealment, and so trials are at unclear or high risk of selection bias. Loss of follow-up was generally more than 20% and attrition bias may be present.
[2]No serious inconsistency: statistical heterogeneity between trials was low.
[3]Downgraded by 1 for serious indirectness: these three trials were conducted in the USA and Canada in people with scores in the range of mild to moderate depression. The results are not easily generalized to other settings or populations.
[4]Downgraded by 1 for serious imprecision: the 95% CI are wide and includes both potentially important effects and no effect.

DISCUSSION

Summary of main results

Group-based psychosocial interventions based on cognitive behavioural therapy (CBT) may have a small effect on measures of depression, and this effect may last for up to 15 months after participation in the group sessions (*low certainty evidence*). Most trials used the Beck Depression Inventory (BDI) which has a maximum score of 63, and the mean score in the intervention groups was around 1.4 points lower at the end of follow-up. This small benefit was consistent across five trials where participants had a mean depression score in the normal range at baseline, but trials where the mean score was in the depression range at baseline effects were less consistent. Fewer trials reported measures of anxiety (*low certainty evidence*), stress (*low certainty evidence*), and coping (*low certainty evidence*), and there was no clear evidence of effects.

Group-based interventions based on mindfulness have not demonstrated effects on measures of depression (*very low certainty evidence*), anxiety (*very low certainty evidence*), or stress (*very low certainty evidence*).

Overall completeness and applicability of evidence

Most of the trial interventions were based on cognitive-behavioural approaches, which were delivered in similar ways (with similar group sizes, similar trained facilitators, and similar numbers of sessions). Most included trials were conducted in high-income settings (USA, Canada, and Switzerland). Two trials of CBT were conducted in low- and middle-income countries, which is where the prevalence of HIV is highest; over 95% of HIV infections are in low- and middle-income countries, two-thirds of them in sub-Saharan Africa (Boyle 2016). One trial was conducted among an urban population in Uganda and measures of depression improved significantly in both the intervention and control groups over the course of the study (greater than 10 points on a 20-point scale) with only small differences between groups (2.5 points). The small effects in the Uganda trial are unlikely to be cost-effective where resources and trained staff are scarce. The trial conducted among depressed adults on ART in South Africa showed no effects between the two groups for depression.

One of the main aims of this Cochrane Review was to evaluate whether effects seen at the end of group sessions persisted, or were lost, and our findings do seem to suggest that improvements at the end of group session are sustained for up to 15 months. However, as over half the included trials had mean scores at baseline within the normal range (not depressed), the clinical significance of this effect is unclear. In trials that did contain people with measurable depression the effects were inconsistent and there were too few trials to explore why some interventions seemed to have a benefit and some did not.

The included trials used a variety of measurement scales to assess each outcome which made pooling of studies and comparison across population groups difficult.

Quality of the evidence

We rated the certainty of the evidence for a small effect on measures of depression with CBT group therapy as 'low' meaning we can only have low confidence in the observed effect. We downgraded the evidence from high to low due to 'risk of bias': as most studies were at unclear risk of selection bias and high risk of attrition bias, and due to 'indirectness' of the evidence (with most trials being from high income settings), and the difficulty in generalising the findings to other settings and population groups. We also rated the evidence of no effect on anxiety, stress, and coping as 'low' for the same reasons.

For mindfulness-based group interventions, we rated all outcomes as 'very low' meaning we are very uncertain about the observed effect. We downgraded the evidence for 'risk of bias' due to deficiencies in the study methods, 'indirectness' due to the difficulty generalising the findings to other populations and settings, and 'imprecision' as the effect is towards benefit but the 95% CI are wide and include no effect.

Potential biases in the review process

The inclusion criteria of this Cochrane Review may increase the possibility of poor reproducibility due to many subjective decisions regarding which studies and populations to include. We included all HIV-positive populations (both genders) and we had no exclusion criteria regarding settings when we selected studies for inclusion. However, we minimized this potential bias by including stringent follow-up time criteria and only RCTS.

We only assessed peer-reviewed published trials, which may have led to exclusion of trials in grey literature and presented at conferences. Having no knowledge of unpublished studies may have limited the assessment of the strength of the body of evidence in the review. Another limitation is that we only included papers that reported in English, thus disregarding high quality trials that may have been published in other languages.

We selected only trials that used validated scales, which is a strength of the review. We amended specified outcomes by only including psychological outcomes and no longer behavioural outcomes after we realized that there were poor or invalidated assessments for behavioural outcomes in the first set of literature search results (June 2013). Our decision to change specified outcomes after seeing the results for included studies could have lead to biased and misleading interpretation if the importance of the outcome (primary or secondary) is changed on the basis of those results. We have pro-

vided transparency in the reporting of changes in outcome specification to reduce this risk of bias.

Even when review authors have a common understanding of the selection criteria, random error or mistakes may result from individual errors in reading and reviewing studies. We reduced this potential bias by ensuring that all review authors read the papers and extracted data independently, and then came to mutual agreements.

We noted issues regarding poor reporting in the papers and we were unable to obtain all relevant data due to the lack of responses from study authors about missing data or clarification of data.

Agreements and disagreements with other studies or reviews

To our knowledge, no published systematic review has assessed the psychological impact of psychosocial group interventions for HIV positive adults.

The findings of this Cochrane Review are in contrast to a narrative review (Brown 2011), as well as older meta-analysis syntheses (Crepaz 2008; Scott-Sheldon 2008), of the effect of various group interventions on outcomes for improved mental health. These report on how stress management and cognitive behavioural interventions and mindfulness-based interventions are effective in improving various psychological states in people living with HIV. However, Crepaz 2008 did not assess the randomization method, allocation concealment, and blinding used by the trials, thus making data extraction and quality assessment less rigorous. Scott-Sheldon 2008's meta-analytic review of RCTs of stress-management interventions showed significant overall impact on mental health, whereas Brown 2011's narrative critique of the effectiveness of mindfulness based intervention is the only review of the effectiveness of mindfulness-based interventions on mental health that we found. However, the Brown 2011 review is undermined by inclusion of trials that did not fit our stringent inclusion criteria that trials must have had longer than three months follow-up in order to show sustained effects, and did not include a meta-analysis. Similar to our Cochrane Review, current published reviews on this subject mainly include trials in high-income settings, which makes a strong case for high quality research to be funded and motivated for marginalized populations where HIV is most prevalent.

AUTHORS' CONCLUSIONS

Implications for practice

Group-based psychosocial interventions may have a small but sustained effect on measures of depression. However, the clinical importance of this is unclear as we only consistently observed the small effect in trials where the mean score of participants in both the intervention and control groups was in the normal range (not depressed) for the duration of the trial.

Implications for research

Further trials that include people with signs of depression, stress, or poor coping at baseline will provide evidence of improving psychological adjustment and coping for those who need it most.

Further randomized studies should also meet current standards in reporting of methods as outlined in the CONSORT statement and take appropriate steps to reduce the risk of bias.

To enable a clear understanding of the results, and facilitate future meta-analyses, it would also be useful if this research field utilized a common set of outcome scales rather than the ad-hoc selection that is seen across the included studies.

Additionally, evidence is lacking where HIV prevalence is the highest. This indicates a need for strengthening trial research capacity in low- and middle-income settings.

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* *Indicates the major publication for the study*

CHARACTERISTICS OF STUDIES

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

Antoni 2006

Methods	**Trial design:** 2-arm randomized controlled trial (RCT) **Follow-up:** 3, 9, and 15 months follow up **Loss to follow-up:** 22 in treatment group, 23 in control group
Participants	**Population:** 130 HIV-positive homosexual men receiving highly active antiretroviral therapy (HAART); intervention = 76, control = 54 **Inclusion criteria:** 18 to 65 years old, no changes in their HAART regime during past month **Exclusion criteria:** prescribed medications with immunomodulatory effects, history of chemotherapy or whole-body radiation for cancer that was not AIDS-related, history of chronic illness associated with permanent changes in immune system
Interventions	**Intervention:** N = 76. Cognitive Behavioural Stress Management (CBSM): focused on eliciting participant experiences with adherence and medication side effects using cognitive restructuring exercises, managing stressors related to adherence, using productive coping responses • Group size: 2 to 9. • Facilitators: postdoctoral fellows and advanced clinical health psychology graduate students. • Session duration: 135 mins (45 mins relaxation component and 90 mins stress management component). • Session frequency: 10 weekly sessions. • Additional components: relaxation including progressive muscle relaxation (PMR), autogenic training, meditation and deep breathing: participants were asked to practice these between sessions. + Medication adherence training **Control:** N = 54. Medication adherence training (MAT): aimed to increase knowledge about HIV and HAART, including how medications work, why they must be taken on time and at the proper dose, and how to recognize possible side effects • All participants received MAT from a licensed clinical pharmacist in a 1-hr session at baseline as well as two 30-min maintenance sessions at 3 months and 9 months postrandomization, respectively.
Outcomes	**Included in this review** • Depression by Becks Depression Inventory (BDI) and Profile Of Moods Scale - Depression (POMS-D). • Anxiety by Profile Of Moods Scale - Anxiety (POMS-A). **Not included in this review** • Immunological outcomes: viral load and CD4. • Adherence by Medication Event Monitoring System (MEMS).
Notes	Used 2 scales to measure depression POMS-D and BDI; we chose BDI **Setting:** not reported **Country:** USA

Antoni 2006 (*Continued*)

Risk of bias		*Risk of bias*
Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Quote: "Participants identification numbers were drawn randomly from a box for assignment to trial conditions."
Allocation concealment (selection bias)	Unclear risk	Quote: "Randomization procedures were conducted by a master's level project manager and overseen by the principal investigator. Participants identification numbers were drawn randomly from a box for assignment to trial conditions." No further details
Blinding of participants and personnel (performance bias) Anxiety	Unclear risk	The trial authors did not describe the method of blinding, if any
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	The trial authors did not describe the method of blinding, if any
Incomplete outcome data (attrition bias) All outcomes	High risk	Loss to follow-up: 19.7% intervention group versus 25.9% control. Intention-to-treat (ITT) analysis done
Selective reporting (reporting bias)	Low risk	We did not detect any selective reporting bias.
Other bias	Low risk	We did not detect any other sources of bias.

Antoni 2008

Methods	**Trial design:** 2-arm RCT **Follow-up:** 9-month follow-up **Loss to follow-up:** Cognitive Behavioral Stess Management (CBSM) group: 47% completed follow-up; control participants: 69% completed follow-up
Participants	**Population:** 39 HIV-positive African American, Hispanic, or Caribbean women. Intervention = 21, control = 18 **Inclusion criteria:** HIV-positive women aged 18 to 60 years old; at least 2 Papanicolaou smears indicating low grade squamous intraepithelial lesions (LSIL) or al least 2 cervical biopsies indication CIN 1 (mild or grade 1 neoplasia) in the 2 years prior to trial entry; fluency in spoken English **Exclusion criteria:** no exclusion criteria were listed.

Antoni 2008 (*Continued*)

Interventions	**Treatment:** N = 21. Cognitive behavioural training (CBT) that increased awareness of the effects of stress, identifying and reframing automatic thoughts, improving productive coping skills, anger management, assertiveness training, productive use of one's social network, and safer sex negotiation • Group size: 4 to 6. • Facilitators: doctoral trainees, postdoctoral fellows, and licensed psychologists. • Session duration:135 mins (45 mins relaxation training and 90 mins of cognitive behavioural training). • Session frequency: 10 weekly sessions. • Additional components: weekly homework was assigned, including stress monitoring and relaxation practice. **Control:** N = 18. 5-hour 1-day CBSM workshop with four 20-minute relaxation modules, four 40-minute CBSM modules, and two 30-minute breaks
Outcomes	**Included in this review** • Life Stress measured using 10-item abbreviated form of Life Experiences Survey (LES; Sarason, Johnson & Siegel 1978) **Not included in this review** • CD4 and plasma HIV viral load. • Cervical intraepithelial neoplasia (CIN).
Notes	Jensen 2013 did secondary analysis on psychological well-being but only used a subset of Beck Depression Inventory (BDI) **Setting:** not reported **Country:** USA

Risk of bias ***Risk of bias***

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "randomly assigned to either the 10-week CBSM group intervention or the one-day CBSM workshop at a 2:1 ratio (experimental:control)". No further details
Allocation concealment (selection bias)	Unclear risk	Quote: "Participants and assessors were blinded to experimental condition during completion of all study entry procedures". No further details
Blinding of participants and personnel (performance bias) Anxiety	Unclear risk	The trial authors did not describe the method of blinding, if any
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	The trial authors did not describe the method of blinding, if any

Antoni 2008 (*Continued*)

Incomplete outcome data (attrition bias) All outcomes	High risk	Loss to follow-up: 43.2% intervention group versus 21.7% control. Trial authors conducted an ITT analysis
Selective reporting (reporting bias)	Low risk	We did not detect any selective reporting bias.
Other bias	Low risk	We did not detect any other sources of bias.

Berger 2008

Methods	**Trial design:** 2-arm RCT **Follow-up:** 12 months **Loss to follow-up:** intervention loss n = 2; treatment loss n = 4
Participants	**Population:** 104 HIV-positive people taking combination antiretroviral therapy (ART) , intervention = 53, control = 51 **Inclusion criteria:** adults between 18 to 65 years, German speaking, received combination Antiretroviral Therapy (cART) within the 3 months prior to screening, had a CD4 lymphocyte count > 100 cells/μL and no opportunistic infection at baseline **Exclusion criteria:** received psychotherapy in past 3 months, intravenous drug users or on stable methadone maintenance, diagnosis of psychiatric disorder as determined by standardized interview
Interventions	**Treatment:** N = 53. Psychoeducation, group dynamics exercises, homework, cognitive strategies, and PMR • Group size: 4 to 10. • Facilitators: cognitive behavioural psychotherapist and one psychotherapist trainee. • Session duration: 120 minutes. • Session frequency: 12 weekly sessions. **Control:** N = 51. 30-minute health check by physician.
Outcomes	**Included in review** • Anxiety and Depression by HADS. **Not included in review** • CD4 lymphocyte cell count and HIV-1 RN. • Adherence to therapy (SMAQ). • Physical and Mental Health (MOS-HIV).
Notes	Ethics approval. **Setting:** outpatient clinics **Country:** Switzerland

Risk of bias ***Risk of bias***

Bias	**Authors' judgement**	**Support for judgement**

Berger 2008 (*Continued*)

Random sequence generation (selection bias)	Low risk	Quote: "Allocation sequences included randomly permuted block sizes of two and four and were generated using the computer program RANCODE V3.0"
Allocation concealment (selection bias)	Low risk	Quote: "Individual assignment codes were properly concealed between black sheets, stored in sequentially numbered envelopes and opened in the presence of study participants"
Blinding of participants and personnel (performance bias) Anxiety	Unclear risk	The trial authors did not describe the method of blinding, if any
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	The trial authors did not describe the method of blinding, if any
Incomplete outcome data (attrition bias) All outcomes	High risk	Losses to follow-up: 37.7% intervention group versus 25.5% control group.Trial authors conducted an ITT analysis
Selective reporting (reporting bias)	Low risk	We did not detect any selective reporting bias.
Other bias	Low risk	We did not detect any other sources of bias.

Bormann 2006

Methods	**Trial design:** RCT 2 group by 4 time repeated measures design **Follow-up:** baseline, 10 weeks, 3 months follow-up, 22 weeks post follow-up **Loss to follow-up:** 71% completed all trial points
Participants	**Population:** 93 HIV-positive adults, intervention = 46, control = 47 **Inclusion criteria:** HIV-positive for ≥ 6 months; 18 to 65 years old; no drug or substance abuse for ≥ 6 months; able to read, write, and comprehend English **Exclusion criteria:** Trial authors did not list any exclusion criteria**.**
Interventions	**Treatment:** N = 46. Information on choosing and using a mantram, attention to mindfulness, phone calls to encourage mantram practice • Group size: 8 to 15. • Facilitators: led by the same 2 Masters' prepared psychiatric mental health nurses. • Session duration:135 mins (45 mins relaxation training and 90 mins of cognitive behavioural training). • Session frequency: 10 weekly sessions: 5 x 90 min weekly sessions, followed by 4 weekly automated phone calls from facilitators and a final session in week 10. **Control:** N = 47. Videotapes on HIV topics including medications, treatment issues,

Bormann 2006 (*Continued*)

	wasting syndrome, and nutrition. Attention control group the same
Outcomes	**Included in review** • Stress using the Perceived Stress Scale (PSS). • Anxiety using the Spielberger Trait-Anxiety Inventory (STAI). • Depression using the Centre for Epidemiological Studies-Depression Scale (CES-D). **Not included in review** • Quality of Life assessed with the Overall-General Activities sub-scale from the Quality of Life Enjoyment and Satisfaction Questionnaire. • Anger using the Spielberger Trait-Anger Inventory (STAI).
Notes	50% homosexual participants **Setting:** not reported **Country:** USA University Institutional Review Board approval

Risk of bias ***Risk of bias***

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "Random assignment was done by the project coordinator using a table of random numbers and stratifying on CD4 count"
Allocation concealment (selection bias)	Unclear risk	Trial authors did not describe selection bias.
Blinding of participants and personnel (performance bias) Anxiety	Unclear risk	Trial authors conducted an ITT analysis.
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	The trial authors did not describe the method of blinding, if any
Incomplete outcome data (attrition bias) All outcomes	High risk	Losses to follow-up: 30.4% intervention group versus 27.7% control group
Selective reporting (reporting bias)	Low risk	We did not detect any selective reporting bias.
Other bias	Unclear risk	Groups differed on 4 baseline variables; "baseline imbalance"

Carrico 2005

Methods	**Trial design:** 2-arm RCT **Follow-up:** pre, post, 6 months, and 12 months **Loss to follow-up:** 50% followed up in intervention and 47% in control.
Participants	**Population:** 129 HIV seropositive homosexual men. Intervention = 31, control = 18 **Inclusion criteria:** have at least 1 non-AIDS HIV-related symptom occurring within 3 years of trial entry of laboratory signs of mildly progressed HIV infection, have at least an 8th grade education and ability to read and write in fluent English, CD4 counts > 200 cells/mm^3, those on AZT or ART had to have maintained current dosage without change in regimen for at least 2 months before trial entry, those concurrently engaged in psychotherapy or support groups were asked not to change their involvement during the trial **Exclusion criteria:** individuals with AIDS symptomology, a prior diagnosis of AIDS (CD4 count < 200 cells/mm^3), those who had been hospitalized in previous 3 months, those who had a chronic immune system-related physical condition other than HIV and regular use of medications (other than ARVs) with substantial known effects on the endocrine or immune systems, those with psychiatric or neuropsychological conditions, alcohol or substance abuse dependency, or and major psychiatric and personality disorder, who were cognitively impaired, patients with concurrent clinical levels of depression, individuals who had been bereaved of a significant other within the previous 6 months, risk factors for HIV transmission other than sexual orientation (for example, past or present intravenous drug use, blood transfusion), initiating a new psychotherapy or exercise training programme in past 3 months
Interventions	**Treatment:** N = 31. CBSM (GET SMART) included increasing awareness of physiological effects of stress, cognitive behavioural theory of stress and emotions, identification of cognitive distortions and automatic thoughts, rational thought replacement, coping skills training, assertiveness training, anger management, and identification and use of social supports. Homework was assigned and participants were taught a variety of relaxation techniques including PMR, autogenic training, meditation and breathing exercises • Group size: 4 to 9 men. • Facilitators: 2 advanced clinical-health psychology graduate students. • Session duration: 135-minute group sessions (90-minute stress management and 45-minute relaxation) and were asked to complete relaxation exercises twice daily between sessions. • Session frequency: 10 weekly sessions. **Control:** N = 18. Waitlist, 2 weeks post treatment they were offered a 1 day seminar consisting of condensed CBSM components
Outcomes	**Included in review** • Depression by BDI. **Not included in review** • Mood by Profile of Mood States (POMS-TMD). • Social Support by Social Provisions Scale (SPS). • CD4 by blood sample. • Herpes Virus by IgG antibodies. • DHEA-S and cortisol.

Notes	**Setting:** not reported **Country:** USA

Risk of bias ***Risk of bias***

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	The trial authors described the trial as "randomized" but did not provide any further details
Allocation concealment (selection bias)	Unclear risk	The trial authors did not describe selection biases, if any.
Blinding of participants and personnel (performance bias) Anxiety	Unclear risk	The trial authors did not describe the method of blinding, if any
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	The trial authors did not describe the method of blinding, if any
Incomplete outcome data (attrition bias) All outcomes	High risk	Losses to follow-up: 66.3% intervention group versus 65.2% control group
Selective reporting (reporting bias)	Low risk	We did not detect any selective reporting bias.
Other bias	Low risk	We did not detect any other sources of bias.

Chesney 2003

Methods	**Trial design:** 3-arm RCT **Follow-up:** 6 and 12 months **Loss to follow-up:** 86% retained
Participants	**Population:** 149 HIV-positive men who have sex with men (MSM) and who have depression **Inclusion criteria:** (1) self-identified as homosexual or bisexual, (2) 21 to 60 years of age, (3) self-reported CD4 levels between 200 and 700 cells/mm^3 **Exclusion criteria:** (1) individuals with major depressive or psychotic disorders, (2) history of drug or alcohol dependency in past year, (3) currently in psychotherapy, (4) using psychoactive medication
Interventions	**Treatment:** N = 54. Coping Effectiveness Training (CET) comprising psychoeducation: appraisal of stressful situations, problem-focused and emotion-focused coping, use of social support; skills-building group activities, relaxation guidance • Group size: 8 to 10.

	• Facilitators: co-leaders with graduate experience in social work and clinical psychology or community-based HIV services. • Session duration: 90 minutes. • Session frequency: 10 weekly plus 6 maintenance sessions. • Additional components: a day-long retreat and take home activities. **Control:** N = 51. HIV-Informational Control comprising Didactic information on HIV-related topics and resources, workbooks, fact sheets, and reading material 10 weekly 90-minute group sessions of 8 to 10 men plus 6 maintenance sessions **Waiting list**: N = 44. Waiting list control
Outcomes	**Included in review** • Depression by CES-D. • Stress by PSS. • Anxiety by STAI. **Not included in review** • Burnout (own scale developed). • Negative Morale and Positive morale (Affect Balance Scale). **Mediating variables** • Coping self-efficacy. • Social support. • Optimism. • Positive state of mind.
Notes	**Setting:** not reported **Country:** San Francisco, USA

Risk of bias ***Risk of bias***

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	The trial authors described the trial as "randomized" but did not provide any further details
Allocation concealment (selection bias)	Unclear risk	The trial authors did not describe selection bias, if any.
Blinding of participants and personnel (performance bias) Anxiety	Unclear risk	The trial authors did not describe the method of blinding, if any
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	The trial authors did not describe the method of blinding, if any
Incomplete outcome data (attrition bias) All outcomes	High risk	Loss to follow-up: 33.3% intervention versus 33.3% control.

Chesney 2003 (*Continued*)

Selective reporting (reporting bias)	Low risk	We did not detect any selective reporting bias.
Other bias	Low risk	We did not detect any other sources of bias.

Duncan 2012

Methods	**Trial design:** 2-arm RCT **Follow-up:** baseline, 3 month and 6 month follow-up **Loss to follow-up:** 93% 6-month follow-up
Participants	**Population:** 76 participants actively taking ART, intervention = 40, control = 36 **Inclusion criteria:** (1) documentation of HIV test results, (2) currently taking a recognized ART regimen and (3) reporting a side effect bother in last 30 days of 8 or a bother on the side effect and symptom distress scale **Exclusion criteria:** (1) if enrolled in another behavioural coping or HIV adherence intervention research trial or MBSR
Interventions	**Treatment:** N = 40. Mindfulness-based stress reduction consisting of daily homework, sitting meditation with mindfulness of breath, thoughts, and emotions, including deliberate awareness of routine activities such as eating and interpersonal communication, and yoga postures • Group size: 2 to 9. • Facilitators: course instructor was an experienced MBSR teacher with a personal mindfulness meditation practice who had undergone formal training in the delivery of MBSR. • Session duration: 2.5 to 3 hours. • Session frequency: 8-weekly sessions plus 1 day retreat. • Additional components: In addition to teaching mindfulness practices, the course includes didactic presentations that include information on stress physiology and stress reactivity. The course also addresses the effects of perception, appraisal,and attitude on health habits and behavior and on interpersonal communication. **Control:** N = 36. Waitlist control group offered the MBSR subsequent to 6 month follow-up
Outcomes	**Included in the review** • Depression by BDI. • Stress by PSS. **Not included in the review** • CD4 count. • ART side effects by Side Effects Checklist. • ART adherence by percentage.
Notes	**Setting:** not reported **Country:** USA

Risk of bias	***Risk of bias***

Duncan 2012 (*Continued*)

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "Randomization was performed in blocks of six using the SAS system's PLAN procedure"
Allocation concealment (selection bias)	Unclear risk	The trial authors did not describe any selection bias.
Blinding of participants and personnel (performance bias) Anxiety	Unclear risk	The trial authors did not describe the method of blinding, if any
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	The trial authors did not describe the method of blinding, if any
Incomplete outcome data (attrition bias) All outcomes	Low risk	Losses to follow-up: 7.5% intervention group versus 5.6% control
Selective reporting (reporting bias)	Low risk	We did not detect any other potential sources of selection reporting bias
Other bias	Low risk	No differences between groups at baseline except for viral load and this was controlled for

Gayner 2012

Methods	**Trial design:** 2-arm follow-up **Follow-up:** baseline, 2 months post, and 6 months follow-up **Loss to follow-up:** 21 participants discontinued the intervention
Participants	**Population:** 117 homosexual male participants, intervention =78, control = 39 **Inclusion criteria:** male, aged 18 to 70 years, living within 1 hour of the hospital, and having a diagnosis of HIV **Exclusion criteria:** (1) subjects with active current major depression, substance abuse, or significant cognitive deficit
Interventions	**Treatment:** N = 78. Mindfulness-Based Stress Reduction (MBSR): participants were taught mindfulness skills geared towards enhancing their awareness of and relation to current experience rather than focusing on the content and reappraisal of thoughts and interpretations of experiences • Group size: 14 to 18. • Facilitators: no details given. • Session duration: 3 hours. • Session frequency: 8 weekly sessions. • Addiditional components: a day-long retreat with an hour daily homework.

Gayner 2012 (*Continued*)

	Control: N = 39. Treatment as Usual (TAU) group offered at end of intervention
Outcomes	**Included in review** • Stress by Impact of Event Scale (IES). • Anxiety by Hospital Anxiety and Depression Scale (HADS). • Depression by HADS. **Not included in review** • Mood by Positive and Negative Affect Schedule (PANAS). • Mindfulness by the Toronto Mindfulness Scale (TMS).
Notes	Homosexual population Ethics reviewed. **Setting:** hospital **Country:** Toronto, Canada

Risk of bias ***Risk of bias***

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Quote: "A randomization free-ware, software program (Network, 1997) was utilized to generate a random allocation sequence 2:1 in favour of the group intervention for each cohort of up to 30 eligible participants"
Allocation concealment (selection bias)	Unclear risk	Quote: "study staff were not aware of a potential participant's group member- ship until the whole cohort was assigned at the same time". The trial authors did not provide any further details
Blinding of participants and personnel (performance bias) Anxiety	Unclear risk	The trial authors did not describe the method of blinding, if any
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	The trial authors did not describe the method of blinding, if any
Incomplete outcome data (attrition bias) All outcomes	High risk	Losses to follow-up: 24.4% intervention group versus 5.1% control. ITT analysis done
Selective reporting (reporting bias)	Low risk	We did not detect any selective reporting bias.
Other bias	Low risk	We did not detect any other sources of bias.

Heckman 2007

Methods	**Trial design:** 3-arm RCT **Follow-up:** baseline, post, 4 months, and 8 months follow-up **Loss to follow-up:** 73%; 68%, 82%
Participants	**Population:** 299 adults, intervention = 84, control = 107 **Inclusion:** 18 years or older, provision of written consent, a self reported diagnosis of HIV AIDS, and residence in a community of 50,000 people or fewer that was at least 20 miles from a city of 100,000 or more **Exclusion:** there were no exclusion related to psychological functioning
Interventions	**Treatment:** N = 108. Coping improvement group intervention used cognitive behavioural principles to appraise stressor severity, develop adaptive problem- and emotion-focused coping skills, and optimize coping through the appropriate use of personal and social resources • Group size: 6 to 8. • Facilitators: Master's degree level in psychology or social work. • Session duration: 90 minutes. • Session frequency: 8 sessions. **Treatment:** N = 84. Information Support Group provided information on HIV symptom management, nutrition and HIV, exercise and HIV, and discussions of personal topics • Group size: 6 to 8 participants per group. • Facilitators: conducted using teleconference technology and co-facilitated by nurse practitioners or social workers. • Session duration: 90 minutes. • Session frequency: 8 sessions. **Control:** N = 107. Usual care condition received no intervention but had access to usual services
Outcomes	**Included in review** • Depression by BDI. • Life stressors by HIV-Related Life Stressor Burden Scale (HRLSBS). • Coping by Coping Self-Efficacy Scale. **Not included in review** • Psychological symptoms by Symptom Checklist 90-Revised (SCL-90-R). • Emotional and social well-being by Funtional Assessment of HIV Infection Inventory (FAHI). • Barriers to care by Barriers to Care Scale (BACS). • Social Support by Provision of Social Relations Scale (PSRS).
Notes	**Setting:** telephone-delivered **Country:** USA Groups conducted separately for MSM, heterosexual men, and women 71% reporting moderate to severe depression at baseline.

Risk of bias			*Risk of bias*
Bias	**Authors' judgement**	**Support for judgement**	

Heckman 2007 (*Continued*)

Random sequence generation (selection bias)	Unclear risk	The trial authors described the trial as "randomized" but did not provide any further details
Allocation concealment (selection bias)	Unclear risk	The trial authors did not describe selection bias, if any.
Blinding of participants and personnel (performance bias) Anxiety	Unclear risk	The trial authors did not describe the method of blinding, if any
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	The trial authors did not describe the method of blinding, if any
Incomplete outcome data (attrition bias) All outcomes	High risk	Losses to follow-up: 18.5 intervention group versus 27.1% control. ITT done. A last-observation-carried-forward (LOCF) approach was used to input missing data
Selective reporting (reporting bias)	Low risk	We did not detect any selective reporting bias.
Other bias	Low risk	We did not detect any other sources of bias.

Heckman 2011

Methods	**Trial design:** 3-arm RCT **Follow-up:** baseline, post, 4 months, and 8 months follow-up **Loss to follow-up:** coping group 79% loss, interpersonal support group 69% loss, individual therapy group 86% loss
Participants	**Population:** 295 men and women over the age of 50, intervention = 104, control = 105 **Inclusion:** 50 years or older, a diagnosis of HIV infection or AIDS, a BDI-II score of 10 or higher, a score of 75 or more on the 3MS, a minimum value of 10 on the BDI-II. (A minimum value of 10 on the BDI-II was used to ensure that participants had a minimally elevated number of depressive symptoms that had the potential to be reduced by the interventions) **Exclusion:** the project did not exclude individuals with alcohol or substance use disorders, active bipolar disorder, psychotic symptoms, or individuals receiving psychotherapy
Interventions	**Treatment:** N = 104. Coping improvement group intervention addressed introductions and participants' sharing of personal histories (Session 1 and 2) appraisal and changeability of stressors related to one's HIV infection and stressors related to normal ageing (Sessions 3 and 4); developing and implementing adaptive problem- and emotion-focused coping skills (Sessions 5 through 9); optimizing coping efforts through the use of interpersonal supports (Session 10 and 11); and termination issues and voluntary sharing of personal contact information (Session 12)

	• Group size: 6 to 8 participants. • Facilitators: Master's degree level in psychology or social work and had provided mental health support services to persons living with HIV AIDS for more than 10 years. • Session duration: 90 minutes. • Session frequency: 12 weeks. **Treatment:** N = 105. Interpersonal Support Group of 12 x 90-minute group sessions (5 minutes spent on viewing and discussing videotapes on HIV-related topics of nutrition, treatment, adherence, sexual risk reduction, 45 minutes spent discussing how the sessions' topic pertained to their personal lives) Facilitators: 2 Masters-level clinicians **Control:** N = 86. Individual Therapy Upon Request (ITUR) Group had access to standard psychosocial community-based services
Outcomes	**Included in review** • Depression by Geriatric Depression Scale (GDS). **Not included in the review** • None.
Notes	**Setting:** community **Country:** Ohio and New York, USA. Each 90-minute group conducted separately for MSM, heterosexual men, and women

Risk of bias ***Risk of bias***

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	The trial authors described the trial as "randomized" but did not provide any further details
Allocation concealment (selection bias)	Unclear risk	The trial authors did not describe selection bias, if any.
Blinding of participants and personnel (performance bias) Anxiety	Unclear risk	The trial authors did not describe the method of blinding, if any
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	The trial authors did not describe the method of blinding, if any
Incomplete outcome data (attrition bias) All outcomes	High risk	Losses to follow-up: 15.4% intervention group versus 31.4% control
Selective reporting (reporting bias)	Low risk	We did not detect any selective reporting bias.
Other bias	Low risk	We did not detect any other sources of bias.

Jones 2010

Methods	**Trial design**: 2-arm RCT **Follow-up:** pre, post, 12 months **Loss to follow-up:** not reported.
Participants	**Population:** 451 minority women, intervention = 212, control = 239 **Inclusion:** 18 years and older, meet the CDC classification for case-defined AIDS (i. e. CD4+ cell count below 200/mm² and/or one opportunistic infection, CDC 1993), have at least 6th grade education **Exclusion:** women with psychiatric, neuropsychiatric or medical conditions were temporarily excluded pending treatment
Interventions	**Treatment:** N = 212. Cognitive Behavioural Stress Management: sessions included didactic components on the physiological effects of stress, cognitive behavioural interpretation of stress and emotions, identification of cognitive distortions and automatic thoughts, rational thought replacement, coping skills training, assertiveness training, anger management, and identification of social support • Group size: not stated. • Facilitators: not described. • Session duration: 120 minutes (30 mins relaxation component and 90 mins stress management component). • Session frequency: 10 weekly sessions. • Additional components: expressive support therapy addressing: needs for mutual support, improved family and social support, emotional expressiveness, normalization of experiences, integration of changed body image, doctor-patient relationship, and death and dying issues **Control:** N = 239. Individual 120-minute information education sessions delivered by videotape covering stress management, relaxation, and coping with HIV. 10 sessions
Outcomes	**Included in this review** • Depression by BDI. • Anxiety by STAI • Coping Self efficacy by Cognitive Behavioral Self efficacy (CB-SE). **Not included in this review** • Socio-demographic characteristics.
Notes	**Setting:** medical school setting and community health centres **Country:** USA

Risk of bias ***Risk of bias***

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	The trial used a table of random numbers to randomize participants to treatment
Allocation concealment (selection bias)	Unclear risk	The trial authors did not describe selection bias, if any.

Jones 2010 (*Continued*)

Blinding of participants and personnel (performance bias) Anxiety	Unclear risk	The trial authors did not describe the method of blinding, if any
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	The trial authors did not describe the method of blinding, if any
Incomplete outcome data (attrition bias) All outcomes	High risk	Losses to follow-up: 45.1% intervention group versus 36.9% control
Selective reporting (reporting bias)	Low risk	We did not detect any potential source of selective reporting bias
Other bias	Low risk	We did not detect any other sources of bias.

McCain 2003

Methods	**Trial design**: 3-arm RCT **Follow-up:** pre, post, and 6 months **Loss to follow-up:** 69% follow-up at 6 months
Participants	**Population:** 148 individuals diagnosed with HIV disease (119 men, 29 women). Intervention = 59, support group = 3, Waitlist = 36 **Inclusion:** (1) 18 years of age, (2) able to read and speak English, (3) previously aware of their HIV diagnosis, (4) deemed capable of attending intervention sessions and completing 6 months follow-up **Exclusion:** (1) no significant psychiatric illness, (2) no cognitive impairment, (3) not pregnant or taking steroids
Interventions	**Treatment 1:** N = 59. CBSM focused on breathing, PMR, yoga-form stretching, guided imagery, and beginning meditation, along with cognitive restructuring techniques and active coping skills • Group size: 6 to 10 participants. • Facilitators: Trial authors did not describe characteristics of the facilitators. • Session duration: 90 minutes. • Session frequency: 8 weekly. **Treatment 2:** N = 43. SSG focused on facilitating communication related emotional issues, problem-solving and cognitive-reframing techniques, and individual and group empowerment • Group size: 6 to 10 participants. • Facilitators: facilitated by mental health nurse. • Session duration: 90 minutes. • Session frequency: 8 weekly. **Control:** N = 36. Waitlist group

Outcomes	**Included in this review** • Stress with Mishel Uncertainity in Illness Scale (MUIS). • Coping by Dealing with Illness Scale (DIS). **Not included in this review** • Social support by Social Provisions Scale (SPS). • Psychological distress by Impact of Events Scale (IES). • Overall quality of life by Functional Assessment of HIV Infection scale (FAHI). • Neuroendocrine indicators of stress by cortisol and DHEA levels. • Health Status by revised HIV Center Medical Staging System (rHCMSS). • CD4 by immunophenotyping. • NK cell cytotoxicity by cell samples. • Cytokines levels using enzyme-linked immunosorbent assay (ELISA) kits. • Viral load by HIV monitor assay.
Notes	**Setting**: Trial authors did not describe the setting. **Country:** USA Separate gender groups, interaction terms included by group by gender

Risk of bias ***Risk of bias***

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "Quota sampling was used to achieve appropriate sample representation by gender, at a ratio of 4 males:1 female (20%)". The trial authors did not provide any further details
Allocation concealment (selection bias)	Unclear risk	The trial authors did not describe selection bias, if any.
Blinding of participants and personnel (performance bias) Anxiety	Unclear risk	The trial authors did not describe the method of blinding, if any
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	The trial authors did not describe the method of blinding, if any
Incomplete outcome data (attrition bias) All outcomes	High risk	Losses to follow-up: 27.1% intervention group versus 27.8% control
Selective reporting (reporting bias)	Low risk	We did not detect any potential source of selective reporting bias
Other bias	Low risk	We did not detect any other sources of bias.

Nakimuli-Mpungu 2015

Methods	**Trial design:** 2-arm RCT **Follow-up:** baseline, immediately post, 6 months follow-up **Loss to follow-up:** 23% in intervention group, 21% lost in control group
Participants	**Population:** 109 HIV-positive individuals (peasant farmers) with major depression, intervention = 57, control = 52 **Inclusion:** 19 years or older, met the MINI International Neuropsychiatric Interview criteria for major depression, from an urban HIV care centre, were antidepressant naive **Exclusion:** individuals with severe medical disorder such as pneumonia or active tuberculosis, psychotic symptoms, and hearing or visual impairment
Interventions	**Treatment:** N = 57. Group Support Psychotherapy (GSP) is a culturally sensitive intervention that aims to treat depression by enhancing social support, teaching coping skills and income generating skills • Group size: 10 to 12 participants (gender specific groups). • Facilitators: Mental Health workers with mental health diploma or degree, of the same gender as group. • Session duration: 2 to 3 hours. • Session frequency: 8 weekly sessions. **Control:** N=52. Active treatment group receives Group HIV education (GHE) immediately post intervention and 6 months later
Outcomes	**Included in the review** • Depression by Self Reported Questionnaire (SRQ-20). **Not included in review** • Functioning levels assessed using a locally developed scale. • Percieved social support (Multi-dimensional social support scale). • Self Esteem (Rosenberg self esteem scale).
Notes	**Setting:** HIV care centre, urban **Country:** Uganda Gender-specific groups

Risk of bias ***Risk of bias***

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	The trial authors performed randomization by urn with a ratio of 1:1. The trial authors did not provide any further details or properties of this method
Allocation concealment (selection bias)	Unclear risk	Men and women separately picked a paper containing the intervention allocation from a basket, ratio. The trial authors did not provide further details on allocation concealment

Nakimuli-Mpungu 2015 (*Continued*)

Blinding of participants and personnel (performance bias) Anxiety	Unclear risk	The trial authors did not describe the method of blinding, if any
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	The trial authors did not describe the method of blinding, if any
Incomplete outcome data (attrition bias) All outcomes	High risk	Losses to follow-up: 22.8% intervention group versus 21.2% control
Selective reporting (reporting bias)	Low risk	We did not detect any potential source of selective reporting bias
Other bias	Low risk	We did not detect any other sources of bias.

Peltzer 2012

Methods	**Trial design:** 2 arm RCT **Follow-up:** baseline, 1 month, 4 months **Loss to follow-up:** 147 follow-up (96.7% follow-up); 3.9% attrition in MAI and 2.6% attrition in SC
Participants	**Population:** 152 HIV-positive individuals on ART with an adherence problem, intervention = 76, control = 72 **Inclusion:** 18 years or older, new ARV medication users (2 to 24 months of ARV use) **Exclusion:** Trial authors did not describe any exclusion criteria.
Interventions	**Treatment**: N = 76. Medication adherence intervention (MAI) is medication information combined with problem-solving skills in an experiential/interactive group format • Group size: 10 participants. • Facilitators: MAI led by a trained lay health worker and adherence counsellor. • Session duration: 1 hour a month. • Session frequency: 3 months. **Control:** N = 76. Practitioner medical directive (standard of care; 20 min) led by medical physician. Patients individually attended monthly 1 visit to review their health status with their medical practitioner
Outcomes	**Included in this review** • Depression measured by BDI-II **Not included in this review** • The Life-Windows Information-Motivation-Behavioural Skills ART adherence questionnaire. • CD4 count was obtained from medical chart.
Notes	**Setting**: hospital **Country**: South Africa. Short follow-up of 3 months

Peltzer 2012 (*Continued*)

Risk of bias		*Risk of bias*
Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Quote: "Participants were randomized into study condition using a table of random numbers following their baseline assessment"
Allocation concealment (selection bias)	Unclear risk	The trial authors did not describe any selection bias, if any
Blinding of participants and personnel (performance bias) Anxiety	Unclear risk	The trial authors did not describe the method of blinding, if any
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	The trial authors did not describe the method of blinding, if any
Incomplete outcome data (attrition bias) All outcomes	Low risk	Losses to follow-up: 3.9% intervention group versus 2.6% control. Trial authors performed an intention-to-treat analysis
Selective reporting (reporting bias)	Low risk	We did not detect any potential source of selective reporting bias
Other bias	Low risk	We did not detect any other sources of bias.

Safren 2012

Methods	**Trial design**: 2-arm RCT **Follow-up:** 3 months, 6 months and 12 months **Loss to follow-up:** 84% follow-up to at least one follow-up assessment
Participants	**Population:** 89 HIV individuals prescribed ARVS and with a history of injection drug use, intervention = 44, control = 45 **Inclusion:** aged 18 to 65 years, HIV-positive, prescribed ARVs, endorsed history of injection drug use, currently enrolled in opoid treatment for at least one month, and met criteria for a diagnosis of current or subsyndromal depressive mood disorder **Exclusion: i**ndividuals with any active untreated or unstable major mental illness, inability or unwillingness to provide informed consent, or current participation in a CBT for depression
Interventions	**Treatment:** N = 44. CBT-AD included Life Steps, psychoeducation about HIV and depression, motivational interviewing for behaviour change, behavioural activation to increase pleasurable activities, training in adaptive thinking, problem solving, PMR, and diaphragmatic breathing

	• Group size: not stated • Facilitators: pre- and postdoctoral clinical psychologists. • Session duration: 50 minutes. • Session frequency: 8 sessions over 3 months. **Control:** N = 45. Enhanced Treatment As Usual (ETAU) with a letter to medical provider documenting participants depression and suggesting continued assessment and treatment Both treatment conditions received a single-session intervention on medication adherence (Life Steps) with involved 11 informational, problem-solving and cognitive-behavioural steps
Outcomes	**Included in this review** • Depression by BDI and Montgomery-Asberg Depression Rating Scale. **Not included in this review** • Clinical Global Impression - a rating of global distress and impairment for depression and substance abuse. • Adherence by MEMS. • CD4.
Notes	**Setting:** methadone clinics **Country:** Boston, USA

Risk of bias ***Risk of bias***

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Quote "Random assignment in block of 2 - stratified by sex, depression severity and adherence". The trial authors did not provide any further details
Allocation concealment (selection bias)	Unclear risk	Quote: "Assignment to study condition (CBT-AD or ETAU) was concealed from both study therapists and participants until the conclusion of the first counseling visit (see below)". The trial authors did not provide any further details
Blinding of participants and personnel (performance bias) Anxiety	Unclear risk	The trial authors did not describe the method of blinding, if any
Blinding of outcome assessment (detection bias) All outcomes	Low risk	An independent assessor who was blinded to the trial conditions assessed depression
Incomplete outcome data (attrition bias) All outcomes	High risk	Losses to follow-up: 18.2% intervention group versus 33.3% control

Safren 2012 (*Continued*)

Selective reporting (reporting bias)	Low risk	We did not detect any potential sources of selective reporting bias
Other bias	Unclear risk	Small sample size of 89. CD4 count differed at baseline but controlled for in analysis

Sikkema 2013

Methods	**Trial design:** 3-arm RCT **Follow-up:** baseline, post, 4, 8, 12 months **Loss to follow-up:** minimal loss to follow-up, ITT analysis done
Participants	**Population:** 247 HIV-positive men (N = 117) and women (N = 130), intervention = 124, control = 123 **Inclusion:** sexual abuse as a child (age 12 and under) and/or adolescent (age 13 to 17 years); current age of 18 or older; HIV serostatus **Exclusion:** acute distress due to sexual revictimization experienced within past month; presence of impaired mental status; extreme distress or depressive symptomatology
Interventions	**Treatment 1:** N= 124. HIV and Trauma Coping Group Intervention (LIFT) where participants Identify stressors that they perceived to be related to their sexual abuse experiences and those related to their HIV diagnosis, learn adaptive coping and risk reduction skills related to both sexual abuse and HIV infection • Group size: 6-10 • Facilitators: coping group lead by 2 clinical psychologists and 2 social workers. Support group lead by 4 social workers. • Session duration: 90 minutes. • Session frequency: 15 weekly sessions. **Control:** N = 123. HIV standard therapeutic support group. The comparison intervention paralleled a standard therapeutic support group and was led by experienced co-therapists not trained on the coping intervention model. The purpose of the group was to provide a supportive environment for participants to address issues of HIV and trauma
Outcomes	**Included in this review** • Traumatic Stress by the Impact of Events Scale (IES). • Avoidant coping by the Coping with AIDS ScaleWays of Coping Questionnaire (WOCQ). **Not included in this review** • Condom use by frequency of unprotected vaginal and anal intercourse with all partners in last month.
Notes	**Setting:** Community Health Centre **Country:** USA Different populations in each report

Risk of bias		***Risk of bias***

Sikkema 2013 (*Continued*)

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	The trial authors described the trial as 'randomized' but did not provide any further details
Allocation concealment (selection bias)	Unclear risk	The trial authors did not describe the method of allocation concealment, if any
Blinding of participants and personnel (performance bias) Anxiety	Unclear risk	The trial authors did not describe the method of blinding, if any
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	The trial authors did not describe the method of blinding, if any
Incomplete outcome data (attrition bias) All outcomes	High risk	Losses to follow-up: 16.5% Intervention group versus 33.3% control. The trial authors conducted an intention-to-treat analysis
Selective reporting (reporting bias)	Low risk	We did not detect any other sources of selective reporting bias
Other bias	Low risk	We did not detect any other potential sources of bias.

Abbreviations: HAART: highly active antiretroviral therapy; PMR: progressive muscle relaxation; RCT: randomized controlled trial.

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

Study	Reason for exclusion
Antoni 2000	No 3-month follow-up post intervention.
Balfour 2006	Individual psychoeducational intervention, not a group intervention
Bormann 2009	No specified outcomes reported. The study measured salivary cortisol as a biomarker of immune function
Carrico 2009	Individual counselling sessions, not a group intervention.
Chan 2005	No 3-month follow-up postintervention.

(*Continued*)

Chhatre 2013	Not a group-based intervention.
Chiou 2004	No specified outcomes measured.
Creswell 2009	No 3-month follow-up postintervention.
Cruess 2000	No 3-month follow-up postintervention.
Côté 2002	Nurse-patient intervention, not a group intervention.
Davies 2006	Overview of intervention, not a randomized controlled trial (RCT)
Davies 2009	Only formative qualitative data presented, not a RCT.
Evans 2003	We contacted the study author. This was not a group intervention
Fife 2008	Individual therapy for patient-partner dyads. This was not a group intervention
Gifford 1998	No 3-month follow-up postintervention, only 3-month follow-up after baseline
Golin 2006	Individual, not a group intervention.
Goodkin 1998	No specified outcomes.
Goodkin 1999	No 3-month postintervention follow-up.
Hansen 2009	No specified outcomes included.
Heckman 2004	No RCT result reported, only baseline data reported.
Heckman 2006	No post 3-month follow-up.
Ingersoll 2011	Not a group intervention.
Jensen 2013	Measured positive affect and positive mood. These are not specified outcomes
Jones 2005	Not a RCT as no control group.
Kaaya 2013	No 3-month follow-up postintervention.
Kalichman 2005	Describes intervention development and components, not a RCT
Koenig 2008	Nurse-patient intervention, not a group intervention.
Kunutsor 2011	Treatment supporter intervention, not a group intervention.

(*Continued*)

Laperriere 2005	The study author presented a subgroup analysis only, a subgroup from the larger Jones 2010 study.
Latkin 2003	Not a HIV-positive population.
Lechner 2003	No 3-month follow-up postintervention.
Lee 1999	Not a RCT and no control group.
Lehavot 2011	Not a group intervention.
MacNeil 1999	Not a group intervention.
Marhefka 2014	No specified outcomes reported.
Markowitz 1998	Interpersonal therapy, not a group intervention.
Molassiotis 2002	Not truly randomized.
Mundell 2011	Not a RCT, quasi-experimental.
Nakimuli-Mpungu 2014	No 3-month follow-up postintervention.
Nokes 2003	No RCT reported.
Olley 2006	Individual therapy, not a group intervention.
Pacella 2012	Not a group intervention.
Papas 2011	No specified outcomes reported.
Petersen 2014	No 3-month follow-up postintervention.
Prado 2012	Adolescents 12 to 17 years old.
Proeschold-Bell 2011	No RCT reported.
Rao 2009	Individual art therapy sessions, not a group intervention.
Rao 2012	No RCT reported.
Ravaei 2013	No 3-month follow-up postintervention, small sample size (N = 30), and unsure whether a group intervention
Remien 2005	Not a group intervention. The intervention was individually administered to each couple
Robins 2006	No 3-months follow-up postintervention.

(*Continued*)

Roth 2012	One-to-one intervention by lay health workers, not a group intervention
Rotheram-Borus 2011	Study protocol only. No RCT data reported.
Rotheram-Borus 2012	No specified outcomes.
Sacks 2011	Both individual and group formats to intervention. No effects reported for group components of intervention
Safren 2009	Control invited to cross over to intervention at 3-months postintervention. No postintervention follow-up of 3 months for control group
Saleh-Onoya 2009	Measured coping using 3 subscales of Coping Scale.
SeyedAlinaghi 2012	No specified outcomes. Used global score of broad range of psychological symptoms, did not measure depression and anxiety outcomes separately
Sikkema 2004	No 3-month follow-up postintervention.
Simoni 2013	Not a group-based intervention.
Stewart 2001	Content analysis, no RCT reported.
Szapocznik 2004	Therapy sessions with family at home.
Wagner 2006	Individually administered intervention, not a group intervention
Williams 2014	Not a group intervention but home-based individual intervention
Wingood 2004	Inconsistencies in reporting of data.
Wong 2008	Individual counselling sessions, not a group intervention.
Wyatt 2004	There was unclear presentation of follow-up data and it was unclear whether it was 3-month or 6-month follow-up data. We contacted the study author but received no response
Yu 2014	Not a RCT, no control group, HIV-positive and HIV-negative mixed sample
Zisook 1998	Individual psychotherapy, not a group intervention.
Znoj 2010	Not a group intervention.

Abbreviations: RCT: randomized controlled trial.

DATA AND ANALYSES

Comparison 1. Group therapy (CBT) versus control

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Depression scores	10		Std. Mean Difference (IV, Random, 95% CI)	Subtotals only
1.1 Baseline mean scores	10	1600	Std. Mean Difference (IV, Random, 95% CI)	0.05 [-0.05, 0.15]
1.2 Mean score at end of group sessions (10 to 12 weeks after randomization)	9	1142	Std. Mean Difference (IV, Random, 95% CI)	-0.17 [-0.29, -0.05]
1.3 Mean score at longest follow-up (6 to 15 months after randomization)	10	1139	Std. Mean Difference (IV, Random, 95% CI)	-0.26 [-0.42, -0.10]
2 Depression scores at longest follow-up; subgrouped by depression score used	10		Mean Difference (IV, Random, 95% CI)	Subtotals only
2.1 Beck depression inventory (score out of 63)	6	753	Mean Difference (IV, Random, 95% CI)	-1.41 [-2.61, -0.21]
2.2 Hospital Anxiety and Depression score (score out of 21)	1	71	Mean Difference (IV, Random, 95% CI)	-2.12 [-3.90, -0.34]
2.3 Geriatric depression score (score out of 30)	1	160	Mean Difference (IV, Random, 95% CI)	-1.48 [-2.83, -0.13]
2.4 Centre for Epidemiological Studies (score out of 60)	1	70	Mean Difference (IV, Random, 95% CI)	0.30 [-4.03, 4.63]
2.5 Self-reported questionnaire (score out of 20)	1	85	Mean Difference (IV, Random, 95% CI)	-2.5 [-3.91, -1.09]
2.6 Profile of mood states (depression) (score out of 60)	1	101	Mean Difference (IV, Random, 95% CI)	-4.30 [-10.47, 1.87]
2.7 Montgomery-Asberg Depression Rating Scale (score out of 60)	1	66	Mean Difference (IV, Random, 95% CI)	-4.72 [-9.67, 0.23]
3 Depression scores (trials with mean scores in the range of depression at baseline)	5		Std. Mean Difference (IV, Random, 95% CI)	Subtotals only
3.1 Baseline mean scores	5	790	Std. Mean Difference (IV, Random, 95% CI)	0.04 [-0.10, 0.18]
3.2 Mean score at longest follow-up	5	628	Std. Mean Difference (IV, Random, 95% CI)	-0.20 [-0.46, 0.06]
4 Depression scores at longest follow-up; subgrouped by control	10		Std. Mean Difference (IV, Random, 95% CI)	Subtotals only
4.1 Standard care ± a minimal intervention (< 1 day)	6	595	Std. Mean Difference (IV, Random, 95% CI)	-0.24 [-0.45, -0.04]
4.2 Alternative group sessions	3	300	Std. Mean Difference (IV, Random, 95% CI)	-0.25 [-0.71, 0.22]
4.3 Individual therapy	2	389	Std. Mean Difference (IV, Random, 95% CI)	-0.22 [-0.42, -0.01]

5 Depression scores (trials with mean scores in the normal range at baseline)	5		Std. Mean Difference (IV, Random, 95% CI)	Subtotals only
5.1 Baseline mean scores	5	810	Std. Mean Difference (IV, Random, 95% CI)	0.10 [-0.11, 0.30]
5.2 Mean score at longest follow-up (6 to 15 months after randomization)	5	511	Std. Mean Difference (IV, Random, 95% CI)	-0.30 [-0.48, -0.13]
6 Depression scores at longest follow-up; subgrouped by primary focus of intervention	10		Std. Mean Difference (IV, Random, 95% CI)	Subtotals only
6.1 Stress management	3	216	Std. Mean Difference (IV, Random, 95% CI)	-0.46 [-0.73, -0.18]
6.2 Coping	3	396	Std. Mean Difference (IV, Random, 95% CI)	-0.14 [-0.37, 0.08]
6.3 Self-efficacy	1	229	Std. Mean Difference (IV, Random, 95% CI)	-0.13 [-0.39, 0.13]
6.4 Depression	1	85	Std. Mean Difference (IV, Random, 95% CI)	-0.75 [-1.19, -0.30]
6.5 Adherence and depression	1	66	Std. Mean Difference (IV, Random, 95% CI)	-0.43 [-0.92, 0.06]
6.6 Adherence	1	147	Std. Mean Difference (IV, Random, 95% CI)	0.03 [-0.30, 0.35]
7 Depression scores at longest follow-up; subgrouped by gender	10	1139	Std. Mean Difference (IV, Random, 95% CI)	-0.26 [-0.42, -0.10]
7.1 Men only	3	215	Std. Mean Difference (IV, Random, 95% CI)	-0.26 [-0.55, 0.04]
7.2 Women only	1	229	Std. Mean Difference (IV, Random, 95% CI)	-0.13 [-0.39, 0.13]
7.3 Both men and women	6	695	Std. Mean Difference (IV, Random, 95% CI)	-0.31 [-0.55, -0.07]
8 Anxiety scores	4		Std. Mean Difference (IV, Random, 95% CI)	Subtotals only
8.1 Baseline mean scores	4	697	Std. Mean Difference (IV, Random, 95% CI)	0.11 [-0.05, 0.27]
8.2 Mean score at end of group sessions (10 to 12 weeks after randomization)	3	420	Std. Mean Difference (IV, Random, 95% CI)	-0.01 [-0.25, 0.22]
8.3 Mean score at longest follow-up (12 to 15 months after randomization)	4	471	Std. Mean Difference (IV, Random, 95% CI)	-0.12 [-0.31, 0.06]
9 Anxiety scores: at longest follow-up; subgrouped by anxiety scale used	4		Mean Difference (IV, Random, 95% CI)	Subtotals only
9.1 State trait anxiety inventory (score between 20 and 80)	1	70	Mean Difference (IV, Random, 95% CI)	-0.80 [-6.06, 4.46]
9.2 Modified State Trait Anxiety Inventory (score between 10 and 40)	1	229	Mean Difference (IV, Random, 95% CI)	-0.61 [-2.09, 0.87]
9.3 Hospital Anxety and Depression Scale (score out of 21)	1	71	Mean Difference (IV, Random, 95% CI)	-2.4 [-4.92, 0.12]
9.4 Profile of Mood States (score out of 36)	1	101	Mean Difference (IV, Random, 95% CI)	0.20 [-2.64, 3.04]
10 Anxiety scores: at longest follow-up; subgrouped by control	4		Mean Difference (IV, Random, 95% CI)	Subtotals only
10.1 Standard care ± a minimal intervention (< 1 day)	2	172	Mean Difference (IV, Random, 95% CI)	-1.18 [-3.73, 1.36]
10.2 Alternative group therapy	1	70	Mean Difference (IV, Random, 95% CI)	-0.80 [-6.06, 4.46]
10.3 Individual therapy	1	229	Mean Difference (IV, Random, 95% CI)	-0.61 [-2.09, 0.87]

11 Stress scores	5		Std. Mean Difference (IV, Random, 95% CI)	Subtotals only
11.1 Baseline mean scores	5	695	Std. Mean Difference (IV, Random, 95% CI)	0.12 [-0.03, 0.27]
11.2 Mean score at end of group sessions	4	533	Std. Mean Difference (IV, Random, 95% CI)	-0.06 [-0.23, 0.12]
11.3 Mean score at longest follow-up	5	507	Std. Mean Difference (IV, Random, 95% CI)	-0.04 [-0.23, 0.15]
12 Stress scores at longest follow-up; subgrouped by stress score used	5		Mean Difference (IV, Random, 95% CI)	Subtotals only
12.1 Perceived stress score (score out of 40)	1	70	Mean Difference (IV, Random, 95% CI)	-0.70 [-3.77, 2.37]
12.2 Dealing with illness scale	1	69	Mean Difference (IV, Random, 95% CI)	-1.80 [-7.62, 4.02]
12.3 HIV-related life-stressor burden score (score out of 5)	1	166	Mean Difference (IV, Random, 95% CI)	0.08 [-0.06, 0.22]
12.4 Life experiences survey (score out of 3)	1	39	Mean Difference (IV, Random, 95% CI)	-1.36 [-3.00, 0.28]
12.5 Impact of event scale (score out of 75)	2	232	Mean Difference (IV, Random, 95% CI)	-1.33 [-3.60, 0.95]
13 Stress scores at longest follow-up; subgrouped by control	5		Mean Difference (IV, Random, 95% CI)	Subtotals only
13.1 Standard care ± a minimal intervention (< 1 day)	3	274	Mean Difference (IV, Random, 95% CI)	-0.37 [-1.46, 0.71]
13.2 Alternative group therapy	4	454	Mean Difference (IV, Random, 95% CI)	0.09 [-0.05, 0.22]
13.3 Individual therapy	0	0	Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]
14 Coping scores	5		Std. Mean Difference (IV, Random, 95% CI)	Subtotals only
14.1 Baseline mean scores	5	1022	Std. Mean Difference (IV, Random, 95% CI)	0.01 [-0.11, 0.14]
14.2 Mean score at end of group sessions	5	762	Std. Mean Difference (IV, Random, 95% CI)	0.02 [-0.16, 0.19]
14.3 Mean score at longest follow-up (6 months after randomization)	5	697	Std. Mean Difference (IV, Random, 95% CI)	0.04 [-0.11, 0.19]
15 Coping scores at longest follow-up; subgrouped by coping score used	5		Mean Difference (IV, Random, 95% CI)	Subtotals only
15.1 Dealing with illness: coping subscale (score out of 120)	1	69	Mean Difference (IV, Random, 95% CI)	1.90 [-1.79, 5.59]
15.2 Cognitive behavioural self-efficacy scale (score out of 28)	1	229	Mean Difference (IV, Random, 95% CI)	-0.16 [-1.29, 0.97]
15.3 Coping self-efficacy scale (score out of 260)	2	236	Mean Difference (IV, Random, 95% CI)	1.76 [-6.53, 10.05]
15.4 Avoidant coping scale (score out of 69)	1	163	Mean Difference (IV, Random, 95% CI)	-1.70 [-5.26, 1.86]
16 Coping scores at longest follow-up; subgrouped by control	5		Mean Difference (IV, Random, 95% CI)	Subtotals only
16.1 Standard care ± a minimal intervention (< 1 day)	2	235	Mean Difference (IV, Random, 95% CI)	0.19 [-0.21, 0.59]
16.2 Alternative group therapy	4	454	Mean Difference (IV, Random, 95% CI)	-0.25 [-0.67, 0.17]

16.3 Individual therapy	1	229	Mean Difference (IV, Random, 95% CI)	-0.16 [-1.29, 0.97]

Comparison 2. Group therapy (mindfulness) versus control

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Depression scores	3		Std. Mean Difference (IV, Random, 95% CI)	Subtotals only
1.1 Baseline mean scores	3	286	Std. Mean Difference (IV, Random, 95% CI)	-0.11 [-0.35, 0.12]
1.2 Mean scores at end of group sessions (8 weeks after randomization)	3	242	Std. Mean Difference (IV, Random, 95% CI)	-0.22 [-0.48, 0.04]
1.3 Mean score at longest follow-up	3	233	Std. Mean Difference (IV, Random, 95% CI)	-0.23 [-0.49, 0.03]
2 Anxiety scores	2		Std. Mean Difference (IV, Random, 95% CI)	Subtotals only
2.1 Baseline mean scores	2	210	Std. Mean Difference (IV, Random, 95% CI)	-0.01 [-0.29, 0.27]
2.2 Mean scores at end of group sessions (8 weeks after randomization)	2	178	Std. Mean Difference (IV, Random, 95% CI)	-0.23 [-0.53, 0.07]
2.3 Mean score at longest follow-up	2	162	Std. Mean Difference (IV, Random, 95% CI)	-0.16 [-0.47, 0.15]
3 Stress scores	2		Mean Difference (IV, Random, 95% CI)	Subtotals only
3.1 Baseline mean scores	2	169	Mean Difference (IV, Random, 95% CI)	-1.02 [-3.50, 1.46]
3.2 Mean scores at end of treatment	2	139	Mean Difference (IV, Random, 95% CI)	-2.29 [-4.46, -0.11]
3.3 Mean score at longest follow-up	2	137	Mean Difference (IV, Random, 95% CI)	-2.02 [-4.23, 0.19]

ADDITIONAL TABLES

Table 1. Description of populations

Trial	Country	Age (years)	On antiretroviral therapy (ART)	General population or subgroup	Mood disorders	
					Inclusion criteria	Exclusion criteria
Antoni 2006	USA	18 to 65	Yes	Homosexual men	None stated	Current psychosis or panic disorder
Antoni 2008	USA	18 to 60	Not stated	Women with evidence of CIN1	None stated	Current major psychiatric illness
Berger 2008	Switzerland	18 to 65	Yes	General population	None stated	Current major psychiatric disorder

Table 1. Description of populations (*Continued*)

Carrico 2005	USA	Not stated	No (recruited largely during the era prior to highly active antiretroviral therapy (HAART; 1992 to 1997)	Homosexual men	None stated	Current major psychiatric illness
Jones 2010	USA	> 18	Not stated	Minority women	None stated	Untreated major psychiatric illness
McCain 2003	USA	> 18	Yes	General population	None stated	Significant psychiatric illness
Safren 2012	USA	18 to 65	Yes	Prior intravenous drug users	Current depressive mood disorder	Untreated or unstable major mental illness
Heckman 2007	USA	Not stated	Not stated	Rural population	No inclusion or exclusion criteria related to psychological functioning were employed	No inclusion or exclusion criteria related to psychological functioning were employed
Heckman 2011	USA	> 50	Not stated	Individuals over the age of 50	BDI-II score is minimum 10	Exclude severe depression or cognitive impairment
Sikkema 2013	USA	Not stated	Not stated	History of child sexual abuse	Not stated	Not stated
Peltzer 2012	South Africa	> 18	Yes	Individuals with ART adherence problem/ new antiretroviral (ARV) medication users (6 to 24 months of ARV use)	Not stated	Not stated
Chesney 2003	USA	21 to 60	No	Homosexual men	Reported depressed mood 10 or higher on CES-D scale	Major depressive disorder or other psychotic disorders
Bormann 2006	USA	18 to 65	Not stated	Adult men and women (50% homosexual)	Not stated	Cognitive impairment of active psychosis

Table 1. Description of populations (*Continued*)

Duncan 2012	USA	Not specified	Yes	Adult men and women who reported distress associated with side effects from ART treatment	Reporting a level of side effect-related bother for the previous 30 days at or above eight (corresponding to the 40th percentile in another sample) on the side effect and symptom distress scale	Severe cognitive impairment, active psychosis, or active substance abuse
Gayner 2012	Canada	Not specified	Not stated	Homosexual men	None stated	Active current major depression, substance abuse, or significant cognitive deficit
Nakimuli-Mpungu 2015	Uganda	> 19	Not stated	Both men and women	People with major depression on Mini Psychiatric Interview Scale	The trial excluded individuals with a severe medical disorder such as pneumonia or active tuberculosis, psychotic symptoms, and hearing or visual impairment

Abbreviations: ART: antiretroviral therapy; ARV: antiretroviral.

Table 2. Depression scales reported by trials

Scale	Number of items (depression)	Scale for each item[1]	Total score (depression)	Interpretation	Description[2]	Trials
Beck Depression Inventory (BDI/BDI-II) (Beck 1988)	21	0 (I do not) to 3 (I do and I can't stand it)	0 to 63	0 to 13: minimal 14 to 19: mild 20 to 28: moderate 29 to 63: severe	Participants rate the intensity of depressive feelings over the preceding 1 or 2 weeks	Carrico 2005; Antoni 2006; Heckman 2007; Jones 2010; Duncan 2012; Peltzer 2012; Safren 2012

Table 2. Depression scales reported by trials (*Continued*)

Hospital Anxiety and Depression Scale (HADS) (Zigmond 1983)	7	0 (not at all) to 3 (very often)	0 to 21	0 to 7: normal 8 to 10: borderline 11 to 21: depression	Participants rate the frequency of depressive thoughts and behaviours over the preceding 4 weeks	Berger 2008; Gayner 2012
Geriatric Depression Scale (GDS) (Yesavage 1982)	30	0 (no) to 1 (yes)	0 to 30	0 to 9: normal 10 to 19: mild 20 to 30: severe	Participants report the presence or absence of depressive thoughts and behaviours	Heckman 2011
The Centre for Epidemiological Studies-Depression Scale (CES-D) (Radloff 1977)	20	0 (not at all) to 3 (all of the time)	0 to 60	0 to 15: normal 16 to 60: depression Cut off is 16	Participants rate the frequency of depressive symptoms, feelings, and behaviours over the past week	Chesney 2003; Bormann 2006
Self Reported Questionnaire (SRQ-20) (Sheehan 1997)	20	0 (no) to 1 (yes)	0 to 20	0 to 5: normal 6 to 20: depression	Participants report the presence or absence of depressive symptoms, thoughts, and behaviours	Nakimuli-Mpungu 2015
Profile of Mood States (POMS) Depression (D) (McNair 1971)	15	0 (not at all) to 4 (extremely)	0 to 60	Higher scores indicate worsening depression	Participants rate adjectives describing their mood states over the past week	Antoni 2006[3]
Montgomery-Asberg Depression Rating Scale (MADRS) (Montgomery 1979)	10	0 (normal) to 6 (severe)	0 to 60	0 to 6: normal 7 to 19: mild 20 to 34: moderate > 34: severe	A physician assessment based on a clinical interview covering depression symptoms	Safren 2012[3]

[1]The exact responses may vary between items.

[2]The descriptions in this table represent our best understanding of the scale derived from the description provided by the included studies and other information available through Internet searches. The exact scale used in the trials may have differed.

[3]These papers presented more than one measure of depression. In the main analysis only Beck Depression Inventory was presented. The additional measures are presented in Analysis 1.2 and had similar findings.

Table 3. Anxiety scales reported by the included trials

Scale	Number of items (anxiety)	Score for each item[1]	Total score (anxiety)	Interpretation	Description[2]	Trials
Profile of Mood States (POMS) Anxiety (A) (McNair 1971)	9	0 (not at all) to 4 (extremely)	0 to 36	Higher scores indicate worsening anxiety	Participants rate adjectives describing their mood states over the past week	Antoni 2006
Hospital Anxiety and Depression Scale (HADS) (Zigmond 1983)	7	0 (not at all) to 3 (very often)	0 to 21	0 to 7: normal 8 to 10: borderline 11 to 21: anxiety	Participants rate the frequency of anxiety feelings and behaviours over the preceding 4 weeks	Berger 2008; Gayner 2012
State Trait-Anxiety Inventory (STAI) (Spielberger 2010)	20	1 (not at all) to 4 (very much so)	20 to 80	A cut point of 39 to 40 has been suggested to detect clinically significant symptoms	Participants rate the frequency and intensity of anxiety feelings at this moment (state), and more generally (trait)	Chesney 2003; Bormann 2006; Jones 2010

[1]The exact responses may vary between items.
[2]The descriptions in this table represent our best understanding of the scale derived from the description provided by the included studies and other information available through Internet searches. The exact scale used in the trials may have differed.

Table 4. Stress scales reported by trials

Scale	Number of items	Score for each item[1]	Total score	Interpretation	Description[2]	Trials
Perceived Stress Scale (PSS) (Cohen 1983)	10	0 (never) to 4 (very often)	0 to 40	Higher scores indicate higher perceived stress	Participants rate the frequency of stress related thoughts and feelings in the preceding 4 weeks	Chesney 2003; Bormann 2006; Duncan 2012
Dealing with Illness Scale - Stress subscale (DIS) (McCain 1992)	Unclear	Unclear	Unclear	Higher scores reflect higher stress	Participants rate the desirability or undesirability and personal impact of experienced events	McCain 2003

Table 4. Stress scales reported by trials (*Continued*)

HIV-Related Life-Stress Scale (Sikkema 2000)	19	1 (not a problem) to 5 (most serious problem)	1 to 5	Higher scores indicate higher stress	Participants rate the severity of each HIV-related potential stressor	Heckman 2007
Life Experiences Survey (LES) (Sarason 1978)	10	0 (not at all stressed) to 3 (extremely stressful)	0 to 3	0 = not at all stressed 1 = mildly stressed 2 = moderately stressed 3 = extremely stressed	Participants rate the extent to which an event commonly experienced by HIV-positive women had been stressful	Antoni 2008 (a 10-item abbreviated version)
Impact of Event Scale (IES) (Horowitz 1979)	15	0 (not at all) to 4 (often)	0 to 75	Higher scores indicate higher impact	Participants rate the frequency of intrusive or avoidant thoughts and experiences over the preceding 7 to 28 days (the authors describe this scale as measuring 'psychological distress' or 'traumatic stress')	McCain 2003; Gayner 2012; Sikkema 2013

[1]The exact responses may vary between items.
[2]The descriptions in this table represent our best understanding of the scale derived from the description provided by the included studies and other information available through Internet searches. The exact scale used in the trials may have differed.

Table 5. Description of cognitive-behavioural interventions

Trial	Group size	Session duration (mins)	Session frequency	Intervention						Comparison
				Underlying theory	Primary focus	Components				
						Skills training	Relaxation techniques	Peer support[2]	Education[2]	
McCain 2003	6 to 10	90	Weekly for 8 weeks	Cognitive-behavioural	Stress management	Cognitive restructuring coping	Progressive muscle relaxation	Not described	Not described	No intervention - waitlist group

Table 5. Description of cognitive-behavioural interventions *(Continued)*

						skills	(PMR)/ meditation/yoga			
Carrico 2005	4 to 9	135	Weekly for 10 weeks	Cognitive-behavioural	Stress management	Cognitive restructuring, coping skills, anger management, use of social network	PMR/ meditation	Not described	Not described	No intervention - waitlist group
Antoni 2006	4 to 9	135	Weekly for 10 weeks	Cognitive-behavioural	Stress management	Cognitive restructuring, coping skills	PMR/ meditation	Not described	Medication adherence	1 hour medication adherence training (MAT)
Antoni 2008	4 to 6	135	Weekly for 10 weeks	Cognitive-behavioural	Stress management	Cognitive restructuring, coping skills, assertiveness, anger management, use of social network	PMR/ meditation	Not described	Not described	Condensed 1 day CBSM workshop
Berger 2008	4 to 10	120	Weekly for 12 weeks	Cognitive-behavioural	Stress management	Cognitive strategies	PMR	Group dynamic exercises	HIV related topics	No intervention - 30-minute health check by physician
Sikkema 2013	10	90	Weekly for 15 weeks	Cognitive theory of stress and coping	Traumatic stress	Cognitive appraisal, coping skills	'relaxation strategies'	Not described	Not described	Attention control - HIV standard therapeutic

Table 5. Description of cognitive-behavioural interventions *(Continued)*

										support group
Chesney 2003	8 to 10	90	Weekly for 10 weeks	Cognitive theory of stress and coping	Coping/ stress	Appraising stressors, coping skills, stress management	'relaxation guidance'	Skill building group exercises	Psychoeducation around models of coping	No intervention - waitlist group
Heckman 2007	6 to 8	90	Weekly for 8 weeks	Transactional model of stress and coping	Coping	Appraising stressors, coping skills, use of personal and social resources	No	Not described	Not described	No intervention - usual care
Heckman 2011	6 to 810	90	Weekly for 12 weeks	Transactional model of stress and coping	Coping	Appraising stressors, coping skills, use of personal and social resources	No	Not described	Not described	No intervention - individual therapy upon request (ITUR)
Jones 2010	Not stated	120	Weekly for 10 weeks	Cognitive-behavioural	Self-efficacy	Cognitive restructuring, stress management, coping skills, anger management, use of social network	'relaxation'	Expressive supportive therapy	HIV/ mental health topics	Attention control group
Nakimuli-Mpungu 2015	10 to 12	120 to 180	Weekly for 8 weeks	Cognitive-behavioural, social learning theory,	Depression	Coping skills, problem solving skills, deal-	Not described	Group rituals	Triggers, symptoms, and treatment of depression.	Active control group

Table 5. Description of cognitive-behavioural interventions *(Continued)*

				and the sustainable livelihoods framework		ing with stigma, income-generation				
Safren 2012	Not stated	50 mins	Weekly for 9 weeks	Cognitive-behavioural	Adherence/ depression	Cognitive restructuring, problem solving, activity scheduling	PMR/ diaphragmatic breathing	Not described	Adherence, depression	Enhanced treatment as usual (ETAU)
Peltzer 2012	10	60 mins	Monthly for 3 months	Cognitive-behavioural	Adherence	Not specifically described	Not described	Buddy system to increase social support	Knowledge of HIV and HIV-related medication	No intervention - standard care

Abbreviations: HIV: human immunodeficiency virus; PMR: progressive muscle relaxation.
[1]The interventions used in McCain 2003, Carrico 2005, Antoni 2006, Antoni 2008, Berger 2008, and Jones 2010 appear to be very similar.
[2]Although peer support and education were often not well described in these papers, these aspects are inevitable with group therapy and are likely to be an important factor in any observed effect regardless of the therapeutic theory.

Table 6. Coping scales reported by trials

Scale	Number of items	Score for each item[1]	Total score	Interpretation	Description[2]	Trials
Coping Self-Efficacy Scale (CSES) (Chesney 2006)	26	0 (cannot do at all) to 10 (certain can do)	0 to 260	Higher scores indicate better coping skills	Participants rate the extent to which they believe they could perform behaviours important to adaptive coping	Chesney 2003; Heckman 2007

Table 6. Coping scales reported by trials (*Continued*)

Cognitive Behavioral Self Efficacy (CB-SE) (Ironson 1987)	7	0 (not at all) to 4 (all of the time)	0 to 28	Higher scores indicate higher self-efficacy	Participants rate their certainty that they could perform certain skills related to AIDS, and antiretroviral medication adherence	Jones 2010
Dealing with Illness Scale - coping subscale (DIS) (McCain 1992)	40	0 (never used) to 3 (regularly used)	0 to 120	Higher scores reflect more frequent use of the various coping strategies	The DIS is a 40-item coping subscale modelled on the Revised Ways of Coping Checklist. Participants rate the frequency that thoughts or behaviours have been used to deal with problems and stresses over the past month	McCain 2003
'Avoidant Coping Scale' Created from 23 items taken from 'The ways of Coping Questionnaire' and 'the Coping with AIDS Scale' (Sikkema 2013)	23	0 (not at all) to 3 (used a great deal)	0 to 69	Higher scores reflect more frequent use of coping strategies	Participants rate how often they have used avoidant strategies for coping	Sikkema 2013

[1]The exact responses may vary between items.
[2]The descriptions in this table represent our best understanding of the scale derived from the description provided by the included studies and other information available through Internet searches. The exact scale used in the trials may have differed.

Table 7. Description of mindfulness interventions

Trial	Group size	Session duration (mins)	Session frequency	Intervention				Comparison
				Primary focus	Secondary components			
					Relaxation techniques	Peer support	Education	

Table 7. Description of mindfulness interventions (*Continued*)

Duncan 2012	Not stated	150 to 180	Weekly for 8 weeks plus 1 day retreat	Mindfulness-stress reduction	Mindfulness meditation	Not described	Stress physiology and reactivity	No intervention - wait-list group
Gayner 2012	14 to 18	180	Weekly for 8 weeks plus 1 day retreat	Mindfulness-stress reduction	Mindfulness meditation	Not described	Not described	No intervention - treatment as usual (TAU) group offered at end of intervention
Bormann 2006	8 to 15	90	Weekly for 5 weeks, then 4 automated phone calls, then a final session in week 10	Mindfulness-stress reduction	Mantram repetition	Not described	Not described	Attention control

CONTRIBUTIONS OF AUTHORS

Ingrid van der Heijden worked on developing and testing a gender-specific coping intervention for people living with HIV in South Africa which prompted the importance of doing a review on what works to improve the lives of people living with HIV. As first author, Ingrid van der Heijden was responsible for the overall leadership in this review and received Cochrane-based training and support to lead the review. She was responsible for reviewing abstracts and full papers, and extracting and collating data for the review, assessing risk of bias, and interpreting findings, and putting the review together.

Professor Naeemah Abrahams works in HIV-related stigma research and post-rape and HIV and mental health services in South Africa and helped with reviewing abstracts and full papers, and extracting and collating data for the review, assessing risk of bias, and interpreting findings.

David Sinclair is a UK qualified general practitioner (GP), and has worked within primary healthcare in the UK, Kenya, and North and South Sudan. Over the past seven years he has worked as an author and editor with the CIDG, and served as a temporary advisor to the World Health Organization's Technical Guidelines Development Groups on Malaria Treatment, nutritional care for people with TB and HIV, and screening for active tuberculosis. David's contribution to this review proved invaluable for statistical analysis, interpretation of results, and guidance for Cochrane-style edits and outputs.

DECLARATIONS OF INTEREST

All review authors have no present or past affiliations in any organization or entity with an interest in the review that might lead to real or perceived conflict of interest.

All review authors have not been involved in any trials included in the review or in authoring a systematic review included in the Background.

All review authors do not know of any financial or commercial sources that may have or be perceived to have an interest in the outcome of the review.

All review authors will report any secondary conflicts of interest that may concern, for example, the inclusion or exclusion of trials, assessment of validity of included trials, or interpretation of results to the editors of the CIDG and they and the review authors will jointly decide on the management of such conflicts whether the conflicts of interest warrant being disclosed in the review (Higgins 2008; Higgins 2011).

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DIFFERENCES BETWEEN PROTOCOL AND REVIEW

We excluded behavioural outcomes.

We only included the outcomes for meta-analysis if the trials measured them for at least three months post-intervention.

We changed the overall outcome of effectiveness to 'psychological well-being' instead of 'Quality of Life' (QOL) as QOL was too broad.