

Relaxation for depression (Review)

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[Intervention review]

Relaxation for depression

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ABSTRACT

Background

Many members of the public have negative attitudes towards antidepressants. Psychological interventions are more acceptable but require considerable therapist training. Acceptable psychological interventions that require less training and skill are needed to ensure increased uptake of intervention. A potential intervention of this sort is relaxation techniques.

Objectives

To determine whether relaxation techniques reduce depressive symptoms and improve response/remission.

Search strategy

The register of trials kept by the Cochrane Collaboration Depression, Anxiety and Neurosis Group was searched up to February 2008. We also searched the reference lists of included studies.

Selection criteria

Studies were included if they were randomised or quasi-randomised controlled trials of relaxation techniques (progressive muscle relaxation, relaxation imagery, autogenic training) in participants diagnosed with depression or having a high level of depression symptoms. Self-rated and clinician-rated depression scores and response/remission were the primary outcomes.

Data collection and analysis

Two reviewers selected the trials, assessed the quality and extracted trial and outcome data, with discrepancies resolved by consultation with a third. Trial authors were approached for missing data where possible and missing data were estimated or imputed in some cases. Continuous measures were summarised using standardised mean differences and dichotomous outcomes by risk ratios.

Main results

There were 15 trials with 11 included in the meta-analysis. Five trials showed relaxation reduced self-reported depression compared to wait-list, no treatment, or minimal treatment post intervention (SMD -0.59 (95% CI -0.94 to -0.24)). For clinician-rated depression, two trials showed a non-significant difference in the same direction (SMD -1.35 (95% CI -3.06 to 0.37)).

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Nine trials showed relaxation produced less effect than psychological (mainly cognitive-behavioural) treatment on self-reported depression (SMD = 0.38 (95% CI 0.14 to 0.62)). Three trials showed no significant difference between relaxation and psychological treatment on clinician-rated depression at post intervention (SMD 0.29 (95% CI -0.18 to 0.75)).

Inconsistent effects were found when comparing relaxation training to medication and there were few data available comparing relaxation with complementary and lifestyle treatments.

Authors' conclusions

Relaxation techniques were more effective at reducing self-rated depressive symptoms than no or minimal treatment. However, they were not as effective as psychological treatment. Data on clinician-rated depressive symptoms were less conclusive. Further research is required to investigate the possibility of relaxation being used as a first-line treatment in a stepped care approach to managing depression, especially in younger populations and populations with subthreshold or first episodes of depression.

PLAIN LANGUAGE SUMMARY

Relaxation for depression

Many people with depression do not get treatment or delay getting treatment. One reason for this is that they do not like antidepressants. Another is the limited availability of specialized psychological treatments, such as cognitive-behaviour therapy. Relaxation techniques are a simple psychological treatment that can be administered after brief training. The review of 15 trials found that it was better than no treatment or minimal treatment, but not as effective as psychological therapies like cognitive-behaviour therapy. Relaxation techniques have potential as a simple first-line psychological treatment for depression. Those who do not respond within a set time could be offered more complex psychological treatment such as cognitive-behaviour therapy.

BACKGROUND

Description of the condition

Depressive disorders are characterised by persistent depressed mood or loss of interest or pleasure in usual activities, accompanied by various cognitive, behavioural or somatic symptoms. DSM-IV defined depressive diagnoses include major depression and dysthymic disorder and ICD-10 diagnoses include recurrent or persistent depression with mild, moderate or severe episodes. Depression is the largest source of non-fatal disease burden in the world, accounting for 12% of years lived with disability (Ustun 2004), making its effective treatment a high priority. The risks of untreated depression are significant, as the illness often takes a relapsing or chronic course, with an increased risk of developing other psychiatric and substance use disorders (Harrington 1991; Weller 2000) and adverse outcomes in chronic medical conditions such as congestive heart failure (Jiang 2001).

Description of the intervention

Clinical practice guidelines for the treatment of depression recommend antidepressants, cognitive-behaviour therapy (CBT) and interpersonal psychotherapy (IPT) as potentially effective interventions (APA 2000; NICE 2004; RANZCP 2004). However, there is a large gap between recommended best practice and what people with depression actually receive. Data from a range of countries show that many people with depressive disorders get no professional help or have long delays before seeking help (Kohn 2004). Even in developed countries, only around half of cases receive intervention. When treatment is received, it is frequently not consistent with best practice (Andrews 2000).

There are a number of factors that contribute to this unmet need for effective intervention. One of these is the acceptability of the interventions that are offered. Data from several countries show that many members of the public have negative attitudes towards psychotropic medication, including antidepressants (Jorm 2000). Psychological interventions offered in primary and secondary care, including CBT, IPT, psychodynamic therapy and humanistic or supportive therapy, are more acceptable. However, these therapies are complex and require considerable therapist training and ex-

pertise. The number of available therapists is a limiting factor in the face of the high prevalence of depressive disorders.

How the intervention might work

More simple psychological interventions are needed, which require less training and skill to administer. Such interventions need to be acceptable and in line with consumer preference in order to ensure increased uptake. A potential intervention of this sort is relaxation. In an earlier qualitative review of complementary and self-help interventions, relaxation techniques were found to be as efficacious as the standard treatments they were compared to (Jorm 2002). Although often used as a form of placebo or non-specific supportive therapy, relaxation merits closer examination given the generally favourable findings from these trials. Additionally, there is evidence that relaxation techniques are highly acceptable to the public. In Australian community surveys asking adults about the likely helpfulness of treatments for depression, “attending courses on relaxation, stress management, meditation or yoga” has emerged as one of the most highly regarded (Jorm 2006b). Similarly, in an Australian community survey of young people and their parents, relaxation training was frequently rated as likely to be helpful for depression (Jorm 2007). A recent study of people with clinical depression confirmed this finding, showing those using relaxation often judged it effective (Parker 2007). There are a variety of techniques for inducing relaxation. Probably the most common are variants of Jacobson’s progressive muscle relaxation training (Bernstein 1973). Other methods include autogenic training (Schultz 1959), use of relaxation imagery, biofeedback, and practices derived from meditation and yoga techniques.

Why it is important to do this review

The aim is to review the evidence for the efficacy of this potentially simple and publicly acceptable intervention that could conceivably reduce the unmet need for depression treatment.

OBJECTIVES

The primary aim was to review the effects of relaxation techniques on depressive symptoms and response/remission compared to no

treatment (including waitlist), psychological treatments, medication, and lifestyle and complementary treatments. Secondary aims were to see if there were (a) differential effects of various types of relaxation techniques and (b) differential impacts on patients with depression as the main presenting problem compared to patients where depression is secondary to a medical condition.

METHODS

Criteria for considering studies for this review

Types of studies

Any published (including Internet publication) or unpublished randomised or quasi-randomised controlled trials (including cross-over trials and cluster randomised trials). There were no time or language restrictions.

Types of participants

Patient characteristics and diagnosis

Patients of any age or gender were included if they had a primary diagnosis of depression, diagnosed by any diagnostic system from the Feighner Criteria (Feighner 1972), Research Diagnostic Criteria (Spitzer 1978), DSM-III or ICD 10 onwards, or depression symptoms. As it is difficult to categorise depression severity across different symptom scales, severity was classified according to whether participants had a diagnosis of depression versus a high level of symptoms. In addition, mean baseline depression scores were noted.

Comorbidity

Patients with a diagnosed depressive disorder or with depressive symptoms that are secondary to a medical condition were included.

Exclusion Criteria

Those trials where anxiety disorder or symptoms were the primary focus were excluded.

Types of interventions

Interventions

Relaxation techniques including progressive muscle relaxation, relaxation imagery, autogenic training, combined or enhanced versions of these, as well as relaxation adjunctive to other treatments, aimed at treating depression directly or via its influence on some other variable, e.g. anxiety.

Exclusion Criteria

Interventions defined as promoting relaxation that were part of a broader intervention such as cognitive behaviour therapy (CBT). Trials of meditation, yoga and other techniques such as aromatherapy, music therapy, hand touching and prayer were excluded. The effectiveness of music therapy for depression has been examined in a recently published Cochrane review (Maratos 2008). Yoga for depression is the topic of a Cochrane review currently in progress (McMahon *inpress*).

Control conditions

Any type of control comparison group. Comparisons were classified as:

- 1) wait-list, no treatment or minimal treatment (contact with a treating person without a therapeutic element)
- 2) psychological treatment (cognitive behaviour therapy, interpersonal therapy, psychodynamic therapy, supportive therapy)
- 3) medication (monoamine oxidase inhibitors, tricyclic antidepressants, selective serotonin reuptake inhibitors, serotonin-norepinephrine reuptake inhibitors)
- 4) lifestyle and complementary treatment (such as massage, exercise, negative air ionisation and light therapy). Lifestyle and complementary treatments were combined as they are alternative treatment approaches to depression and can overlap, e.g. exercise.

Types of outcome measures

Primary outcomes

1. Depression symptoms measured on a validated, reliable depression symptom scale.

A list of the most commonly used adult depression symptom scales in CCDAN reviews was compiled, together with the hierarchy of scales developed by Hazell 2002. From these lists (below) a self report and a clinician rated scale (with no preference for one over the other) was chosen when several depression scales were used in one trial. In addition, preference was given to the scale used in more than one of the included studies.

2. Response/remission (using author's predefined criteria)

Adult scales

Self rating

Beck Depression Inventory (BDI; Beck 1961; Beck 1996)

Zung Self-Rating Depression Scale (SDI; Zung 1965)

Center for Epidemiologic Studies Depression scale (CES-D; Radloff 1977).

General Health Questionnaire (GHQ; Goldberg 1972)

Geriatric Depression Scale (GDS; Gompertz 1993; Kurlowicz 1999)

Hospital Anxiety and Depression Rating Scale (HADS; [Zigmond 1983](#))

Clinician rated

Hamilton Depression Rating Scale (HAM-D; [Hamilton 1960](#); [Hamilton 1967](#))

Montgomery-Åsberg Depression Rating Scale (MADRS; [Montgomery 1979](#))

Inventory for Depressive Symptomatology-Clinician Rated or Self-rated (IDS-C/SR; [Rush 1986](#))

Clinical Global Impression, Severity and Improvement scales (CGI-S/I; [Guy 1976](#)).

Child/Adolescent hierarchy of scales from Hazell 2002

Cochrane review

The hierarchy of selection for analysis was as follows:

1. Schedule for Affective Disorders and Schizophrenia for School-Age Children (Kiddie-SADS; [Kaufman 1997](#)), combined child and parent report.
2. Children's Depression Rating Scale (CDRS; [Poznanski 1979](#)).
3. Bellevue Index of Depression (BID; [Petti 1978](#)).
4. Children's Depression Inventory (CDI; [Kovacs 1985](#)).
5. Hamilton Depression Rating Scale (HAM-D; [Hamilton 1960](#); [Hamilton 1967](#)).
6. Depressive Adjective Checklist (DACL; [Lubin 1965](#); [Lubin 1967](#)).

Secondary outcomes

1. Functioning related to mental health/well-being and related to general health, measured on a validated, reliable scale (e.g. SF-36 Health Survey [Ware 1993](#), and the Global Assessment Scale [Endicott 1976](#)).
2. Drop-outs.
3. Adverse outcomes.
4. Acceptability, satisfaction, preference.
5. Health care utilisation/concurrent/adjunctive.

Outcomes were assessed at post-intervention and follow-up where these data were available.

Search methods for identification of studies

For more information see: Depression, Anxiety and Neurosis Collaborative Review Group search strategy.

1. Electronic searches

The CCDAN registers were searched using the following terms: CCDANCTR-Studies

Diagnosis = Depress* or Dysthymi* or "Adjustment Disorder*" or "Mood Disorder*" or "Affective Disorder" or "Affective Symptoms"

and

Intervention = relaxation or autogenic

CCDANCTR-References

Keyword = Depress* or Dysthymi* or "Adjustment Disorder*" or "Mood Disorder*" or "Affective Disorder" or "Affective Symptoms"

and

Free-text = relax* or autogen*

The following databases were also searched with the terms autogen* or relax*:

KoreaMED, INDMED, controlled-trials.com, clinicaltrials.gov

2. Reference lists

The reference lists of articles and other reviews retrieved in the search or known to the authors were searched.

3. Personal communication

Authors of included studies and experts in the field were consulted to find out if they knew of any published or unpublished RCTs or quasi-RCTs of relaxation for depression, which had not been identified through electronic searches.

Data collection and analysis

Selection of studies

Two review authors (AJ, AM) independently selected trials for possible inclusion in the study. Firstly, the titles and abstracts of trials identified from the search were independently reviewed. Secondly, each review author independently examined the full text of all studies that they considered to be of possible relevance. Each review author compiled a list of studies that they believed met the inclusion criteria. The contents of each review author's list were compared, and any disagreement was resolved by discussion and consensus between all of the review authors.

Data extraction and management

All review authors independently extracted data using specially developed data extraction forms. Two review authors extracted data per study. Information was collected on participants (diagnosis or symptoms of depression and severity of depression, medical illness and medication, age, gender, comorbid anxiety, level of baseline suicidality and other co-morbid psychiatric diagnoses, recruitment strategy, setting and country, inclusion and exclusion criteria); interventions (description of relaxation training, who it was delivered by, group or individual setting, length and number of sessions, whether manualised, number of sessions actually attended, whether intended as intervention or control) and comparison interventions using similar detail; outcome measures (description of measures used, timing of administration, continuous/dichotomous nature, references provided), and results (point

estimates and measures of variability, frequency counts for dichotomous variables) and methods (randomisation and allocation procedure, blinding, number of participants randomised, withdrawn, dropped out, analysed, intention-to-treat analysis, other problems). Any disagreement was resolved by discussion and consensus between all of the review authors.

One review author compiled all comparisons and entered outcome data into RevMan for meta-analysis. A second review author performed double-data entry to ensure accuracy of results. One review author attempted to contact trial authors to obtain missing data. Missing data were obtained from [Baillon 2003](#), [Maher 2002](#) and [Kahn 1990](#).

Assessment of risk of bias in included studies

All review authors independently assessed the risk of bias of the included trials using a descriptive approach as advocated by the Cochrane Handbook for Systematic Reviews of Interventions ([Higgins 2005](#)). Any disagreement was resolved by discussion and consensus between all of the review authors. Potential for selection, performance, attrition, detection and reporting bias was considered using the following criteria:

Selection bias

1. Was the allocation sequence adequately generated?
2. Was the allocation adequately concealed?

Performance bias

3. Blinding of participants/care providers is not possible in relaxation interventions, so this was not assessed.

Detection bias

4. Were the outcome assessors adequately blinded to the allocated interventions?

Attrition bias

5. Were drop outs and exclusions adequately addressed?
6. Were intention-to-treat analyses used?

Reporting bias

7. To assess reporting bias, we recorded which of the review outcomes were available with usable data from each included trial, as well as noting which of the review outcomes were only reported in terms of whether there were significant differences between groups. Additionally, the other outcomes (not collected for the review) reported by the trialists in the paper publication(s) were compiled. We also assessed whether trialists reported on all their a-priori defined outcomes.

Other potential sources of bias

8. Was the study apparently free of other problems that could mean a high risk of bias e.g. early stopping, baseline imbalance, choice of design, evidence of carry over effect, funding?

Each criterion was assessed using 'yes', 'no', 'not possible' or 'unclear'. Allocation concealment was scored as adequate (A), unclear (B), inadequate (C) or not used (D) in the Characteristics of Included Studies table according to the guidelines in the Cochrane Handbook for Systematic Reviews of Interventions ([Higgins 2005](#)). When criteria were scored as unclear, one review author attempted to obtain further information from the authors of the trial. The review authors discussed any disagreement in the assessment of risk of bias to reach a consensus.

Measures of treatment effect

Review Manager software was used for statistical analysis. For dichotomous outcomes, such as 'response', results from each trial were expressed as a Risk Ratio (RR) with 95% confidence intervals. Continuous outcomes, such as symptom measures, were presented in several ways. When absolute values of post-treatment means and standard deviations (SD) were given, using the same rating scale across studies, these were used to calculate the mean difference (MD) and 95% confidence intervals. If different scales were used to measure the same outcomes, the standardised mean difference (SMD) was calculated with 95% confidence intervals and was then combined for meta-analysis.

Unit of analysis issues

Only one of the cross-over trials had usable data of which we extracted only the pre-cross-over means and standard deviations. The protocol outlined our intended analyses for cluster randomised trials, however none of the included studies were cluster randomised trials. Where studies had multiple treatment groups that fit into one comparison group, such as two psychological treatment groups, we extracted data from the treatment group that had the most standard approach (e.g. cognitive behavior therapy over non-standard therapy). For more information see Included studies.

Dealing with missing data

Where there were missing data, we imputed standard deviations from standard errors, p-values, and pre-intervention standard deviations, and this is noted in the Characteristics of Included Studies table. For two trials we decided post-hoc to estimate data from figures. For one study we estimated means from figures in the publication ([McCann 1984](#)) and from another we estimated standard errors from figures in the publication ([Wood 1996](#)). In future updates of the review, where it is not possible to impute missing data, available case analysis based on participants who completed a trial will be carried out. Missing dichotomous data will be managed through intention to treat (ITT analysis).

Assessment of heterogeneity

Clinical homogeneity was satisfied when participants, interventions and outcome measures were considered to be similar. For trials that were clinically heterogeneous or presented insufficient information for pooling, a descriptive analysis was performed. Statistical homogeneity was assessed using the I^2 statistic, with a value of >50% taken as indicating heterogeneity. If statistical heterogeneity was found, it was examined by subgroup and sensitivity analyses.

Assessment of reporting biases

We intended to investigate the potential for publication bias using a funnel plot for the primary outcomes relating to depression diagnosis and/or symptoms. Publication bias has long been associated with funnel plot asymmetry, however, asymmetry may be due to reasons other than publication bias and was difficult to assess due to the small number of included trials. As tests for funnel plot asymmetry should be used only when there are at least 10 studies included for a particular outcome (Higgins 2005), we decided against testing for funnel plot asymmetry. Assessment of publication bias was complicated by the fact that relaxation is often used as a control or comparison group. For these reasons, an assessment of the risk of reporting bias was also included as stated above.

Data synthesis

For all meta-analyses, a fixed effect (Mantel 1959) meta-analysis was used in the first instance. Where heterogeneity was observed, we used random effects models (DerSimonian 1986). When the pooled summary statistic differed between models (e.g. was significant in one model but not in the other), this was reported.

Subgroup analysis and investigation of heterogeneity

Subgroup analysis was carried out by examining the effects of:

1. Age (children vs adolescents vs adults). For the grouping by age, trials were included as trials of adolescent participants if the age range for inclusion was 12 to 19 years or if the mean age of participants fell within this range. The rationale for grouping trials by participant age was that children may respond differently due to difficulties in following instructions and these may have to be adapted for children. Adolescents may also respond differently, as it has been shown that the effects of psychotherapies on depression are much weaker in adolescents than in adults (Cuijpers 2005; Gloaguen 1998; Weisz 2006).
2. Diagnosed depression versus symptoms
3. Those with primary depression compared to those with depression secondary to a medical condition
4. Relaxation treatment considered an active treatment versus a placebo

Sensitivity analysis

Pre-planned sensitivity analyses based on allocation concealment, blinding of outcome assessment and intention-to-treat analyses were not performed as the majority of trials did not adequately undertake these aspects of trial conduct or it was unclear from the reports that these aspects of trial conduct were adequately undertaken.

RESULTS

Description of studies

See: [Characteristics of included studies](#); [Characteristics of excluded studies](#); [Characteristics of ongoing studies](#).

Results of the search

Of the 62 references to 49 studies retrieved in the search, 15 trials were eligible for inclusion and 11 of these (Bowers 1990; Kahn 1990; Krampen 1997; McCann 1984; McLean 1979; Murphy 1995; Pace 1977a; Pace 1977b; Reynolds 1986; Wilson 1982; Wood 1996) had data suitable for extraction and pooling in the meta-analysis. Four trials did not contribute data to the meta-analyses (Byrne 1984; Field 1996; Field 2004; Sonis 1987).

Included studies

Interventions

Ten of the trials evaluated progressive muscle relaxation (Byrne 1984; Field 2004; McCann 1984; McLean 1979; Murphy 1995; Pace 1977a; Pace 1977b; Reynolds 1986; Wilson 1982; Wood 1996), one evaluated autogenic training (Krampen 1997) one evaluated relaxation imagery (Sonis 1987) and three evaluated various combined methods: muscle relaxation and modified pain-reduction procedure (Bowers 1990), progressive muscle relaxation and yoga exercises (Field 1996), and progressive muscle relaxation plus psychoeducation including mental imagery and breathing (Kahn 1990).

Nine trials used relaxation as an active intervention for depression (Byrne 1984; Field 1996; Kahn 1990; Krampen 1997; Pace 1977a; Pace 1977b; Reynolds 1986; Sonis 1987; Wilson 1982), whereas six used it as a control or "placebo" condition for comparison with some active treatment (Bowers 1990; Field 2004; McCann 1984; McLean 1979; Murphy 1995; Wood 1996).

The relaxation treatment was manualised for 11 of the trials (Bowers 1990; Byrne 1984; Kahn 1990; Krampen 1997; McLean 1979; Murphy 1995; Pace 1977a; Pace 1977b; Sonis 1987; Wilson 1982; Wood 1996), 3 were unclear (Field 1996; Field 2004; Reynolds 1986) and one was not manualised (McCann 1984). The number of sessions of relaxation treatment varied considerably: 5-8 (Wood 1996), 6 (Sonis 1987), 7 (Wilson 1982; Pace 1977a; Pace 1977b), 10 (Field 1996; Krampen 1997; McLean

1979; Reynolds 1986), 12 (Kahn 1990), maximum of 20 (Murphy 1995), 21 (Byrne 1984) and 40 (McCann 1984). The treatment was delivered by therapeutically trained persons except in 3 trials where it was self-administered (Field 2004; McCann 1984; Sonis 1987) and one where it was unclear (Field 1996).

The trials varied in the interventions to which relaxation was compared and some compared it to more than one other intervention. Six compared it to wait-list (Kahn 1990; Krampen 1997; Reynolds 1986), no treatment (Field 2004; McCann 1984), or minimal intervention controls (Wilson 1982) (non-directive therapy coinciding with supply of placebo medication and intended as a control); ten to psychological treatment (cognitive-behavioural, behavioural or "integrative") (Byrne 1984; McLean 1979; Kahn 1990; Krampen 1997; Murphy 1995; Pace 1977a; Pace 1977b; Reynolds 1986; Wilson 1982; Wood 1996); four compared it to lifestyle or complementary therapies (exercise, light therapy, massage) (Field 1996; Field 2004; McCann 1984; Sonis 1987); and two to antidepressant medication (McLean 1979; Murphy 1995). There were two trials that compared relaxation-plus-medication to antidepressant medication alone (Bowers 1990; Wilson 1982). Four of the trials with cognitive-behavioural or behavioural comparisons also involved a second psychological treatment condition: self-modelling (Kahn 1990), sensory awareness training (Pace 1977a), client-oriented therapy (Pace 1977b) and short-term psychodynamic therapy (McLean 1979). In these trials only the cognitive-behavioural and behavioural treatment data were used for comparison with relaxation.

Participants

The number of participants randomised varied from 8 (Byrne 1984) to 196 (McLean 1979), with a median of 37.

Ten of the trials involved adults (Bowers 1990; Byrne 1984; Field 2004; Krampen 1997; McCann 1984; McLean 1979; Murphy 1995; Pace 1977a; Pace 1977b; Wilson 1982), four involved adolescents (Field 1996; Kahn 1990; Reynolds 1986; Wood 1996) and one children and adolescents (Sonis 1987).

Participants were selected as depressed using a diagnostic approach in three trials (Bowers 1990; Krampen 1997; Sonis 1987), a cut-off on a depression scale was used in seven trials (Byrne 1984; Kahn 1990; McCann 1984; Pace 1977a; Pace 1977b; Reynolds 1986; Wilson 1982), both a diagnosis and scale cut-off in four trials (Field 1996; McLean 1979; Murphy 1995; Wood 1996), and one study did not state a method of selection (Field 2004). In all of the trials, depression was the primary diagnosis rather than secondary to a medical condition. Because of the varied measures of depression used, it was difficult to describe the severity of the participants, apart from noting that six trials required a diagnosis for entry.

The settings of the treatment were varied. Two were with in-patients (Bowers 1990; Field 1996), six were in educational settings (Byrne 1984; Kahn 1990; McCann 1984; Pace 1977a; Pace 1977b; Reynolds 1986), six were in community or home settings (Field

2004; Krampen 1997; McLean 1979; Murphy 1995; Sonis 1987; Wilson 1982), and one was unclear about setting (Wood 1996). All but six of the trials were carried out in the USA; these were from Germany (Krampen 1997), Canada (McLean 1979), Australia (Pace 1977a; Pace 1977b; Wilson 1982) and the UK (Wood 1996).

Outcomes

For measuring outcomes, all trials included a self-report measure of depressive symptoms. These measures were diverse, but 10 of the 15 trials used the Beck Depression Inventory (BDI) (Bowers 1990; Byrne 1984; Krampen 1997; McCann 1984; McLean 1979; Murphy 1995; Pace 1977b; Reynolds 1986; Sonis 1987; Wilson 1982); (Reynolds 1986 used a modified version of the BDI). Six of the trials also used a clinician-rated measure of depression (Bowers 1990; Kahn 1990; Murphy 1995; Reynolds 1986; Sonis 1987; Wood 1996), but there was no consistency in the actual measure used. Because of the diversity of continuous depression measures, standardized mean differences were used for data pooling, except in cases where the BDI was consistently used.

All of the trials with a depression measure reported the data in terms of continuous scale scores. However, some of the trials also dichotomized the scale scores to indicate whether the participant's depression had reduced to some defined point of clinical relevance. Dichotomized outcomes were reported for self-reported depression in 5 of the trials, with three trials defining remission with BDI < 9 or ≤ 9, and one trial using BDI ≤ 7. Dichotomized outcomes were reported for clinician-rated depression in 3 trials, but these had little consistency in how response/remission was defined.

Another outcome of interest was functioning. However, this was measured in only two trials (McLean 1979; Wood 1996) and it was unclear whether the measures that were used were correlated so that the data could be pooled.

Of the other secondary outcomes of interest, the only one assessed with any consistency was drop-outs, which were assessed in 11 trials. Drop-outs per arm ranged from 0 (Murphy 1995; Reynolds 1986) to 14 (McLean 1979), with most clustered around 0-5 per arm.

For a full description of each study, see Characteristics of Included Studies table.

Excluded studies

There were 32 excluded studies, with trials most frequently excluded because participants were not selected for having diagnosed depression or a high depression symptom score.

Ongoing studies

There were 2 ongoing studies found in the search. Both studies have participants with a primary diagnosis of depression and both classify relaxation as a control intervention. Relaxation is compared with exercise in one study and a multi-sensory environment in the other study.

Risk of bias in included studies

Allocation

The allocation sequence was adequately generated in one study (Murphy 1995), not adequately generated in two (Bowers 1990; Krampen 1997), and the rest did not clearly describe the method of allocation. Allocation was not adequately concealed in three trials (Bowers 1990; Krampen 1997; Murphy 1995) and the rest did not give a clear description.

Blinding

Blinding of participants to treatment is not possible for relaxation training. Blinding of outcome assessors is not possible for self-reported outcomes, only for clinician-rated outcomes. Where there was a clinician-rated measure of depression, blinding was carried out in one study (Bowers 1990), not carried out in two trials (Kahn 1990; Murphy 1995), and was unclear in the remaining three (Reynolds 1986; Sonis 1987; Wood 1996).

Follow up and exclusions

Drop-outs were adequately described in seven trials (Bowers 1990; Byrne 1984; Krampen 1997; Pace 1977a; Pace 1977b; Reynolds 1986; Wood 1996), not adequately described in five (Field 1996; Field 2004; Kahn 1990; Sonis 1987; Wilson 1982) and were unclear in three (McCann 1984; McLean 1979; Murphy 1995). Of the three that were unclear, the reasons for the drop-outs were not given in two (McCann 1984; Murphy 1995) and the numbers were difficult to interpret in one (McLean 1979). Intention-to-treat analysis was used in one study (Wilson 1982), only for the continuous measure of outcome in one study (Murphy 1995), was not used in seven trials (Bowers 1990; Krampen 1997; McCann 1984; Pace 1977a; Pace 1977b; Reynolds 1986; Wilson 1982), and it was unclear in six trials (Byrne 1984; Field 1996; Field 2004; Kahn 1990; McLean 1979; Sonis 1987).

Selective reporting

The authors reported on all their a priori hypothesized outcomes in ten trials (Bowers 1990; Field 1996; Field 2004; Kahn 1990; McLean 1979; Pace 1977a; Pace 1977b; Reynolds 1986; Wilson 1982; Wood 1996) and did not report on all in five (Byrne 1984; Krampen 1997; McCann 1984; Murphy 1995; Sonis 1987). Another potential source of bias was the selective availability of useable data from all included trials. In one trial (Field 2004) there was no significant difference between relaxation and no-treatment groups, however raw data were not available and it is unclear how these data might have affected the results of the meta-analysis. There were two trials without useable data that compared relaxation to complementary interventions, but in these trials Field 1996 and Sonis 1987 reported results that were consistent with the meta-analysis. However, it should be noted that the meta-

analysis included data on exercise, but not on massage or light therapy. It is unclear how data on massage and light therapy would affect the results of the meta-analysis if included. The other trial without useable data (Byrne 1984) compared relaxation with a non-standard form of psychological therapy called 'paradoxical intention'.

Other potential sources of bias

All trials included pre-test and post-test measures of depression. Only seven reported follow-up measures of depression, which ranged in time from 1 month (Kahn 1990), 5 weeks (Reynolds 1986), 3 months (McLean 1979; Wood 1996), 13 weeks (Pace 1977a), 16 weeks (Pace 1977b) to 6 months (Wilson 1982; Wood 1996). For the meta-analysis, we used the 3 months follow-up data from the Wood study because this was closest to the median of the other trials. The McLean 1979 trial also had longer-term follow-up data over 2.25 years, but the data were not presented in a form which allowed identification of individual time points beyond 3 months.

For a full description of the quality of included trials, see the Characteristics of included studies table.

Effects of interventions

Of the 11 trials which had data that could be extracted, a number had multiple arms. There were five that compared relaxation with wait-list, no treatment or minimal interventions, nine with a psychological treatment, one with a lifestyle or complementary intervention and two with antidepressant medication. In addition there were two that compared relaxation plus medication with medication alone.

Due to missing data, values in several trials were estimated or imputed. This involved estimating data from figures in two trials (McCann 1984; Wood 1996), estimating SDs from p-values in one study (McCann 1984), and using pre-test SDs as estimates of post-test SDs in one study (McLean 1979). In addition, one study had an obvious typographical error with a SD and the author confirmed the correct value (Kahn 1990). Full details are given in the Characteristics of Included Studies table.

Analyses were carried out by grouping trials based on: the nature of the comparison condition (wait-list, no treatment or minimal treatment, psychological treatment, complementary or lifestyle intervention, medication), the type of outcome measure (self-report or clinician-rated), and the measurement points (post-intervention, follow-up). Where there were heterogeneous effects ($I^2 > 50\%$), we further sub-divided the trials to explain this. These subdivisions covered the intention of the relaxation treatment (as an active treatment hypothesized to reduce depression or as a placebo control) the age group of the participants (adolescents, adults) and the method of classifying the participants as depressed (diagnosis or scale cut-off).

Effect sizes were calculated so that a SMD < 0 or a RR < 1 means that a comparison favoured relaxation treatment.

1) Comparison with wait-list, no treatment or minimal treatment

Depression scores

Pooling data from five of six trials comparing relaxation with wait-list, no treatment or minimal treatment, showed a post-intervention SMD in self-reported depression symptoms of -0.59 (95% CI -0.94 to -0.24) (Analysis 1.1). At follow-up, two trials had short-term follow-up data and showed a continuing advantage of relaxation (SMD = -0.74, 95% CI -1.34 to -0.15) (Analysis 1.2), but only one trial had long-term follow-up data (SMD = -0.39, 95% CI -1.24 to 0.45) (Analysis 1.3). For clinician-rated measures, there were two trials with data at post-test and only one at follow-up, and the effects favoured relaxation: post-test SMD = -0.95 (95% CI -1.56 to -0.35) (Analysis 1.4); follow-up SMD = -1.41 (95% CI -2.59 to -0.22). Due to significant heterogeneity in the post-test comparison, the random effects model was applied (see Exploration of heterogeneity): SMD = -1.35 (95% CI -3.06 to 0.37) (Analysis 1.5).

Non response/remission

The dichotomous outcomes of non-response or non-remission were assessed by whether participants were below a cut-off on a self-reported depression scale. Such data were reported in two trials and favoured relaxation: RR = 0.28 (95% CI 0.14 to 0.54) (Analysis 1.6). Only one of these had short-term follow-up data: RR = 0.43 (95% CI 0.22 to 0.86) (Analysis 1.8). For clinician-rated non-response or non-remission, there was only one trial with post-test data and none with follow-up; this favoured relaxation: RR = 0.43 (95% CI 0.22 to 0.85) (Analysis 1.9).

Functioning

There were no data on functioning to pool for a meta-analysis.

Dropouts

For the secondary outcome of drop-out during the trial, four trials reported drop-outs at post-test, with the data compatible with either greater or fewer dropouts between relaxation and minimal or no treatment: RR = 0.71 (95% CI 0.24 to 2.14). Due to significant heterogeneity, the random effects model was applied, and there was no statistically significant difference in dropouts, RR = 0.72 (95% CI 0.08 to 6.73) (Analysis 1.10). There were two trials reporting drop-out at short-term follow-up, with no statistically significant difference found: RR = 1.00 (95% CI 0.19 to 5.29) (Analysis 1.11); and one with long-term follow-up with no statistically significant difference found (RR = 0.36, 95% CI 0.02 to 8.04) (Analysis 1.12).

2) Comparison with psychological treatment

Depression scores

There were ten trials comparing relaxation with psychological treatment and nine had data that could be pooled. On self-report scales, relaxation produced less effect than psychological treatment at post-test: SMD = 0.38 (95% CI 0.14 to 0.62) (Analysis 2.1). Six of these trials also reported short-term follow-up data, with similar results: SMD = 0.36 (95% CI 0.07 to 0.65) (Analysis 2.2). Two trials had long-term follow-up data and found no statistically significant difference: SMD = 0.11 (95% CI -0.39 to 0.61) (Analysis 2.3). Three trials had clinician-rated scale data. Although the data showed that relaxation had less effect, the difference was smaller and no longer significant: SMD = 0.29 (95% CI -0.18 to 0.75) (Analysis 2.4). Only one of these trials reported follow-up data: SMD = 0.81 (95% CI -0.39 to 2.01) (Analysis 2.5). The trial without useable data (Byrne 1984) compared relaxation with 'paradoxical intention' (a thought monitoring condition) but only reported a non-significant t-test comparing pre- and post-treatment scores for both groups combined.

Non response/remission

For the dichotomous outcomes of non-response or non-remission on self-report scales, there were five trials, with the data again favouring psychological treatment: RR = 1.71 (95% CI 1.25 to 2.34) (Analysis 2.6). Only two of these trials had follow-up data, but the effect was similar: RR = 1.88 (95% CI 1.05 to 3.34) (Analysis 2.7). Three trials had data on non-response or non-remission by clinician-rated measures: RR = 1.96 (95% CI 1.20 to 3.22) (Analysis 2.8). Only one of these trials had follow-up data: RR = 1.42 (95% CI 0.91 to 2.21) (Analysis 2.9).

Functioning

There were no data on functioning to pool for a meta-analysis.

Dropouts

Drop-outs were reported at post-test in eight trials, with data showing no statistically significant difference between relaxation and psychological treatments: RR = 1.59 (95% CI 0.83 to 3.05) (Analysis 2.10). At follow-up, there were three trials with short-term drop-out data finding no statistically significant difference: RR = 1.54 (95% CI 0.43 to 5.51) (Analysis 2.11); and two with long-term data finding a higher drop-out with relaxation: RR = 5.93 (95% CI 1.43 to 24.61). Due to significant heterogeneity in long-term dropout data, the random effects model was applied, and there was no statistically significant difference between relaxation and psychological treatment (RR = 2.72 (95% CI 0.03 to 251.39)) (Analysis 2.12).

3) Comparison with complementary and lifestyle treatments

One trial had data that could be extracted, comparing relaxation training to exercise. Using a post-intervention self-report scale, no statistically significant difference was found: SMD = 0.73 (95% CI -0.02 to 1.49) (Analysis 3.3). One trial reported drop-out data at post-test, finding no statistically significant difference from relaxation: RR = 1.07 (95% CI 0.07 to 15.57) (Analysis 3.10).

All of the three trials that were not included in the meta-analysis compared relaxation with complementary and lifestyle treatments. [Sonis 1987](#) used a cross-over design to compare relaxation with light therapy. Data could not be extracted from this study because the data before and after cross-over were not reported separately. This study reported that relaxation was more effective than light therapy for 4 participants with non-seasonal depression (post-test scores on CDRS: relaxation M = 34.3, SD = 4.5; light M = 52.3 SD = 10.4), while light therapy was more effective for 5 participants with seasonal depression (post-test scores on CDRS: relaxation M = 57.4, SD = 15.2; light M = 42.4 SD = 11.4). Two studies were not included because standard deviations were not reported and the raw data had been lost in a hurricane. [Field 1996](#) compared relaxation with massage therapy in depressed adolescent mothers who had recently given birth. Therapy consisted of twice weekly sessions over five weeks. Assessment before the final session showed little difference in depression scores between treatments (scores on the POMS-Depression: relaxation M = 18.56, massage M = 20.39) and no long term effects (final session scores did not differ from pre-intervention scores, which were: relaxation M = 18.37, massage M = 19.44). [Field 2004](#) compared relaxation with massage therapy and no treatment control in pregnant women and reported a significant group by time interaction effect ($F(3,66) = 24.32, p < .001$) showing the massage group had a greater decrease in depression (post-test scores on the CES-D: relaxation M = 24.8, massage therapy M = 19.9, no treatment control M = 27.8).

4) Comparison with medication

Depression scores

Two trials compared relaxation with tricyclic antidepressant medication. Using depression self-report scales, the post-intervention effect was not significantly different: SMD = -0.14 (95% CI -0.51 to 0.24). Due to significant heterogeneity, the random effects model was applied, and the effect size statistics were: SMD = -0.59 (95% CI -2.07 to 0.89) (Analysis 4.1). Only one of these trials had follow-up data, showing medication superior: SMD = 0.50 (95% CI 0.05 to 0.95) (Analysis 4.3). For clinician-rated outcomes, there was only post-intervention data from one trial, with no statistically significant difference found: SMD = -0.80 (95% CI -1.66 to 0.06) (Analysis 4.4).

Non response/remission

Non-response or non-remission was measured by self-report in one trial at post-intervention only. Relaxation was found to have

a similar effect to medication: RR = 0.95 (95% CI 0.75 to 1.22) (Analysis 4.8).

Functioning

There were no data on functioning to pool for a meta-analysis.

Dropouts

Two trials reported drop-out data, at post-test only, and found no statistically significant difference: RR = 0.71 (0.39 to 1.31) (Analysis 4.10).

5) Effects of relaxation combined with medication

Depression scores

Two trials compared relaxation combined with tricyclic antidepressant medication to medication alone. These trials gave post-intervention data on self-reported depression. Relaxation was found to add effects to medication: SMD = -0.90 (95% CI -1.56 to -0.24) (Analysis 5.1). Because both trials used the BDI, it was also possible to estimate the effect in raw scale units: Difference = -8.03 (95% CI -13.32 to -2.74) (Analysis 5.2). However, only one study reported follow-up data and this found no statistically significant added effect of relaxation: SMD = -0.02 (95% CI -0.90 to 0.86) (Analysis 5.3); Difference = -0.20 (95% CI -9.18 to 8.78) (Analysis 5.4).

One of the two trials reported clinician-rated data at post-intervention only, finding no statistically significant difference between treatments: SMD = -0.20 (95% CI -1.08 to 0.68) (Analysis 5.5), which equated to a difference of -1.20 (95% CI -6.23 to 3.83) on the Hamilton Rating Scale for Depression (HRSD) (Analysis 5.6).

Non response/remission

Only one of the trials reported data on non-response or non-remission. Using self-report data at post-intervention, relaxation added an effect to medication alone: RR = 0.05 (95% CI 0.00 to 0.72) (Analysis 5.7). Using the clinician-rated data at post-test in the same study, there was no statistically significant difference between the groups: RR = 1.13 (95% CI 0.78 to 1.63) (Analysis 5.8).

Functioning

There were no data on functioning to pool for a meta-analysis.

Dropouts

Only one of the trials reported drop-out data, at post-test only, and there was no statistically significant difference between the groups: RR = 1.00 (95% CI 0.07 to 14.05) (Analysis 5.9).

Exploration of heterogeneity

Heterogeneity was explored where $I^2 > 50\%$. The trials were subdivided according to the age of the participants, the way depression was defined for entry into the study, and whether relaxation was intended as active or placebo treatment.

Relaxation versus wait-list, no treatment or minimal treatment

Depression scores

The comparisons of relaxation with wait-list, no treatment or minimal interventions were found to be heterogeneous for clinician-rated scales ($I^2 = 82.6\%$, $P = 0.02$) at post-intervention. For clinician-rated data, there were only two trials and these both involved adolescents who were defined as depressed by a scale cut-off and the treatment was regarded as active. Therefore, none of the three sub-grouping variables accounted for the heterogeneity in the clinician-rated data. Results obtained from the random-effects model differed from those obtained from the fixed effect model, demonstrating no statistically significant difference between relaxation and wait-list, no treatment or minimal intervention (SMD = -1.35 (95% CI -3.06 to 0.37)).

Dropouts

For the drop-out data, heterogeneity exceeded the critical threshold for the four trials that compared relaxation to wait-list, no treatment or minimal interventions ($I^2 = 53.1\%$, $P = 0.12$). Analysis of sub-groups of trials was hampered by the small numbers of trials in some of the sub-groups. If a random effects model was applied, there was no statistically significant difference, RR = 0.72 (95% CI 0.08 to 6.73).

Relaxation versus psychological treatment

Dropouts

The threshold for heterogeneity was exceeded for the two trials that reported long-term drop-outs in relaxation versus psychological treatments ($I^2 = 79.0\%$, $P = 0.03$). Wood 1996 reported a significantly greater drop-out from relaxation whereas Wilson 1982 reported a non-significantly lower drop-out for relaxation. There were a number of differences between these trials. Wood 1996 used a diagnosis to select adolescent participants and intended relaxation to be a placebo, whereas Wilson 1982 used a scale cutoff with adults and intended relaxation as a treatment. Results obtained from the random-effects model differed from those obtained from the fixed effect model demonstrating no statistically significant difference between relaxation and wait-list, no treatment or minimal intervention (RR = 2.72 (95% CI 0.03 to 251.39)).

Relaxation versus medication

Depression scores

There was also heterogeneity of the two trials that compared relaxation with medication ($I^2 = 88.1\%$, $P = 0.004$). On self-rated depression at post-intervention, McLean 1979 found relaxation to have a similar effect to medication, SMD = 0.10 (95% CI -0.31 to 0.51), while Murphy 1995 found relaxation to be superior, SMD = -1.41 (95% CI -2.35 to -0.47). Both trials involved adults, both intended relaxation to be a placebo, and both used a diagnosis to select participants, so none of these factors can account for the difference. In the report of the Murphy trial, the authors noted the poor performance of medication. They explained this poor effect as follows: "In our effort to keep drug treatment uncontaminated by psychotherapy effect, it appears that we went too far. The planned avoidance of "supportive" interactions in this treatment cell may have been experienced by the patients as coldness or disinterest on the part of the pharmacotherapist. To the extent this was true, we are seeing the negative side of the importance of the doctor-patient relationship, even when the treatment modality is pharmacologic" (pp. 417-418). When a random-effects model was applied, the effect size statistics were: SMD = -0.59 (95% CI -2.07 to 0.89).

DISCUSSION

Summary of main results

The data showed that relaxation training was more effective at reducing self-rated depressive symptoms than waitlist or no or minimal treatment (5 studies, 136 participants). Clinician-rated depressive symptoms were less clear because of significant heterogeneity, with the fixed-effects model finding relaxation more effective, but the random-effects model demonstrating no statistically significant difference (2 studies, 52 participants). In this and other cases where heterogeneity was observed, none of our sub-grouping factors could account for the heterogeneity. However, relaxation training was not as effective as psychological (mainly cognitive-behaviour) treatment in reducing self-rated depressive symptoms. These differences were found both at the end of treatment (9 studies, 286 participants) and at follow-up several months later (6 studies, 192 participants). Results from clinician-rated depressive symptoms were partially supportive, with non response/remission post intervention favouring psychological treatment (3 studies, 104 participants), but no significant difference in clinician-rated depression scores post intervention (3 studies, 72 participants). Drop-out rates were generally low and did not differ at follow-up between relaxation and these other treatments. There were inconsistent effects found when comparing relaxation training to medication (2 studies, 115 participants). The comparisons with medication did not lead to clear conclusions because of

inconsistencies between the post-test and follow-up data. Similar inconsistencies were also found in the trials comparing relaxation-plus-medication to medication alone (2 studies, 40 participants), which also showed inconsistency between self-report and clinician-rated data.

There were too little data to draw any conclusions about relaxation in comparison with complementary and lifestyle treatments. Three of the four trials that compared relaxation to complementary or lifestyle therapies did not have data that could be pooled.

Overall completeness and applicability of evidence

A major weakness in the trials was the lack of measurement of functional outcomes. Although it was a goal of the review to cover these, there were very little data on this domain. Symptoms and drop-outs were the only outcomes reported with sufficient consistency to be covered in the review.

Most trials used some version of progressive muscle relaxation. Little comment can be made regarding the usefulness of other forms of relaxation. Nor is it clear what dose of relaxation therapy is needed to produce improvements. Although the therapy was described in each study, the dose was difficult to quantify, because it differed in number of sessions, duration of sessions and whether therapist- or self-administered (or a combination of the two).

The severity of depression for which relaxation is suited was also unclear. Participants were selected for the trials in various ways, making it hard to compare severity. However, some trials did use a diagnostic method of participant selection and these produced similar effects to trials that selected participants using a symptom scale cutoff, showing that relaxation works with typical clinical cases. The range of participants in the trials was limited in a number of other ways. There were no trials on children or the elderly and none on depressive symptoms secondary to medical illness. While many of the studies reported follow-ups over several months, there were no data on the long-term impact of relaxation, such as on relapse rates.

Quality of the evidence

The quality was hard to judge because methodological details were often not described adequately. The lack of detail may be related to the age of the trials. All but one were carried out over a decade ago, when standards of reporting were not as rigorous. The lack of detail was particularly evident for descriptions of allocation sequence generation, allocation concealment and drop-outs. Given that there was generally limited information reported about the conduct of the trials, it is difficult to assess their internal validity. Intention-to-treat analysis was not used in most of the trials where there was a description. However, given that the analysis showed similar drop-out rates across treatments, the failure to use it may not have had a significant impact.

Blinding of participants was not possible for relaxation training or for self-reported symptoms. Only clinician-ratings of depression were able to be blinded. However, only one study reported that it blinded the clinical rater.

Potential biases in the review process

Four of the studies, most comparing relaxation to a complementary or lifestyle intervention, did not have data that could be pooled. Attempts were made to obtain missing data, however, in many cases it was not possible, and data were estimated or imputed for several trials (McCann 1984; McLean 1979; Wood 1996). There was also potential for bias in trials where there were multiple scales and we had to choose one scale for data extraction.

Agreements and disagreements with other studies or reviews

The results of the current review are consistent with previous narrative reviews undertaken. One on adults concluded that: "Relaxation therapy looks a promising technique, but requires research in larger studies with longer-term follow-up" (Jorm 2002, p. 176). A second on children and adolescents concluded: "Relaxation may have an immediate effect on emotional state, but there is currently no evidence that it alleviates depression in children and adolescents" (Jorm 2006a, p. 371). The present review could not determine whether depressive symptoms were relieved in adolescents due to heterogeneous results, and no relevant evidence was found in children. A third review only covered one study (Murphy 1995) and concluded that relaxation had "Grade 2 evidence", which involves "At least one good, randomised controlled trial" (Thachil 2007). The current review strengthens these previous reviews that highlight the potential of relaxation and the need for further well designed studies in relevant populations.

AUTHORS' CONCLUSIONS

Implications for practice

This review shows that relaxation is better than wait-list, no treatment or minimal treatment at relieving self-rated depression, but not as effective as psychological therapies like cognitive-behaviour therapy. If relaxation and psychological therapies were equal in cost and availability, then relaxation would have no clinical role. However, relaxation is a very simple intervention which could be implemented at minimal cost. Relaxation can be readily manualised and requires brief training. By contrast, psychological therapies require a highly skilled clinician and are a scarce resource. Relaxation and psychological treatment could be used together in stepped care, with relaxation offered as a first-line treatment and psychological therapy as a second-line for those who do not respond.

Although this review could not determine benefit in adolescents specifically, relaxation could potentially play a role in a stepped care model for adolescent depression. This may be of clinical importance because of the dearth of evidence-based treatments for depression in adolescents. Given that the effectiveness of antidepressants in this age group is unclear (Hetrick 2007), and psychological therapies are limited in their availability, relaxation therapy has a potentially important role as a first-line treatment. The adolescent age group is more likely to contain those who are experiencing their initial episode of depression and, according to a staged model of illness, may be more likely to respond to more basic interventions at this earlier stage of illness (McGorry 2006).

There may also be implications for the use of relaxation in the early stages of a depressive illness, at whatever age this occurs, although this was not assessed in the review. Much research has pointed to the possibility that subsyndromal depression may be a type of prodrome for a depressive disorder, and relaxation may be a useful intervention for the group of people who experience these subthreshold states (Eaton 1995; Fava 1990; Fergusson 2005; Judd 1996; Mrazek 1994).

Implications for research

While relaxation looks to be a promising first-line treatment, there are many unanswered questions. We need to know what sort of patients it is most suitable for, in terms of age, severity and stage of disorder. We also don't know whether it is suitable for patients with depressive symptoms secondary to medical conditions, and this deserves research attention. Given the possibility of its effectiveness, it may be more suited to first onset or early stages of depression. It may also be effective for milder or subsyndromal

depressions, which also potentially represent earlier stages of a depressive disorder and this possibility is worth research attention.

If relaxation were to be used as a first line in stepped care, we need to know how much treatment to give and at what point other treatments should be trialled. Furthermore, we need data on the cost-effectiveness of relaxation therapy compared to other alternatives. This would allow a judgement of the extent to which a lower cost would justify the use of relaxation as a first-line treatment in place of a more complex alternative like cognitive-behaviour therapy.

There are limited data on relaxation compared to medication and none comparing it to the newer antidepressants. This comparison also needs to consider cost-effectiveness. Furthermore, we need to know more about whether relaxation can add to the effects of antidepressants. While two trials seem to indicate that it might, the data were inconsistent.

There needs to be research on a broader range of outcomes besides depressive symptoms. In particular, we need to know the effect of relaxation on functioning and on longer-term outcomes, including relapse rates.

The mechanism by which relaxation works is unclear. On the one hand, it may simply be a vehicle for showing care and giving hope of improvement. On the other, it may work through some specific mechanism such as the reduction of co-morbid anxiety. While understanding the mechanism is not necessary for its clinical application, it could help to refine the intervention.

Finally, all future research on relaxation for depression needs to pay attention to the methodological and reporting requirements for RCTs, as specified in the CONSORT Statement (Moher 2001).

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- * Indicates the major publication for the study

CHARACTERISTICS OF STUDIES

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

Bowers 1990

Methods	Was allocation sequence adequately generated: No Was allocation adequately concealed: No Were interventions blinded to participant/provider: Not possible Were outcome assessors blinded: Not possible for self-rated, yes for clinician rated Were drop outs adequately described: Yes Was ITT analysis undertaken: No Did authors report on all a-priori outcomes: Yes Other: Medication group appears worse based on baseline anxiety and depression scores, no test for baseline differences reported Number randomised: 33 Number dropped out (relaxation): 1 Number dropped out (CT): 1 Number dropped out (medication only): 1
Participants	Primary or Secondary depression: Primary How was depression defined: Diagnosis using DSM-III criteria by psychiatrist Setting: Inpatients Severity (relaxation): BDI 25.8, HRSD 16.5 Severity (CT): BDI 24.2, HRSD 20.7 Severity (medication only): BDI 31.2, HRSD 22.1 Age (relaxation): 37.7 Age (CT): 31.2 Age (medication only): 39.6 Sex (overall): M: 6 (20%), F: 24 (80%) Ethnicity (overall): Caucasian Suicidality: not stated Comorbid anxiety (relaxation): ATQ: 93.2 Comorbid anxiety (CT): ATQ: 101.9 Comorbid anxiety (medication only): ATQ: 121.0 Psychiatric comorbidity: not stated Recruitment strategy: from inpatient unit Country: USA Criteria for trial entry: Minimum 8th grade education, sufficient reading comprehension, aged between 18 and 60, written consent, no mental retardation, no specific physical illness, no active suicidal behaviour, no treatment with ECT, no contraindications for the use of antidepressants, none of bipolar affective disorder, panic disorder, alcoholism, drug use disorder, antisocial personality, Briquet's disorder, any psychotic depressive episode, schizophrenia, organic brain syndrome
Interventions	RELAXATION Type of relaxation: Two autogenic-like procedures - muscle relaxation and modified pain-reduction procedure Individual/group: Individual Manualised: Yes

Bowers 1990*(Continued)*

Delivered by: The author, a trained therapist
 Length of sessions: 50 minutes
 Number of sessions: 12
 Length of intervention: Average of 27 days in hospital, discharge approx. 9 days from the end of therapy
 How many sessions actually attended: Not stated
 Was it intended as intervention or control: Control
 Concurrent treatment: Antidepressant: dosage ranged from 25-75mg/day at the start, and 100-200mg/day at the end of the study (discharge dose 137.50mg/day). All subjects were in the normal hospital milieu
 PSYCHOLOGICAL THERAPY
 Type: Cognitive therapy (CT)
 Individual/group: Individual
 Manualised: Yes
 Delivered by: Author, trained therapist
 Length of sessions: Not stated
 Number of sessions: 12
 Length of intervention: Average of 29.4 days in hospital, discharge approx. 11 days after the end of therapy
 How many sessions actually attended: Not stated
 Was it intended as intervention or control: Intervention
 Concurrent treatment: Antidepressant: dosage ranged from 25-75mg/day at the start, and 100-200mg/day at the end of the study (discharge dose 137.50mg/day). All subjects were in the normal hospital milieu
 ANTIDEPRESSANTS
 Type: Tricyclic: nortriptyline
 Dosage/regime of pharmacotherapy: dosage ranged from 25-75mg/day at the start, and 100-200mg/day at the end of the study.
 Length of intervention:
 Average of 31.90 days in hospital
 Discharge dose: 120.00mg/day
 Concurrent treatment: normal hospital milieu

Outcomes	1) Depression: Beck Depression Inventory (Beck et al, 1961, 1979) (self rated) 2) Depression: 17-item Hamilton Rating Scale for Depression (Hamilton, 1960) (clinician rated) 3) Cognitive process and content: Dysfunctional Attitudes Scale (Weissman, 1979) (self rated) 4) Cognitive process and content: Automatic Thoughts Questionnaire (Hollon & Kendall, 1980) (self rated) 5) Cognitive process and content: Hopelessness Scale (Beck, Weissman, Lester, 1974) (self rated)
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Notes

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	No	C - Inadequate

Byrne 1984

Methods	Was allocation sequence adequately generated: Unclear Was allocation adequately concealed: Unclear
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(Continued)

	<p>Were interventions blinded to participant/provider: Not possible</p> <p>Were outcome assessors blinded: Not possible for self-rated</p> <p>Were drop outs adequately described: Yes</p> <p>Was ITT analysis undertaken: N/A</p> <p>Did authors report on all a-priori outcomes: No</p> <p>Other:</p> <p>Number randomised: 8</p> <p>Number dropped out (relaxation): 0</p> <p>Number dropped out (paradoxical intention): 0</p>
Participants	<p>Primary or Secondary depression: Primary</p> <p>How was depression defined: Cut-off t score on MMPI Depression Scale > 70 & BDI > 10</p> <p>Setting: University</p> <p>Severity (overall): BDI 17.38</p> <p>Age (relaxation): 39.5 Age (paradoxical intention): 43.0</p> <p>Sex: not stated</p> <p>Ethnicity: not stated</p> <p>Suicidality: not stated</p> <p>Comorbid anxiety: not stated</p> <p>Psychiatric comorbidity: not stated</p> <p>Recruitment strategy: Newspaper advertisements and college campus posters</p> <p>Country: USA</p> <p>Criteria for trial entry: Aged 18-55, average weekly sleep onset latency of ≥ 45 minutes, average of ≥ 3 nights per week difficulty falling asleep, subjects considered their sleep problem serious enough to warrant treatment, T score on MMPI Depression Scale > 70, BDI > 10.</p>
Interventions	<p>RELAXATION</p> <p>Type of relaxation: Progressive muscle relaxation</p> <p>Individual/group: Individual</p> <p>Manualised: Yes</p> <p>Delivered by: Therapist (5th year graduate student with 1.5 years supervised clinical experience) and self</p> <p>Length of sessions: Not stated</p> <p>Number of sessions: 21</p> <p>Length of intervention: 3 weeks</p> <p>How many sessions actually attended: Not stated</p> <p>Was it intended as intervention or control: Intervention</p> <p>Concurrent treatment: None</p> <p>PSYCHOLOGICAL THERAPY</p> <p>Type: Thought monitoring in bed before going asleep</p> <p>Individual/group: Individual</p> <p>Manualised: Yes</p> <p>Delivered by: Therapist (5th year graduate student with 1.5 years supervised clinical experience) and self</p> <p>Length of sessions: not stated</p> <p>Number of sessions: 21</p> <p>Length of intervention: 3 weeks</p> <p>How many sessions actually attended: Not stated</p> <p>Was it intended as intervention or control: Intervention</p> <p>Concurrent treatment: None</p>
Outcomes	<p>1) Depression: Beck Depression Inventory (BDI) (Beck et al, 1961) (self rated)</p> <p>2) Depression: Minnesota Multiphasic Personality Inventory (MMPI) Depression Scale 3) Objective sleep</p>

Byrne 1984

(Continued)

onset latency: Sleep monitoring unit⁴) Subject sleep parameters: Daily sleep log recorded subjective sleep onset latency, changes in frequency of nightly awakenings, early morning rising, difficulty in falling asleep, overall quality of sleep, bed and waking times, drug intake.

Notes Data were not presented separately for each group so could not be pooled.

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Field 1996

Methods	Was allocation sequence adequately generated: Unclear Was allocation adequately concealed: Unclear Were interventions blinded to participant/provider: Not possible Were outcome assessors blinded: Not possible for self-rated, unclear for clinician rated Were drop outs adequately described: No Was ITT analysis undertaken: Unclear Did authors report on all a-priori outcomes: Yes Other: Funds from Johnson & Johnson. Analysed acute changes on specific days rather than long term change over the intervention period Number randomised: 32 Number dropped out: not stated
Participants	Primary or Secondary depression: Primary (post-natal) How was depression defined: Diagnosis of dysthymia on the Diagnostic Inventory Schedule (Costello et al, 1985) and cut-off score on depression scale, BDI > 16 Setting: Outpatient at maternity unit Severity (relaxation): POMS 18.37 Severity (massage): POMS 19.44 Age (overall): 18.1 Sex (overall): 100% F Ethnicity (overall): 71% black, 29% Hispanic Suicidality: not stated Comorbid anxiety (relaxation): STAIC: 34.73 Comorbid anxiety (massage): STAIC: 35.67 Psychiatric comorbidity: not stated Recruitment strategy: Hospital maternity ward Country: USA Criteria for trial entry: Recently given birth, adolescent, free from medication or other treatment for depression or related disorders
Interventions	RELAXATION Type of relaxation: Combination of yoga exercises and progressive muscle relaxation Individual/group: Unclear Manualised: Not stated

Field 1996

(Continued)

Delivered by: Not stated
Length of sessions: 30 minutes
Number of sessions: 10
Length of intervention: 5 weeks
How many sessions actually attended: Not stated
Was it intended as intervention or control: Intervention
Concurrent treatment: None
MASSAGE THERAPY
Individual/group: Individual
Manualised: Yes
Delivered by: Trained massage therapists
Length of sessions: 30 minutes
Number of sessions: 10
Length of intervention: 5 weeks
How many sessions actually attended: Not stated
Was it intended as intervention or control: Intervention
Concurrent treatment: None

Outcomes

- 1) Depressed mood: Profile of Mood States (McNair et al, 1971) (self rated)
- 2) State, affect, activity level, anxiety level, fidgeting/nervous behaviour, vocalizations, cooperation: Behavior Observation Scales (Platania-Solazzo et al, 1992) (clinician rated)
- 3) State anxiety: State Anxiety Inventory for Children (Spielberger et al, 1970) (self rated)
- 4) Pulse rate: Radial pulse
- 5) Cortisol: Sampled from saliva and urine

Notes

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Field 2004

Methods

Was allocation sequence adequately generated: Unclear
Was allocation adequately concealed: Unclear
Were interventions blinded to participant/provider: Not possible
Were outcome assessors blinded: Not possible for self-rated, yes for clinician rated
Were drop outs adequately described: No
Was ITT analysis undertaken: Unclear
Did authors report on all a-priori outcomes: Yes
Other: Funding by Johnson & Johnson, conducted by Touch Research Institutes
Number randomised: 84
Number dropped out: not stated

Participants

Primary or Secondary depression: Primary (in pregnant women)
How was depression defined: Not stated.

Field 2004*(Continued)*

Setting: Participants' own home
 Severity (relaxation): CES-D 26.2
 Severity (massage): CES-D 24.9
 Severity (control): CES-D 28.3
 Age (overall): 28.8
 Sex (overall): 100% F
 Ethnicity (overall): 46% Caucasian, 39% Hispanic, 12% African American, 3% Asian
 Suicidality: not stated
 Comorbid anxiety (relaxation): STAI: 45.5
 Comorbid anxiety (massage): STAI: 37.4
 Comorbid anxiety (control): STAI: 36.4
 Psychiatric comorbidity: not stated
 Recruitment strategy: From obstetric and gynaecology clinics
 Country: USA
 Criteria for trial entry:
 Depressed, pregnant - second trimester (18-24 weeks gestation)

Interventions

RELAXATION
 Type of relaxation: Progressive muscle relaxation
 Individual/group: Individual
 Manualised: Not stated
 Delivered by: Self, once instructed by researchers
 Length of sessions: 20 minutes
 Number of sessions: 32
 Length of intervention: 16 weeks
 How many sessions actually attended: Not stated
 Was it intended as intervention or control: Control
 Concurrent treatment: Standard prenatal care
 MASSAGE THERAPY
 Individual/group: Individual
 Manualised: Yes
 Delivered by: Participants' significant other
 Length of sessions: 20 minutes
 Number of sessions: 32
 Length of intervention: 16 weeks
 How many sessions actually attended: Not stated
 Was it intended as intervention or control: Intervention
 Concurrent treatment: Standard prenatal care
 NO TREATMENT CONTROL
 Concurrent treatment: Standard prenatal care

Outcomes

- 1) Depression: Center for Epidemiologic Studies-Depression (Radloff, 1977) (self rated)
- 2) Depressed mood: Profile of Mood States (McNair et al, 1971) (self rated)
- 3) State anxiety: State Anxiety Inventory (Spielberger et al, 1970) (self rated)
- 4) Leg and back pain: VITAS (VITAS Healthcare Corporation, 1993) (self rated)
- 5) Cortisol, catecholamines, serotonin: Urine samples
- 6) Fetal activity: ultrasound
- 7) Obstetric complications: Obstetric Complications (OCS) and Postnatal Factor (PNF) Scales (Littman et al, 1978)
- 8) Neonatal behaviour: Brazelton Neonatal Behavior Assessment Scale (Brazelton, 1984) (clinician rated)

Field 2004*(Continued)*

Notes

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Kahn 1990

Methods

Was allocation sequence adequately generated: Unclear
 Was allocation adequately concealed: No
 Were interventions blinded to participant/provider: Not possible
 Were outcome assessors blinded: Not possible for self-rated, no for clinician rated
 Were drop outs adequately described: No
 Was ITT analysis undertaken: Unclear
 Did authors report on all a-priori outcomes: Yes
 Other: Large standard deviations; ethical practice required that the four special education students classified as behaviourally disordered be assured of placement in one of the three active treatment conditions, making these participants not truly randomised
 Number randomised: 68
 Number dropped out (relaxation): 0
 Number dropped out (CWD): 0
 Number dropped out (self-modelling): 0
 Number dropped out (control): 1 during follow-up

Participants

Primary or Secondary depression: Primary
 How was depression defined: Cut-off on depression scales: RADS>72, CDI>15, BID>20
 Setting: School
 Severity (overall): moderate to severe (RADS in the 95th percentile)
 Age (overall): 10 - 14
 Sex (overall): M: 33 (48.5%), F: 35 (51.5%)
 Ethnicity: not stated
 Suicidality: not stated
 Comorbid anxiety: not stated
 Psychiatric comorbidity: not stated
 Recruitment strategy: Multiple stage screening process at a high school to obtain a high risk sample
 Country: USA
 Criteria for trial entry: Not receiving antidepressant medication or other treatment for depression, student willingness and parent permission, aged 10-14

Interventions

RELAXATION
 Type of relaxation: progressive muscle plus psychoeducation including mental imagery and breathing
 Individual/group: Group
 Manualised: Yes
 Delivered by: School psychologist and school counsellor
 Length of sessions: 50 minutes

Kahn 1990

(Continued)

Number of sessions: 12
Length of intervention: 6-8 weeks
How many sessions actually attended: Not stated
Was it intended as intervention or control: Intervention
Concurrent treatment: None
PSYCHOLOGICAL THERAPY 1
Type: CWD Adolescent (cognitive behaviour and psychoeducation)
Individual/group: Group
Manualised: Yes
Delivered by: School psychologist and school counsellor
Length of sessions: 50 minutes
Number of sessions: 12
Length of intervention: 6-8 weeks
How many sessions actually attended: Not stated
Was it intended as intervention or control: Intervention
Concurrent treatment: None
PSYCHOLOGICAL THERAPY 2
Type: self modelling - behavioural/cognitive
Individual/group: Individual
Manualised: Yes
Delivered by: School psychologist and school counsellor
Length of sessions: 10-12 minutes
Number of sessions: 12
Length of intervention: 6-8 weeks
How many sessions actually attended: Not stated
Was it intended as intervention or control: Intervention
Concurrent treatment: None
WAIT-LIST CONTROL

Outcomes	1) Depression: Reynolds Adolescent Depression Scale (RADS) (Reynolds, 1987) (self rated) 2) Depression: Adapted Children's Depression Inventory (CDI) (Kovacs, 1985) (self rated) 3) Depression: Bellevue Index of Depression (BID) (Petti, 1978) (clinician rated) 4) Depression: RADS and CDI - parent rated 5) Self concept: Piers-Harris Childrens Self Concept Scale (Piers (1984) 6) Satisfaction: Rating scale
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Notes

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	No	C - Inadequate

Krampen 1997

Methods	Was allocation sequence adequately generated: No Was allocation adequately concealed: No
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(Continued)

Were interventions blinded to participant/provider: Not possible
Were outcome assessors blinded: Not possible for depression
Were drop outs adequately described: Yes
Was ITT analysis undertaken: No
Did authors report on all a-priori outcomes: No
Other problems: 10-week intervention showed only small improvements in depression scores.
Number randomised: 55
Number dropped out (relaxation): 0
Number dropped out (psychological therapy): 3
Number dropped out (waitlist): 4

Participants	Primary or Secondary depression: Primary How was depression defined: ICD-10 and German version of Structured Clinical Interview for DSM-III-R Patient Edition (SCID-P; Wittchen et al., 1990) Setting: Outpatients Severity (relaxation): BDI: 26.8 Severity (psychological therapy): BDI: 25.4 Severity (control): BDI: 24.9 Age (mean): 41.3 Sex (overall): M: 17 (30.9%), F: 38 (69.1%) Ethnicity: not reported Suicidality: not reported Comorbid anxiety: not reported Psychiatric comorbidity: not reported Recruitment strategy: Unselected sample, recruited from psychotherapy outpatients Country: Germany Criteria for trial entry: Adult, ICD-10 diagnosis of depressive episode (F32.xx), long term depressive reaction (F43.21), recurrent depression (F33.xx), or dysthymia (F34.1)
Interventions	RELAXATION Type of relaxation: Autogenic training Individual/group: Group Manualised: Yes Delivered by: 6 experienced psychotherapists with > 8 years practice with training and certification for behavior therapy or cognitive therapy plus one more approach Length of sessions: Not reported Number of sessions: 10 Length of intervention: 10 weeks How many sessions actually attended: Not reported Was it intended as intervention or control: Intervention Concurrent treatments: 8 of 19 were taking antidepressants at baseline PSYCHOLOGICAL THERAPY Type: "Integrative" (behavior oriented, problem-centred, supportive treatment, psychodynamic oriented) Individual/group: Individual Manualised: No Delivered by: 6 experienced psychotherapists with > 8 years practice with training and certification for behavior therapy or cognitive therapy plus one more approach Length of sessions: Not reported Number of sessions: 20

Krampen 1997

(Continued)

	Length of intervention: 10 weeks How many sessions actually attended: Not reported Was it intended as intervention or control: Intervention Concurrent treatments: 7 of 18 were taking antidepressants at baseline WAITLIST CONTROL Concurrent treatments: 8 of 18 were taking antidepressants at baseline
Outcomes	1) Depression: German version of Beck Depression Inventory (self report) (BDI; Hautzinger et al., 1994) 2) Depression: German version of Structured Clinical Interview for DSM-III-R Patient Edition (SCID-P; Wittchen et al., 1990) 3) Psychosomatic complaints: Symptom Checklist for Autogenic Training (AT-SYM; Krampen 1991)
Notes	Cross-over study: data extracted from pre-cross-over only. Study also had assessments at 20 weeks, 8 months and 3 years.

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	No	C - Inadequate

McCann 1984

Methods	Was allocation sequence adequately generated: Unclear Was allocation adequately concealed: Unclear Were interventions blinded to participant/provider: Not possible Were outcome assessors blinded: Not possible for self-rated Were drop outs adequately described: Unclear (number of dropouts per group described, but not the reasons for dropout) Was ITT analysis undertaken: No Did authors report on all a-priori outcomes: No Other problems: Relaxation intervention was minimal and was not implemented with the same thoroughness as aerobic exercise intervention Number randomised: 47 Number dropped out (relaxation): 1 Number dropped out (exercise): 1 Number dropped out (no treatment): 2
Participants	Primary or Secondary depression: Primary How was depression defined: Cut-off on depression scale: BDI > 11 Setting: University Severity (overall): BDI 15.35 Age: not stated Sex (overall): 47 female (100%) Ethnicity: not stated Suicidality: not stated Comorbid anxiety: not stated Psychiatric comorbidity: not stated

McCann 1984*(Continued)*

Recruitment strategy: Screening of female undergraduate psychology students

Country: USA

Criteria for trial entry: Female, willingness to participate

Interventions	<p>RELAXATION</p> <p>Type of relaxation: Jacobson or derivative</p> <p>Individual/group: Individual</p> <p>Manualised: No</p> <p>Delivered by: Self</p> <p>Length of sessions: 15-20 minutes</p> <p>Number of sessions: 40</p> <p>Length of intervention: 10 weeks</p> <p>How many sessions actually attended: Not reported</p> <p>Was it intended as intervention or control: Control</p> <p>Concurrent treatment: Subjects began their relaxation sessions with a 5 minute leisurely walk</p> <p>EXERCISE</p> <p>Type: Aerobic exercise</p> <p>Individual/group: Group</p> <p>Manualised: Unclear</p> <p>Delivered by: Aerobics instructor and self</p> <p>Length of sessions: 1 hour</p> <p>Number of sessions: 20, plus exercise outside class for total of 30 aerobic points per week</p> <p>Length of intervention: 10 weeks</p> <p>How many sessions actually attended: Not stated</p> <p>Was it intended as intervention or control: Intervention</p> <p>Concurrent treatment: None</p> <p>NO TREATMENT CONTROL</p>
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Outcomes	<p>1) Depression: Beck Depression Inventory (Beck et al, 1961) (self rated)</p> <p>2) Aerobic capacity: Distance travelled during 12 minute walk-run test</p> <p>3) MHPG (norepinephrine): Urine samples (destroyed during preservation process)</p>
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Notes	Means were estimated from Figure 1. SDs were imputed from results of post hoc paired comparison t-tests.
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Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

McLean 1979

Methods	<p>Was allocation sequence adequately generated: Unclear</p> <p>Was allocation adequately concealed: Unclear</p> <p>Were interventions blinded to participant/provider: Not possible</p> <p>Were outcome assessors blinded: Not possible for self-rated</p> <p>Were drop outs adequately described: Unclear</p> <p>Was ITT analysis undertaken: Unclear</p>
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(Continued)

Did authors report on all a-priori outcomes: Yes
 Other problems: Significantly fewer dropouts in the behavior therapy group than in the psychological therapy or drug therapy group
 Number randomised: 196
 Number dropped out (relaxation): 10
 Number dropped out (behavior therapy): 2
 Number dropped out (antidepressants): 14
 Number dropped out (short term psychological therapy): 11

Participants Primary or Secondary depression: Primary
 How was depression defined: Diagnosis by diagnostic criteria for psychiatric research (Feighner et al 1972), plus 2 or more of BDI \geq 23, DACL \geq 14, MMPI Depression Scale \geq 25 for men, \geq 29.5 for women
 Setting: Community
 Severity (relaxation): BDI: 26.79
 Severity (antidepressants): BDI 27.23
 Severity (behaviour therapy): BDI 26.75
 Severity (short term psychological therapy): BDI 26.96
 Age (overall): 39.2
 Sex (overall): M: 28%, F: 72%
 Ethnicity: not stated
 Suicidality (overall): 25% had made a serious suicide attempt
 Comorbid anxiety: not stated
 Psychiatric comorbidity: not stated
 Recruitment strategy: Newspaper announcements
 Country: Canada
 Criteria for trial entry: Aged between 20 and 60, if recently pregnant at least 3 months postpartum, depressed for at least the past 2 months, functionally impaired, fluent in English, not receiving treatment for depression elsewhere, not taking Lithium

Interventions RELAXATION
 Type of relaxation: Progressive muscle relaxation
 Individual/group: Individual
 Manualised: Yes
 Delivered by: Psychologists, physicians or psychiatrists
 Length of sessions: 1 hour
 Number of sessions: 10
 Length of intervention: 10 weeks
 How many sessions actually attended: Not stated
 Was it intended as intervention or control: Control
 Concurrent treatment: None
 ANTIDEPRESSANTS
 Type: Tricyclic: Amitriptyline
 Dose/regimen of pharmacotherapy: Initial dose 75mg up to 150mg/day over a 10 day period, then weaned at 25mg/day at end of trial
 Length of pharmacotherapy: 11 weeks
 How much medication received: Dosage not reported, but blood samples taken on 2 random visits indicated 100% were taking antidepressants
 Concurrent treatment: None
 PSYCHOLOGICAL THERAPY 1
 Type: Behaviour therapy

McLean 1979

(Continued)

Individual/group: Individual
Manualised: Yes
Delivered by: Licensed psychologists, physicians or psychiatrists
Length of sessions: 1 hour
Number of sessions: 10
Length of intervention: 10 weeks
How many sessions actually attended: Not stated
Was it intended as intervention or control: Intervention
Concurrent treatment: None
PSYCHOLOGICAL THERAPY 2
Type: Short term therapy (psychodynamic)
Individual/group: Individual
Manualised: No
Delivered by: Licensed psychologists, physicians or psychiatrists
Length of sessions: 1 hour
Number of sessions: 10
Length of intervention: 10 weeks
How many sessions actually attended: Not stated
Was it intended as intervention or control: Intervention
Concurrent treatment: None

Outcomes

- 1) Depression: Depression Adjective Check List (Lubin, 1965) (self rated)
- 2) Depression: Beck Depression Inventory (self rated)
- 3) Depression/functioning (cognitive, coping, personal activity, social, somatic indicators, mood, overall general satisfaction): Author devised measure (self rated)
- 4) Complaint: Average complaint rating (self rated)
- 5) Goal attainment: Average goal attainment (self rated)
- 6) Dropouts

Notes

No SDs present for post and follow-up scores, therefore pre-intervention SDs used.

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Murphy 1995

Methods

Was allocation sequence adequately generated: Yes
Was allocation adequately concealed: No
Were interventions blinded to participant/provider: Not possible
Were outcome assessors blinded: Not possible for self-rated, no for clinician rated
Were drop outs adequately described: Unclear (number of dropouts per group described, but not the reasons for dropout)
Was ITT analysis undertaken: Yes for continuous measures, no for dichotomous
Did authors report on all a-priori outcomes: No
Other: Patients told their treatment assignment before undertaking the full assessment battery; > 50% of

(Continued)

patients assigned to antidepressants either refused the assignment or dropped out of treatment
 Number randomised: 37
 Number dropped out (relaxation): 3
 Number dropped out (CBT): 0
 Number dropped out (antidepressants): 5

Participants

Primary or Secondary depression: Primary
 How was depression defined: Diagnosis using Feighner et al (1972) research criteria for unipolar affective disorder, depressed and cut-off on depression scales: BDI >= 14, HRSD >= 10,
 Setting: Community
 Severity (relaxation): BDI 24.69, HRSD 15.53
 Severity (CBT): BDI 24.73, HRSD 15.73
 Severity (antidepressants): BDI 25.60, HRSD 16.40
 Age (relaxation): 40.7
 Age (CBT): 39.8
 Age (antidepressants): 37.6
 Sex (relaxation): M: 1 (7.1%), F: 13 (92.9%)
 Sex (CBT): M: 3 (27.3%), F: 8 (72.7%)
 Sex (antidepressants): M: 7 (58.3%), F: 5 (41.7%)
 Ethnicity (relaxation): 100% white
 Ethnicity (CBT): 91% white, 9% black
 Ethnicity (antidepressants): 100% white
 Suicidality: not stated
 Comorbid anxiety: not stated
 Psychiatric comorbidity (relaxation): 8 anxiety disorder
 Psychiatric comorbidity (CBT): 7 anxiety disorder
 Psychiatric comorbidity (antidepressants): 8 anxiety disorder
 Recruitment strategy: News releases
 Country: USA
 Criteria for trial entry: Aged between 18 and 60, free from major medical disease or medication that would be incompatible with antidepressants, free from other Axis I or II psychiatric disorders other than anxiety, willing to accept random treatment assignment and participation in treatment and assessment, not taking psychotropic medications

Interventions

RELAXATION
 Type of relaxation: Jacobson or derivative
 Individual/group: Individual
 Manualised: Yes
 Delivered by: 3 psychologists and a social worker, also self for homework
 Length of sessions: 50 minutes (plus 20 minute relaxation tape daily)
 Number of sessions: max of 20
 Length of intervention: 16 weeks
 How many sessions actually attended: mean 15.0, homework compliance not reported
 Was it intended as intervention or control: Control
 Concurrent treatment: None
 PSYCHOLOGICAL THERAPY
 Type: Cognitive behaviour therapy
 Individual/group: Individual
 Manualised: No
 Delivered by: 3 psychologists

Murphy 1995

(Continued)

Length of sessions: 50 minutes
Number of sessions: max of 20
Length of intervention: 16 weeks
How many sessions actually attended: 16.6
Was it intended as intervention or control: Intervention
Concurrent treatment: None
ANTIDEPRESSANTS
Type: Tricyclic: Desipramine
Dosage/regimen of pharmacotherapy: daily dose increased to 150-300 mg/day
Length of pharmacotherapy: 16 weeks
Length of sessions: 20 minutes weekly with psychiatrist (no supportive therapy) for 4 weeks, then weekly or biweekly for 12 weeks
How much medication received: highly variable
Concurrent treatment: None

Outcomes	1) Depression: Beck Depression Inventory (self rated) 2) Depression: Hamilton Rating Scale for Depression (HRSD-17) (clinician rated) 3) Self control: Self-control Scale (Rosenbaum, 1980) (self rated) 4) Belief in efficacy of assigned treatment: Author devised measure (self rated) 5) Satisfaction with treatment: Author devised measure (self rated)
Notes	Used "response" defined as 50% reduction on clinician rated scale, and "recovery" defined as ≤ 9 on self-rated scale (BDI)

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	No	C - Inadequate

Pace 1977a

Methods	Was allocation sequence adequately generated: Unclear Was allocation adequately concealed: Unclear Were interventions blinded to participant/provider: Not possible Were outcome assessors blinded: Not possible for self-rated Were drop outs adequately described: Yes Was ITT analysis undertaken: No Did authors report on all a-priori outcomes: Yes Other: Number randomised: 18 Number dropped out (relaxation): 1 during intervention, 1 during follow-up Number dropped out (SAT): 0 during intervention, 1 during follow-up Number dropped out (CET): 1 during intervention, 1 during follow-up
Participants	Primary or Secondary depression: Primary How was depression defined: Cut-off on depression scales: BDI>20 Setting: University

(Continued)

Severity (relaxation): BDI 35.5
 Severity (SAT): BDI 27.3
 Severity (CET): BDI 30.2
 Age (relaxation): 32.6
 Age (SAT): 47.6
 Age (CET): 35.0
 Sex (overall): F: 18 (100%)
 Ethnicity: not stated
 Suicidality: not stated
 Comorbid anxiety (overall): STAI 53.6
 Psychiatric comorbidity: not stated
 Recruitment strategy: Public advertisement
 Country: Australia
 Criteria for trial entry: Aged 20 to 55, BDI>20, been depressed for at least 2 months, not taking antidepressants up to within one month prior, not received professional advice for depression within two months prior, absence of excessive alcohol consumption, sexual disorders, mania, hysteria, schizophrenia, physical illnesses.

Interventions

RELAXATION

Type of relaxation: Progressive muscle relaxation
 Individual/group: Individual
 Manualised: Yes
 Delivered by: 2 psychology therapists
 Length of sessions: 1 hour
 Number of sessions: 7
 Length of intervention: 3.5 weeks
 How many sessions actually attended: Not stated
 Was it intended as intervention or control: Intervention

Concurrent treatment: None

PSYCHOLOGICAL THERAPY

Type: Sensory Awareness Training (SAT)
 Individual/group: Individual
 Manualised: Yes
 Delivered by: 2 psychology therapists
 Length of sessions: 1 hour
 Number of sessions: 7
 Length of intervention: 3.5 weeks
 How many sessions actually attended: not stated
 Was it intended as intervention or control: Intervention

Concurrent treatment: None

PSYCHOLOGICAL THERAPY

Type: Cognitive-Emotional Therapy (CET)
 Individual/group: Individual
 Manualised: Yes
 Delivered by: 2 psychology therapists
 Length of sessions: 1 hour
 Number of sessions: 7
 Length of intervention: 3.5 weeks
 How many sessions actually attended: not stated
 Was it intended as intervention or control: Control

Pace 1977a*(Continued)*

	Concurrent treatment: None
Outcomes	1) Depression: Zung Self-Rated Depression Scale (self rated) (Zung, 1965) 2) Depression: Depression Adjective Checklists (DACL) (self rated) (Lubin, 1967) 3) Depression: Sentence Completions Method, abbreviated version (self rated) (Rohdes, 1957) 4) Sleep disturbance: Author devised sleep measure 5) Anxiety: State Trait Anxiety Inventory (STAI) (Spielberger et al, 1970) 6) Psychomotor performance: Block Design of Wechsler Adult Intelligence Scale (Wechsler, 1955) 7) Appearance-responsiveness: the DACL and a 10-point rating scale of depression completed by two observers 8) Decision making: Number of items completed in 10 minutes from Edwards Personal Preference Schedule (Edwards, 1954) 9) Test-taking performance: Tester's ratings of subjects on 8 scales
Notes	Reported as study 2

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Pace 1977b

Methods	Was allocation sequence adequately generated: Unclear Was allocation adequately concealed: Unclear Were interventions blinded to participant/provider: Not possible Were outcome assessors blinded: Not possible for self-rated Were drop outs adequately described: Yes Was ITT analysis undertaken: No Did authors report on all a-priori outcomes: Yes Other: Wait-list group was not randomly assigned and thus we did not extract data from it. Number randomised: 24 Number dropped out (relaxation): 1 during intervention, 0 during follow-up Number dropped out (TA): 1 during intervention, 0 during follow-up Number dropped out (CT): 2 during intervention, 1 during follow-up
Participants	Primary or Secondary depression: Primary How was depression defined: Cut-off on depression scales: BDI>20 (3 week version) Setting: University Severity (relaxation): BDI 25.7 Severity (TA): BDI 25.8 Severity (CT): BDI 25.8 Age (relaxation): 36.0 Age (TA): 42.2 Age (CT): 42.8 Sex (overall): F: 24 (100%) Ethnicity: not stated

(Continued)

Suicidality: not stated
 Comorbid anxiety: not stated
 Psychiatric comorbidity: not stated
 Recruitment strategy: Public advertisement
 Country: Australia
 Criteria for trial entry: Females aged 20 to 55, BDI>20, been depressed for at least 2 months, no history of phobic-anxiety states, not taking antidepressants up to within one month prior, not received professional advice for depression within two months prior, absence of excessive alcohol consumption, sexual disorders, mania, hysteria, schizophrenia, physical illnesses.

Interventions

RELAXATION

Type of relaxation: Progressive muscle relaxation
 Individual/group: Individual
 Manualised: Yes
 Delivered by: 3 psychology therapists
 Length of sessions: 1 hour
 Number of sessions: 7
 Length of intervention: 3.5 weeks
 How many sessions actually attended: Not stated
 Was it intended as intervention or control: Intervention
 Concurrent treatment: None

PSYCHOLOGICAL THERAPY

Type: Task assignment
 Individual/group: Individual
 Manualised: Yes
 Delivered by: 3 psychology therapists
 Length of sessions: 1 hour
 Number of sessions: 7
 Length of intervention: 3.5 weeks
 How many sessions actually attended: not stated
 Was it intended as intervention or control: Intervention
 Concurrent treatment: None

PSYCHOLOGICAL THERAPY

Type: Client-oriented therapy (CT)
 Individual/group: Individual
 Manualised: Yes
 Delivered by: 2 psychology therapists
 Length of sessions: 1 hour
 Number of sessions: 7
 Length of intervention: 3.5 weeks
 How many sessions actually attended: not stated
 Was it intended as intervention or control: Control
 Concurrent treatment: None

Outcomes

- 1) Depression: Beck Depression Inventory (BDI) (self rated) (Beck et al, 1961)
- 2) Depression: Depression Adjective Checklists (DACL) (self rated) (Lubin, 1967)
- 3) Depression: Sentence Completions Method, abbreviated version (self rated) (Rohdes, 1957)
- 4) Sleep disturbance: Author devised sleep measure
- 5) Anxiety: State Trait Anxiety Inventory (STAI) (Spielberger et al, 1970)
- 6) Self-expression: Rathus Assertiveness Scale (RAS) (Rathus, 1973) 7) Activity level and obtained

Pace 1977b*(Continued)*

reinforcement: Pleasant Events Form (PEF) (author devised)

Notes Reported as study 3. Study also included a wait-list arm which did not have random assignment.

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Reynolds 1986

Methods	<p>Was allocation sequence adequately generated: Unclear</p> <p>Was allocation adequately concealed: Unclear</p> <p>Were interventions blinded to participant/provider: Not possible</p> <p>Were outcome assessors blinded: Not possible for self-rated, unclear for clinician rated</p> <p>Were drop outs adequately described: Yes</p> <p>Was ITT analysis undertaken: No</p> <p>Did authors report on all a-priori outcomes: Yes</p> <p>Other: Due to a scheduling conflict, one subject originally assigned to the CBT condition was reassigned to the relaxation condition before receiving any treatment: unclear if baseline data includes this participant's data in the CBT or relaxation group. Although an initial BID score of 20 or greater was required for inclusion, 2 subjects with scores of 18 who met all other criteria were included.</p> <p>Number randomised: 30</p> <p>Number dropped out (relaxation): 3 during intervention, 2 during follow-up</p> <p>Number dropped out (CBT): 3 during intervention, 0 during follow-up</p> <p>Number dropped out (control): 0 during intervention, 1 during follow-up</p>	
Participants	<p>Primary or Secondary depression: Primary</p> <p>How was depression defined: Cut-off on depression scales: BDI?12, RADS?72, BID?20</p> <p>Setting: School</p> <p>Severity (relaxation): BDI 17.1</p> <p>Severity (CBT): BDI 21.1</p> <p>Severity (control): BDI 16.9</p> <p>Age (overall): 15.65</p> <p>Sex (overall): M: 11 (36.7%), F: 19 (63.3%)</p> <p>Ethnicity (overall): "white"</p> <p>Suicidality: not stated</p> <p>Comorbid anxiety (relaxation): STAI: 50.50</p> <p>Comorbid anxiety (CBT): STAI: 57.33</p> <p>Comorbid anxiety (control): STAI: 52.11</p> <p>Psychiatric comorbidity: not stated</p> <p>Recruitment strategy: Multiple stage screening process at a high school to obtain a high risk sample</p> <p>Country: USA</p> <p>Criteria for trial entry: No current use of medication for depression or related disorder, willingness to participate, no learning disabilities, no emotional disturbances (other than affective disorders), no mental retardation</p>	

Reynolds 1986

(Continued)

Interventions	RELAXATION Type of relaxation: Progressive muscle relaxation Individual/group: Group Manualised: Unclear Delivered by: Therapist Length of sessions: 50 minutes Number of sessions: 10 Length of intervention: 5 weeks How many sessions actually attended: 8.25 (range 5-10) sessions Was it intended as intervention or control: Intervention Concurrent treatment: None PSYCHOLOGICAL THERAPY Type: CBT Individual/group: Group Manualised: Yes Delivered by: Therapist Length of sessions: 50 minutes Number of sessions: 10 Length of intervention: 5 weeks How many sessions actually attended: 8.16 (range 6-10) sessions Was it intended as intervention or control: Intervention Concurrent treatment: None WAITLIST CONTROL Manualised: initial information session Length: waited for 10 weeks and participated in all assessments
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Outcomes	1) Depression: RADS (Reynolds, 1986) (self report) 2) Depression: Modified BDI (Beck et al, 1961) (self report) 3) Depression: Interviews using the Bellevue Index of Depression (BID) (Petti, 1978) 4) Self concept: Rosenberg Self esteem Scale (RSES) (Rosenberg, 1965) 5) Anxiety: State Trait Anxiety Inventory (STAI) (Spielberger et al, 1970)
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Notes

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Sonis 1987

Methods	Was allocation sequence adequately generated: Unclear Was allocation adequately concealed: Unclear Were interventions blinded to participant/provider: Not possible Were outcome assessors blinded: Not possible for self-rated, unclear for clinician rated Were drop outs adequately described: No
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(Continued)

Was ITT analysis undertaken: Unclear
 Did authors report on all a-priori outcomes: No, only describe CDRS-R
 Other: Small N's. This is a cross over trial with several issues: 1) no description of how many participants were included in each intervention in each arm (i.e. not clear what the order of cross over was). 2) A cross over trial may be a questionable design in a disorder which is naturally remitting i.e. those who receive the interventions in the second phase may be experiencing a less severe disorder by the time the second phase is undertaken. 3) Unclear if a washout phase is appropriate in a naturally remitting disorder for the same reason. 4) No cross over carry over effects are reported. 5) Overall, due to reporting, no pure relaxation effect can be pulled out. Post hoc division of CDRS into 3 domains.
 Number randomised: 9 (with depression)
 Number dropped out: not stated

Participants Primary or Secondary depression: Primary
 (NOTE: only 9 had a depressive disorder, 5 had no diagnosis, 5 had ADD)
 How was depression defined: Diagnosis by Diagnostic Interview for Children & Adolescents (DICA) or Diagnostic Interview for Parents of Children & Adolescents (DICA-P) for DSM-III criteria; initial assessment also included the Children's Depression Rating Scale (CDRS-R), several self-report scales including the Children's Seasonal Symptom Checklist (SSCL-C, Sonis et al 1985) and the BDI, and several parent report measures including the revised Children's Behaviour Checklist (CBCL, Achenbach & Endelbrock 1983) and the Children's Seasonal Symptom Checklist for Parents (SSCL-P Sonis et al 1985).
 Setting: Study investigator located in university department. Interventions took place in the home
 Severity (overall): For MDD & SD combined 61.25 on the CDRS-R
 Age (overall): Child/adolescent - actual age not reported
 Sex (overall): M: 3 (33.3%), F: 6 (66.6%)
 Ethnicity: not stated
 Suicidality: not stated
 Comorbid anxiety: not stated
 Psychiatric comorbidity: not stated
 Recruitment strategy: Media
 Country: USA
 Criteria for trial entry: Everyone who answered the advertisement (which included some who were not depressed), no mental retardation IQ<70, no chronic medical conditions, not using medication that could affect cognition and/or mood, no ophthalmologic abnormalities

Interventions RELAXATION
 Type of relaxation: Relaxation imagery
 Individual/group: Individual
 Manualised: Yes - self selected tape followed by reading or homework for a total of 1 hour 45 minutes
 Delivered by: Self by tape
 Length of sessions: 15 minutes
 Number of sessions: 6
 Length of intervention: 1 week then 2 day washout
 How many sessions actually attended: Not stated
 Was it intended as intervention or control: Intervention
 Concurrent treatment: None
 LIGHT TREATMENT
 Type: Self exposure to 2500 lux of full spectrum light, instructions to sit 3 feet from light, glance at light once a minute
 Individual/group: Individual
 Manualised: Yes

Sonis 1987

(Continued)

Delivered by: Self
Length of sessions: 2 hours
Number of sessions: 6
Length of intervention: 1 week then 2 day washout
How many sessions actually attended: Not stated
Was it intended as intervention or control: Intervention
Concurrent treatment: None

Outcomes 1) Depression: Children's depression rating scale (CDRS-R) (Poznanski et al, 1984) (clinician rated)
2) Depression: Beck Depression Inventory (BDI) (Beck, 1972) (self rated)
3) Depression: Global Improvement Scale (GIS, Gittleman, 1984)

Notes

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Wilson 1982

Methods Was allocation sequence adequately generated: Unclear
Was allocation adequately concealed: Unclear
Were interventions blinded to participant/provider: Not possible
Were outcome assessors blinded: Not possible for self-rated, yes for clinician rated
Were drop outs adequately described: No
Was ITT analysis undertaken: No
Did authors report on all a-priori outcomes: Yes
Other: During the follow-up period there were significantly more subjects in the minimal contact group who received additional treatment than subjects in the other two conditions
Number randomised: 97
Number dropped out (overall): 33 during intervention (no breakdown of groups given)
Number dropped out (relaxation+placebo): 0 during follow-up
Number dropped out (psychological therapy+placebo): 1 during follow-up
Number dropped out (minimal contact+placebo) 1 during follow-up

Participants Primary or Secondary depression: Primary
How was depression defined: Cut-off score on depression scale, BDI \geq 20
Setting: Community
Severity (psychological therapy+placebo): BDI 27.22
Severity (minimal contact+placebo): BDI 25.00
Age (overall): 38.8
Sex (overall): M: 22(34.4%), F: 42 (65.6%)
Ethnicity: not stated
Suicidality: not stated
Comorbid anxiety (relaxation+placebo): Anxiety Scale: 30.36
Comorbid anxiety (psychological therapy+placebo): Anxiety Scale: 31.33

(Continued)

Comorbid anxiety (minimal contact+placebo): Anxiety Scale: 27.33
 Psychiatric comorbidity: not stated
 Recruitment strategy: Media
 Country: Australia
 Criteria for trial entry:
 Aged between 20 and 55, not in receipt of psychological or pharmacological treatment (except minor tranquillizers), self-reported duration of depression for at least 2 months, absence of other major disorders (psychosis, manic-depressive disorders, addictions, OCD, severe phobic states), no contra-indications for the use of antidepressant amitriptyline

Interventions

RELAXATION

Type of relaxation: Progressive muscle relaxation, closely following Bernstein & Borkovec (1973)
 Individual/group: Individual
 Manualised: Yes
 Delivered by: 3 graduate students in psychology and self for homework
 Length of sessions: 1 hour (40 minutes spent on relaxation), 30 minute daily practice encouraged
 Number of sessions: 7
 Length of intervention: 2 months
 How many sessions actually attended: Not stated for therapist sessions, home practice attended on average for approx. 30 minutes on 6 out of 7 days
 Was it intended as intervention or control: Intervention
 Concurrent treatment: Antidepressant placebo. Half of the subjects also received a 25 min. tape recording at end of treatment, to be used at home at least once a fortnight until follow-up

PSYCHOLOGICAL THERAPY

Type: Task assignment, designed to increase frequency, quality and range of activities and social interactions
 Individual/group: Individual
 Manualised: Yes
 Delivered by: Three graduate students in psychology
 Length of sessions: 1 hour
 Number of sessions: 7
 Length of intervention: 2 months
 How many sessions actually attended: Not stated
 Was it intended as intervention or control: Intervention
 Concurrent treatment: Antidepressant placebo. Half of the subjects also received a 25 min. tape recording at end of treatment, to be used at home at least once a fortnight until follow-up

MINIMAL CONTACT

Type: Non-directive therapy coinciding with supply of medication
 Individual/group: Individual
 Manualised: No
 Delivered by: Three graduate students in psychology
 Length of sessions: 1 hour
 Number of sessions: 2
 Length of intervention: 2 months
 How many sessions actually delivered: Not stated
 Was it intended as intervention or control: Control
 Concurrent treatment: Antidepressant placebo. Half of the subjects also received a 25 min. tape recording at end of treatment, to be used at home at least once a fortnight until follow-up

Outcomes

- 1) Depression: BDI (Beck et al, 1961) (self rated)
- 2) Depression and anxiety: Depression and Anxiety Scales (Lovibond, 1981) (self rated)

Wilson 1982

(Continued)

- 3) Depression (unobtrusive): Sentence Completion Test (Pace, 1977)
- 4) Phobic symptomatology: Modified version of Fear Survey Schedule II (Geer, 1965) (self rated)
- 5) Sleep quality: Sleep questionnaire (author devised) (self rated)
- 6) Positive reinforcement / activity frequency: Pleasant Events Schedule (self rated)

Notes There was also another treatment arm where each of the three treatment conditions (relaxation, psychological therapy, minimal contact) concurrently took an antidepressant, rather than placebo

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Wood 1996

Methods	Was allocation sequence adequately generated: Unclear Was allocation adequately concealed: Unclear Were interventions blinded to participant/provider: Not possible Were outcome assessors blinded: Not possible for self-rated, unclear for clinician rated Were drop outs adequately described: Yes Was ITT analysis undertaken: Yes Did authors report on all a-priori outcomes: Yes Number randomised: 53 Number dropped out (relaxation): 3 during intervention, 2 during 3 month follow up, 12 during 3-6 month follow-up Number dropped out (DTP): 2 during intervention, 2 during 3 month follow-up, 0 during 3-6 month follow-up
Participants	Primary or Secondary depression: Primary How was depression defined: Diagnosis using KSADS for a DSM-III-R diagnosis or RCD diagnosis of minor depression plus cut-off on depression scale MFQ > 15 Setting: Unclear - might assume outpatient at the children's hospital where they were recruited Severity (relaxation): MFQ - parent report 28.7 (11.6) Severity (DTP): MFQ - parent report 25.8 (9.8) Age (relaxation): 14.6 (1.6) Age (DTP): 13.8 (1.7) Sex (relaxation): M: 7 (29%), F: 17 (71% F) Sex (DTP): M: 8 (33%), F: 16 (67%) Ethnicity: not stated Suicidality: most suicidal Comorbid anxiety: not stated Psychiatric comorbidity (relaxation): 7 conduct disorder, 14 overanxious Psychiatric comorbidity (DTP): 4 conduct disorder, 13 overanxious Recruitment strategy: Consecutive outpatient clinic referrals Country: UK Criteria for trial entry: 9-17 years, no other psychiatric disorder, not an inpatient, not taking or likely to take antidepressants, able

Wood 1996*(Continued)*

to complete questionnaires, not autistic, not attending special school for learning problems, no major physical illness or epilepsy

Interventions	<p>RELAXATION Type of relaxation: Progressive muscle relaxation based on Bernstein & Borkoves (1973) Individual/group: Unclear, but assume individual Manualised: Yes Delivered by: Therapists Length of sessions: Unclear Number of sessions: 5-8 Length of intervention: Unclear How many sessions actually attended: 6.2 Was it intended as intervention or control: Control Concurrent treatment: None</p> <p>PSYCHOLOGICAL THERAPY Type: DTP - Depression Treatment Program (called a brief CBT intervention) which targets negative thinking, social relationships problems and symptoms such as sleeping difficulties and inactivity Individual/group: Individual Manualised: Yes Delivered by: Therapists who trained on at least 5 cases with supervision from a psychologist experienced in CBT before the trial and had 3 years experience in child psychiatry Length of sessions: Unclear Number of sessions: 5-8 Length of intervention: Unclear How many sessions actually attended: 6.4 Was it intended as intervention or control: Intervention Concurrent treatment: None</p>
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Outcomes	<ol style="list-style-type: none"> 1) Depression: Mood and Feelings Questionnaire (MFQ) (Angold et al, 1987) (self report) 2) Depression: Depression scale of the K-SADS (clinician rated) 3) Anxiety: Revised Children's Manifest Anxiety Scale (RCMAS) (Reynolds & Richmond, 1978) - child and parent 4) Self esteem: Warr and Jackson Scale (1985) Child and Parent 5) Conduct problems: Antisocial Behaviour Problems (ABS) (Olwevs, 1989) Child and Parent 6) Expectancy of treatment: Likert Scale (Marks, 1981) 7) Satisfaction: Likert Scale (Marks, 1981) 8) Clinical state: Clinical Global Improvement Scale (CGI) (clinician rated) 9) Functioning: GAS (Global Assessment Scale) (Shaffer et al, 1983) (clinician rated)
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Notes SE for MFQ estimated from Figure1. SDs imputed from SEs.

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

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

Study	Reason for exclusion
Broota 1990	Depression symptoms not measured on a validated, reliable depression symptom scale
Brown 1997	Non randomised study
Contreras 2006	Relaxation intervention was part of a CBT package
Corrado 1999	Participants not selected for diagnosed depression or high depression symptom score
DeBerry 1982	Participants not selected for diagnosed depression or high depression symptom score
DeBerry 1989	Participants not selected for diagnosed depression or high depression symptom score
DeVaney 1991	Participants not selected for diagnosed depression or high depression symptom score
Field 1998	Inadequate relaxation intervention
Goodwin 2004	Participants not selected for diagnosed depression or high depression symptom score
Halonen 1985	Participants not selected for diagnosed depression or high depression symptom score
Holland 1991	Participants had comorbid anxiety.
Keyes 1991	Participants not selected for diagnosed depression or high depression symptom score
Kirkpatrick 1977	Non randomised study
Klein 1985	Relaxation intervention based on yoga and meditation
Knubben 2007	Inadequate relaxation intervention
Krishnamurthy 2007	Relaxation intervention was based on yoga and participants not selected for diagnosed depression or high depression symptom score
Leppamaki 2002	Participants not selected for diagnosed depression or high depression symptom score
Leppamaki 2004	Participants not selected for diagnosed depression or high depression symptom score
Lolak 2005	Participants not selected for diagnosed depression or high depression symptom score
Maher 2002	Relaxation intervention arm was dropped from the trial
Parandeh 2006	Participants not selected for diagnosed depression or high depression symptom score
Partonen 1998	Participants not selected for diagnosed depression or high depression symptom score
Petersen 2002	Relaxation included as part of a broader intervention (counselling).
Richards 1988	Participants not selected for diagnosed depression or high depression symptom score
Roth 1987	Participants not selected for diagnosed depression or high depression symptom score
Shaw 1994	Participants not selected for diagnosed depression or high depression symptom score
Sloan 1981	Non randomised study

(Continued)

Study	Reason for exclusion
Sloman 2002	Participants not selected for diagnosed depression or high depression symptom score
Swenson 1986	Relaxation intervention based on hypnosis.
Warren 1995	Participants not selected for diagnosed depression or high depression symptom score
Watts 1988	Depression not measured as an outcome
Wetzel 1992	Data on relaxation group not presented

Characteristics of ongoing studies [ordered by study ID]

Baillon 2003

Trial name or title	Pilot study of the short-term effects of a multi-sensory environment (MSE) on elderly patients suffering from depression
Methods	
Participants	Primary or Secondary depression: Primary How was depression defined: Diagnosis of depressive illness Country: UK Criteria for trial entry: Aged 65+, capacity to give consent, and no organic brain syndrome, significant hearing impairment, significant sight impairment, suicidal ideation, ECT during course of trial, evidence of delirium or change in medication that will trigger withdrawal
Interventions	RELAXATION Two individual relaxation sessions over one week, intended as a control MULTI-SENSORY ENVIRONMENT (MSE) Two individual sessions in the MSE over one week, intended as intervention
Outcomes	Hospital Anxiety and Depression Scale (HADS) Beck Depression Inventory Visual Analog Scales of Mood Heart rate monitoring
Starting date	1 September 2003
Contact information	Sarah Baillon Research Fellow Psychiatry for the Elderly University Department of Health Sciences Leicester General Hospital Gwendolen Road Leicester LE5 4PW United Kingdom email: sfb5@le.ac.uk

Baillon 2003*(Continued)*

Notes

Krogh 2007

Trial name or title	The DEMO trial: A randomized, parallel-group, observer-blinded clinical trial of aerobic versus non-aerobic versus relaxation training for patients with light to moderate depression
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Methods

Participants	Primary or Secondary depression: Primary How was depression defined: Diagnosis of depressive illness Recruitment strategy: Physicians and the public informed through open meetings, newspapers, leaflets and television. Referrals from general practitioners, private practicing psychiatrists, psychologists, and psychiatric wards Setting: Community Country: Denmark Criteria for trial entry: Age 18-55 years; living in the vicinity of Copenhagen; depression (F32.0, F32.1, F33.0, ICD-10 verified F33.1); fluent in Danish; able to read and understand informed consent; no current substance or recreational drug abuse; no contraindications to physical exercise; not exercising more than 1 hour a week; no sick leave longer than 24 months; no suicidal behavior (<=2 on HAM-D17 item 3); not in early retirement
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Interventions	RELAXATION Type of relaxation: Combination of stretches, massage, balance exercises and progressive muscle relaxation exercises Individual/group: Group Manualised: Yes Delivered by: Highly qualified physiotherapists Length of sessions: 1.5 hours Number of sessions: 2 per week Length of intervention: 4 months Was it intended as intervention or control: Control Concurrent treatment: Some patients may be taking antidepressants EXERCISE Type: Aerobic exercise Individual/group: Group Manualised: Yes Delivered by: Highly qualified physiotherapists Length of sessions: 1.5 hours Number of sessions: 2 per week Length of intervention: 4 months Was it intended as intervention or control: Intervention Concurrent treatment: Some patients may be taking antidepressants EXERCISE Type: Non-aerobic exercise Individual/group: Group Manualised: Yes
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Krogh 2007

(Continued)

Delivered by: Highly qualified physiotherapists
Length of sessions: 1.5 hours
Number of sessions: 2 per week
Length of intervention: 4 months
Was it intended as intervention or control: Intervention
Concurrent treatment: Some patients may be taking antidepressants

Outcomes

- 1) Depression: Hamilton Depression Scale-17 (clinician rated), Beck Depression Inventory II (self rated), Montgomery-Asberg Depression Rating Scale (self-rated)
- 2) Anxiety: Hamilton Anxiety Scale
- 3) Psychopathology: Symptom Checklist (SCL-92)

Quality of Life: WHO-5
Lost days from work: Lost days from work during last 10 working days
Verbal intelligence: Danish Adult Reading Test
Attention: Digit Span (WAIS), Subtracting Serial Sevens
Visuomotor speed: Trail Making part A and B, Digit Symbol Test (WAIS-R)
Language: Verbal Fluency S and Animals
Memory: Buschke Selective Reminding Test, Rey Complex Figure Test
Biochemistry: cortisol, prolactin
Physical activity: Physical activity during work and leisure questionnaire by Saltin & Grimsby (1968)

Starting date February 2005

Contact information Jesper Krogh
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Notes

DATA AND ANALYSES

Comparison 1. Relaxation versus wait-list, no treatment or minimal treatment

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Depression scores - self rated post intervention	5	136	Std. Mean Difference (IV, Fixed, 95% CI)	-0.59 [-0.94, -0.24]
2 Depression scores - self rated follow-up (short-term)	2	48	Std. Mean Difference (IV, Fixed, 95% CI)	-0.74 [-1.34, -0.15]
3 Depression scores - self rated follow-up (long-term)			Std. Mean Difference (IV, Fixed, 95% CI)	Subtotals only
4 Depression scores - clinician rated post intervention	2	52	Std. Mean Difference (IV, Random, 95% CI)	-1.35 [-3.06, 0.37]
5 Depression scores - clinician rated follow-up (short-term)			Std. Mean Difference (IV, Fixed, 95% CI)	Subtotals only
6 Non response/remission - self rated post intervention	2	52	Risk Ratio (M-H, Fixed, 95% CI)	0.28 [0.14, 0.54]
7 Non response/remission - self rated follow-up (short-term)			Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
8 Non response/remission - clinician rated post intervention			Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
9 Dropouts during intervention	4	122	Risk Ratio (M-H, Random, 95% CI)	0.72 [0.08, 6.73]
10 Dropouts during follow-up (short-term)	2	54	Risk Ratio (M-H, Fixed, 95% CI)	1.01 [0.19, 5.29]
11 Dropouts during follow-up (long-term)			Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only

Comparison 2. Relaxation versus psychological treatment

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Depression scores - self rated post intervention	9	286	Std. Mean Difference (IV, Fixed, 95% CI)	0.38 [0.14, 0.62]
2 Depression scores - self rated follow-up (short-term)	6	192	Std. Mean Difference (IV, Fixed, 95% CI)	0.36 [0.07, 0.65]
3 Depression scores - self rated follow-up (long-term)	2	62	Std. Mean Difference (IV, Fixed, 95% CI)	0.11 [-0.39, 0.61]
4 Depression scores - clinician rated post intervention	3	72	Std. Mean Difference (IV, Fixed, 95% CI)	0.29 [-0.18, 0.75]
5 Depression scores - clinician rated follow-up (short-term)			Std. Mean Difference (IV, Fixed, 95% CI)	Subtotals only
6 Non response/remission - self rated post intervention	5	203	Risk Ratio (M-H, Fixed, 95% CI)	1.71 [1.25, 2.34]

7 Non response/remission - self rated follow-up (short-term)	3	89	Risk Ratio (M-H, Fixed, 95% CI)	1.88 [1.05, 3.34]
8 Non response/remission - clinician rated post intervention	3	104	Risk Ratio (M-H, Fixed, 95% CI)	1.96 [1.20, 3.22]
9 Non response/remission - clinician rated follow-up (short-term)			Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
10 Dropouts during intervention	8	289	Risk Ratio (M-H, Fixed, 95% CI)	1.59 [0.83, 3.05]
11 Dropouts during follow-up (short-term)	5	135	Risk Ratio (M-H, Fixed, 95% CI)	1.54 [0.43, 5.51]
12 Dropouts during follow-up (long-term)	2	73	Risk Ratio (M-H, Random, 95% CI)	2.72 [0.03, 251.39]

Comparison 3. Relaxation versus lifestyle and complementary treatments

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Depression scores - self rated post intervention			Std. Mean Difference (IV, Fixed, 95% CI)	Subtotals only
2 Dropouts during intervention			Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only

Comparison 4. Relaxation versus medication

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Depression scores - self rated post intervention	2	115	Std. Mean Difference (IV, Random, 95% CI)	-0.59 [-2.07, 0.89]
2 Depression scores - self rated follow-up (short-term)			Std. Mean Difference (IV, Fixed, 95% CI)	Subtotals only
3 Depression scores - clinician rated post intervention			Std. Mean Difference (IV, Fixed, 95% CI)	Subtotals only
4 Non response/remission - self rated post intervention			Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
5 Dropouts during intervention	2	127	Risk Ratio (M-H, Fixed, 95% CI)	0.71 [0.39, 1.31]

Comparison 5. Relaxation + medication versus medication alone

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Depression scores - self rated post intervention (SMD)	2	40	Std. Mean Difference (IV, Fixed, 95% CI)	-0.90 [-1.56, -0.24]
2 Depression scores - self rated post intervention (WMD)	2	40	Mean Difference (IV, Fixed, 95% CI)	-8.03 [-13.32, -2.74]
3 Depression scores - self rated follow-up (long-term, SMD)	1	20	Std. Mean Difference (IV, Fixed, 95% CI)	-0.02 [-0.90, 0.86]
4 Depression scores - self rated follow-up (long-term, WMD)	1	20	Mean Difference (IV, Fixed, 95% CI)	-0.20 [-9.18, 8.78]
5 Depression scores - clinician rated post intervention (SMD)	1	20	Std. Mean Difference (IV, Fixed, 95% CI)	-0.20 [-1.08, 0.68]
6 Depression scores - clinician rated post intervention (WMD)	1	20	Mean Difference (IV, Fixed, 95% CI)	-1.20 [-6.23, 3.83]
7 Non response/remission - self rated post intervention	1	20	Risk Ratio (M-H, Fixed, 95% CI)	0.05 [0.00, 0.72]
8 Non response/remission - clinician rated post intervention	1	20	Risk Ratio (M-H, Fixed, 95% CI)	1.13 [0.78, 1.63]
9 Dropouts during intervention			Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only

WHAT'S NEW

Last assessed as up-to-date: 12 August 2008

Date	Event	Description
21 July 2008	Amended	Converted to new review format.

HISTORY

Protocol first published: Issue 2, 2008

Review first published: Issue 4, 2008

Date	Event	Description
18 January 2007	New citation required and conclusions have changed	Substantive amendment

CONTRIBUTIONS OF AUTHORS

AJ, AM and SH devised the protocol. AJ and AM selected trials for inclusion. AJ, AM and SH all extracted trial information, quality information and outcome data from trials. AJ and SE entered data. AJ drafted text of review, with all authors providing comment and feedback.

DECLARATIONS OF INTEREST

Potential conflict of interest

SOURCES OF SUPPORT

Internal sources

- Orygen Youth Health Research Centre, University of Melbourne, Australia.

External sources

- No sources of support supplied