Effectiveness of complementary and self-help treatments for anxiety in children and adolescents

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ABSTRACT

Objective: To review the evidence for the effectiveness of complementary and self-help treatments for anxiety disorders and situational anxiety in children and adolescents.

Data sources: Systematic literature search using PubMed, PsycINFO and the Cochrane Library for 111 treatments up to February 2006.

Study selection: There were 11 treatments for which intervention studies had been undertaken and reported.

Data extraction: Studies on each treatment were reviewed by one author and checked by a second. A consensus was reached for level of evidence.

Data synthesis: Relevant evidence was available for bibliotherapy, dance and movement therapy, distraction techniques, humour, massage, melatonin, relaxation training, autogenic training, avoiding marijuana, a mineral–vitamin supplement (EMPower +) and music therapy. Findings from case–control studies, individual cohort studies or low quality randomised controlled trials indicated that several treatments may have potential to reduce anxiety, including bibliotherapy, massage, melatonin, and relaxation training.

Conclusions: Although some complementary and self-help treatments might be useful for children and adolescents with anxiety, they need to be tested adequately through randomised controlled trials before they could be recommended.

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In Australia, relatively low priority has been given to assessing the prevalence of anxiety disorders in children and adolescents or to identifying efficacious interventions for such mental health problems in these age groups. However, studies from other countries have assessed anxiety disorders as among the most common psychiatric illnesses in these age groups, estimated to affect between 12% and 20% of young people.[1,2] Common to all anxiety disorders is a state of fear, worry, or dread that greatly impairs the child's ability to function normally and is disproportionate to the circumstances at hand. Some disorders, such as school phobia and separation anxiety, are commonly experienced over a relatively short period in childhood, cause significant subjective distress for the child, and can contribute to persistent functional impairment through difficulties at school, with peers or at home. Other disorders, including social phobia and obsessive-compulsive disorder, which develop in childhood or more typically adolescence, can result in serious negative consequences for the child's or adolescent's development and self-esteem and cause severe and persistent disability.[3]

A systematic review of controlled trials concluded that cognitive behaviour therapy appears to be effective as an intervention for anxiety disorders in children and adolescents, although just over half of patients will improve with this treatment.[4] Selective serotonin reuptake inhibitors (SSRIs) are recognised as an efficacious treatment for obsessive-compulsive disorder in this age group.[5] It has been suggested that the increased risk of suicidal behaviour linked to depressed children's and adolescents' use of SSRIs may not apply in treating those with mental disorders other than depression.[6] Little is known about the efficacy of other pharmacological interventions for anxiety disorders in this age group.[1]

Complementary and alternative medicine (CAM) and self-help treatments that claim to relieve anxiety symptoms are more readily available to the individual, either by purchase in supermarkets, health food stores, and on the Internet, or by undertaking particular activities. Such treatments may be used by children and adolescents or given by their parents. There are few CAM and self-help treatments for anxiety in adults with evidence of efficacy,[7] and only minimal information is available publicly on the efficacy of such alternative treatments in reducing anxiety in children and adolescents.

Another reason for examining these treatments is that they are commonly used with children and adolescents. For example, a United States survey of children and adolescents attending an outpatient psychiatry clinic showed that 11% were using herbal medicines.[8] This use has implications for compliance with conventional treatments, as well as for potential drug interactions and adverse events.

This review summarises the evidence on CAM and self-help interventions as effective treatments for children and adolescents with anxiety disorders or situationally specific symptoms of anxiety, including test anxiety, anxiety relating to medical treatments, and specific children's fears (eg, fear of the dark). CAMs are treatments that are usually not supported in the dominant medical systems in Western countries, while self-help treatments are those which the individual is able to use without first seeking advice from a health care professional.

METHODS

A literature search was performed of CAM and self-help treatments previously reviewed for anxiety in adults.[7] PubMed, PsycINFO and the Cochrane Library were searched using the following terms: name of treatment AND (anxiety OR panic OR phobi* OR agoraphobi* OR post traumatic stress OR posttraumatic stress OR acute stress OR obsessive compulsive) AND (adolescen* or youth or young or children or juvenile or pediatric). The list of treatment terms used in the searches is available on request. The literature searches were performed up to February 2006, except for bibliotherapy, which was searched up to June 2006. Studies were included if participants were identified as children or adolescents, or if the mean age of participants was 19 years or younger. Included studies were required to assess interventions for anxiety disorders (formally diagnosed or highly symptomatic samples) or assess interventions for situational anxiety such as test anxiety, preoperative anxiety and specific children's fears. Studies were excluded if participants were healthy volunteers or had anxiety secondary to other problems (eg, learning disabilities, juvenile delinquents, and psychiatric inpatients).

The literature on each treatment was independently evaluated by a pair of reviewers according to the Oxford Centre for Evidence-based Medicine levels of evidence (see Box 1), who then reached a consensus. The level of evidence refers to the certainty with which conclusions can be drawn, rather than whether the evidence is supportive of a particular treatment. As such, an intervention that has been shown in a well designed study to be ineffective would be described as having a high level of evidence.

RESULTS

A large number of treatments either had no evidence or had evidence that failed to meet the inclusion criteria (Box 2). Only Level 4 or 5 evidence was available for some treatments (Box 3). Treatments with evidence at Level 3 or higher are reviewed below.

1 Levels of evidence according to the Oxford Centre for Evidence-Based Medicine

Level	Description
1a	Systematic review (with homogeneity) of randomised controlled trials (RCTs)
1b	Individual RCT (with narrow confidence interval)
1c	All or none*
2a	Systematic review (with homogeneity) of cohort studies
2b	Individual cohort study (including low-quality RCT)
2c	"Outcomes" research; ecological studies
3a	Systematic review (with homogeneity) of case–control studies
3b	Individual case–control studies
4	Case series (and poor quality cohort and case–control studies)
5	Expert opinion without explicit critical appraisal, or based on physiology, bench research or "first principles"

* All patients died before treatment became available, but some now survive with the treatment; or some patients died before the treatment became available, but none now die with the treatment. ◆

Bibliotherapy

Description: Bibliotherapy involves the use of books to reduce anxiety. Books include both stories read to the child and instruction manuals for adults on how to reduce the child's anxiety.

Rationale: Bibliotherapy relies on standard anxiety-reduction principles, such as exposure to anxiety-provoking situations, modelling of desired behaviour, and teaching of anxiety-coping strategies, but uses a book rather than a therapist.

Anxiety disorders or highly symptomatic samples

Review of effectiveness: There has been one randomised controlled trial (RCT) of bibliotherapy for anxiety disorders.[17] This involved children aged 6–12 years with a variety of disorders, who were randomly assigned to receive either standard group cognitive behaviour therapy, a bibliotherapy version of the same therapy which instructed parents in how to administer the treatment, or a wait-list control. The bibliotherapy for parents produced significant improvement in clinically assessed anxiety compared with wait-list control, but smaller effects than for standard group therapy. Gains were maintained at a 24-week follow-up.

Level of evidence: 1b.

Situational-specific anxiety

Review of effectiveness: One RCT has been carried out with primary school children with high school anxiety.[18] Children were randomly assigned either to sessions where they were read stories based on feelings and attitudes toward school or they were read control stories not about school. The children receiving bibliotherapy were found to have significantly higher school anxiety after therapy as indicated by a self-report questionnaire. However, there were no clinician or teacher assessments and intention-to-treat analysis was not conducted. A series of small trials has been

2 Treatments that did not have relevant evidence

Medicines and homoeopathic remedies

5-Hydroxy-L-tryptophan; American ginseng (*Panax quinquefolius*); ashwagandha (*Withania somnifera*); astragalus (*Astragalus membranaceus*); Bach flower remedies (including Rescue Remedy); Berocca; biotin; black cohosh (*Actaea racemosa* and *Cimicifuga racemosa*); borage (*Borago officinalis*); brahmi (*Bacopa monniera*); California poppy (*Eschscholtzia californica*); catnip (*Nepeta cataria*); cat's claw (*Uncaria tomentosa*); chamomile (*Anthemis nobilis*); chaste tree berry (*Vitex agnus castus*); Chinese medicinal mushrooms (reishi or Lingzhi) (*Ganoderma lucidum*); choline; chromium; coenzyme Q10; combined preparations (Empowerplus [Truehope Nutritional Support Ltd], euphytose, Mindsoothe Jr [Native Remedies], Sedariston, Suanzaorentang, Worry Free), cowslip (*Primula veris*); damiana (*Turnera diffusa*); dandelion (*Taraxacum officinale*); flax seeds (linseed) (*Linum usitatissimum*); γ-aminobutyric acid (GABA); ginger (*Zingiber officinale*); *Ginkgo biloba*; ginseng (*Panax ginseng*); gotu kola (*Centella asiatica*); glutamine; hawthorn (*Crataegus laevigata*); homoeopathy; hops (*Humulus lupulus*); hyssop (*Hyssopus officinalis*); inositol; kava (*Piper methysticum*); lecithin; lemon balm (*Melissa officinalis*); lemongrass leaves (*Cymbopogon citratus*); licorice (*Glycyrrhiza glabra*); magnesium; milk thistle (*Silybum marianum*); mistletoe (*Viscum album*); motherwort (*Leonurus cardiaca*); nettles (*Urtica dioica*); oats (*Avena sativa*); omega-3 fatty acids; *para*-aminobenzoic acid (PABA); passionflower (*Passiflora incarnata*); peppermint (*Mentha piperita*); phenylalanine; potassium; rehmannia (*Rehmannia glutinosa*); *S*-adenosylmethionine (SAM-e); schisandra (*Schisandra chinensis*); selenium; Siberian ginseng (*Eleutherococcus senticosus*); skullcap (*Scutellaria lateriflora*); spirulina (*Arthrospira platensis*); St Ignatius bean (*Ignatia amara*); St John's wort (*Hypericum perforatum*); taurine; tension tamer; tissue salts; tyrosine; valerian (*Valeriana officinalis*); vervain (*Verbena officinalis*); vitamins B and C; wild yam (*Dioscorea villosa*); wood betony (*Stachys officinalis*; *Betonica officinalis*); yeast; zinc; ziziphus (*Ziziphus spinosa*).

Physical treatments

Acupuncture; aromatherapy; hydrotherapy.

Psychological and lifestyle treatments

Adequate sleep; exercise; meditation; pleasant activities; prayer; tai chi; yoga.

Dietary and other changes

Alcohol avoidance; alcohol for relaxation; avoiding certain foods (barley, rye, wheat, sugar, dairy foods); caffeine avoidance; carbohydrate-rich protein-poor diet; ketogenic diet; nicotine avoidance. ◆

reported on bibliotherapy for fear of the dark,[19] but no details of results are given, so the findings are impossible to evaluate.

Level of evidence: 2b.

Conclusion: **Bibliotherapy instructing parents in how to treat anxiety disorders using cognitive behaviour therapy has a small benefit, but much less than therapist-delivered treatment.**

Dance and movement therapy

Description: Dance and movement therapy is a process of using movement to improve the physical and emotional integration of the individual.

Rationale: Dance and movement therapy offers the individual the opportunity to release tension and increase their enjoyment through relaxation. For individuals previously exposed to interpersonal trauma, including sexual abuse, it may provide an opportunity to exercise control over their personal space and recover a sense of control and ownership over their bodies.[20]

Anxiety disorders or highly symptomatic samples

Review of effectiveness: One study compared the effectiveness of 10 weekly group sessions of dance and movement therapy or a multimodal form of verbal therapy in reducing post-traumatic stress and other psychological disturbances in 18 adolescent girls in residential care who reported significant histories of childhood sexual abuse.[21] Neither dance and movement therapy nor verbal therapy was found to produce significant reductions in pre-treatment levels of post-traumatic stress and other measures.

Level of evidence: 3b.

Situational-specific anxiety

No studies.

Conclusion: **There is limited research on dance and movement therapy for reducing anxiety, with the only study to date indicating no effectiveness.**

Distraction techniques

Description: Distraction involves introducing an external stimulus (eg, audio or visual material), or using an internal technique (eg, thinking pleasant thoughts) to both compete and be incompatible with the anxiety response.

Rationale: The psychological and physiological mechanisms that regulate distraction are not clearly understood; however, distraction is hypothesised to divert attention away from the sensations and reactions to a noxious stimulus.

Anxiety disorders or highly symptomatic samples

No studies.

Situational-specific anxiety

Review of effectiveness: There have been three RCTs of distraction for managing anxiety during medical and dental procedures. In the first, children (aged 5–12 years) undergoing minor day surgery were randomly assigned to be accompanied to the pre-operative room by a clown doctor and a parent ($n = 20$) or parent only ($n = 20$).[22] The group exposed to the clown doctor reported lower anxiety during the induction of anaesthesia, and no change in anxiety between the waiting room (baseline) and preoperative room, which significantly increased for the control group. In the second trial,[23] 89 children (aged 3–8 years) undergoing a genital examination as part of a larger study of normal hymenal anatomy were randomly assigned to one of three distraction techniques: passive play (eg, being read to; $n = 26$), active play (singing, blowing bubbles; $n = 28$) and watching a movie via video eyeglasses, with audio delivered through an earpiece ($n = 35$). The subjects' behavioural distress was rated by a researcher not blind to the condition. The results indicated no differences between groups for verbal distress or requests for emotional support; however, physical distress (eg, body movements in reaction to the examination) were significantly less frequent for children in the active play and video eyeglasses conditions. In the final RCT,[24] 45 children (aged 4–6 years) who had undergone restorative dentistry (including local anaesthesia) in the previous weeks were randomly assigned on their second visit to receive upbeat music, relaxing music, or no music. At the conclusion of the session, there were no significant group differences on self-reported anxiety and pain, or heart rate.

Level of evidence: 1b.

Conclusion: **There is currently no consistent evidence that distraction is an effective treatment for reducing immediate situational anxiety in children. However, the trials to date have used small samples and often failed to include appropriate control conditions.**

3 Summary of treatments with Level 4 or 5 evidence only

	Anxiety disorders or highly symptomatic samples		Situational-specific anxiety	
Treatment	Evidence level	References	Evidence level	References
Autogenic training	No studies	—	5	9
Avoiding marijuana	4	10	No studies	—
Mineral–vitamin supplement (EMPower+)	4	11,12	No studies	—
Music therapy	4	13,14	4	15,16

Humour

Description: Humour involves a range of activities that help make children laugh. The types of activities that generate mirth will change as the child develops cognitively.

Rationale: Appropriate humour will reduce a child's level of anxiety before and during the period in which they receive major medical interventions and may allow these interventions to be undertaken more quickly and less painfully.

Anxiety disorders or highly symptomatic samples

No studies.

Situational-specific anxiety

Review of effectiveness: In a study of anxiety reduction for paediatric dental patients, 68 children aged between 7 and 11 years were randomly allocated to receive one of four conditions: humorous audio tape with dental theme, humorous tape without a dental theme, non-humorous tape, or no tape. Children used a

manual analogue scale to indicate their level of anxiety before treatment, during treatment, and after treatment. Treatment provided no additional benefit to the control in reducing levels of anxiety.[25]

Level of evidence: 1b.

Conclusion: **The only RCT which has tested humour has found no evidence that such an intervention is effective in reducing situational anxiety experienced by children.**

Massage

Description: Massage involves the external manipulation of soft tissue for therapeutic purposes.

Rationale: Massage is a traditional therapy, but there is research demonstrating that it can decrease the stress hormone cortisol.[26]

Anxiety disorders or highly symptomatic samples

Review of effectiveness: There has been one RCT of massage therapy.[27] Sixty children (mean age, 7.5 years) who were identified as manifesting classroom behaviour problems in the weeks following Hurricane Andrew, and who subsequently reported severe post-traumatic stress symptoms, were assigned to receive 30-minute massages or to watch relaxing videos for 30 minutes twice a week for a month. Massage was superior to the control condition for reducing self-reported state anxiety after the first and last sessions, and these benefits were sustained over the 4 weeks of the trial. No follow-up assessments were conducted.

Level of evidence: 1b.

Situational-specific anxiety

No studies.

Conclusion: **Massage has immediate and short-term effects on state anxiety; however, there are no controlled studies examining the effects of massage among children and adolescents with diagnosed anxiety disorders. Controlled trials are warranted in clinical samples.**

Melatonin

Description: Melatonin is secreted by the pineal gland in the brain and is important in the regulation of many hormones in the body. It can be bought in tablet form without prescription in some countries, but not in Australia.

Rationale: In adults, melatonin has been found to reduce anxiety before surgery.[28] Preoperative anxiety is associated with postoperative psychological and behavioural problems in children.[29,30]

Anxiety disorders or highly symptomatic samples

No studies.

Situational-specific anxiety

Review of effectiveness: There is limited study of melatonin supplements in children, and safety is not established. One randomised, double-blind, placebo-controlled study compared anxiety reduction, sedation, and postoperative behaviour in children aged 2–5 years after premedication with melatonin 0.1, 0.25 or 0.5 mg/kg or midazolam. Melatonin was as effective as midazolam and resulted in faster recovery and lower incidences of excitement and sleep disturbances postoperatively.[31] One report indicated melatonin may lower seizure threshold in some children.[32]

Level of evidence: 2b.

Conclusion: **There is only preliminary evidence for the efficacy of melatonin in reducing preoperative anxiety.**

Relaxation training

Description: Relaxation training covers a number of techniques designed to obtain a relaxation response.

Rationale: Relaxation induces a state that is incompatible with the physiological and psychological arousal that is experienced with anxiety.

Anxiety disorders or highly symptomatic samples

Review of effectiveness: Three controlled studies have examined the effectiveness of training in relaxation techniques in reducing trait anxiety levels in children assessed as moderately or highly anxious.[33-35] None of these studies found that this intervention produced significantly greater reductions in persistent anxiety compared with a control condition, although two studies did find that such training resulted in greater decreases in short-term anxiety.[34,35]

Level of evidence: 2b.

Situational-specific anxiety

Review of effectiveness: Two controlled studies in school children with marked test anxiety found no significant effects for either progressive muscle relaxation[36] or cue-controlled relaxation.[37]

Level of evidence: 2b.

Conclusion: **There is some evidence to suggest that training in relaxation techniques is effective in reducing short-term anxiety for children and adolescents. However, adequate RCTs are required before definitive conclusions can be drawn.**

DISCUSSION

Similar to findings of a review of CAM and self-help treatments for depression in children and adolescents,[38] there are few studies of adequate quality that have examined CAM and self-help treatments that assist these age groups in dealing with situational anxiety or anxiety disorders. Situational-specific anxiety may be reduced by providing massage, relaxation training or melatonin supplements, and bibliotherapy instructing parents in how to deal with children's anxiety disorders may assist in reducing anxiety. However, there have been case reports of melatonin lowering seizure threshold. There is some weak evidence to suggest that other treatments may be effective; for example, autogenic training for situational anxiety and mineral–vitamin supplements for anxiety disorders, but without controlled trials, recommendations concerning these treatments cannot be made.

A recent Australian study found that use of CAMs for a range of health conditions experienced by children is relatively common.[39] The lack of good quality research on this topic will not deter families and individuals using CAM and self-help treatments in attempts to alleviate health problems, including symptoms of anxiety, but will mean that decisions concerning use of these types of treatments are likely to be poorly informed and inaccurate. The potential for such self-selected treatments to interact with more orthodox treatments prescribed by medical practitioners is also an issue of concern. Clinicians' regular enquiries concerning their patients' use of CAM and self-help treatments, including discus-

sions concerning such treatments that could be potentially harmful, may help reduce this risk. However, the benefits of such discussions depend on their being informed by accurate information drawn from soundly conducted trials concerning the efficacy of such treatments. The information on the benefits of CAM and self-help treatments for mental health problems that is most easily accessed at present through the Internet is commonly not of such quality.[40]

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COMPETING INTERESTS

None identified.

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