

Acupuncture for anxiety and anxiety disorders

– a systematic literature review

Karen Pilkington, Graham Kirkwood, Hagen Rampes, Mike Cummings, Janet Richardson

Abstract

Introduction The aim of this study was to evaluate the evidence for the efficacy of acupuncture in the treatment of anxiety and anxiety disorders by systematic review of the relevant research.

Methods Searches of the major biomedical databases (MEDLINE, EMBASE, CINAHL, PsycINFO, Cochrane Library) were conducted between February and July 2004. Specialist complementary medicine databases were also searched and efforts made to identify unpublished research. No language restrictions were imposed and translations were obtained where necessary. Study methodology was appraised and clinical commentaries obtained for studies reporting clinical outcomes.

Results Twelve controlled trials were located, of which 10 were randomised controlled trials (RCTs). Four RCTs focused on acupuncture in generalised anxiety disorder or anxiety neurosis, while six focused on anxiety in the perioperative period. No studies were located on the use of acupuncture specifically for panic disorder, phobias or obsessive-compulsive disorder. In generalised anxiety disorder or anxiety neurosis, it is difficult to interpret the findings of the studies of acupuncture because of the range of interventions against which acupuncture was compared. All trials reported positive findings but the reports lacked many basic methodological details. Reporting of the studies of perioperative anxiety was generally better and the initial indications are that acupuncture, specifically auricular acupuncture, is more effective than acupuncture at sham points and may be as effective as drug therapy in this situation. The results were, however, based on subjective measures and blinding could not be guaranteed.

Conclusions Positive findings are reported for acupuncture in the treatment of generalised anxiety disorder or anxiety neurosis but there is currently insufficient research evidence for firm conclusions to be drawn. No trials of acupuncture for other anxiety disorders were located. There is some limited evidence in favour of auricular acupuncture in perioperative anxiety. Overall, the promising findings indicate that further research is warranted in the form of well designed, adequately powered studies.

Keywords

Acupuncture, systematic review, anxiety, anxiety disorders.

Introduction

Anxiety has been defined as a 'persistent feeling of dread, apprehension and impending disaster or tension and uneasiness'.¹ The term 'anxiety disorders' is used as an umbrella term for a number of conditions including panic disorder, phobias, obsessive-compulsive disorder, generalised anxiety, traumatic stress disorder and anxiety disorder due to a general medical condition. Severe anxiety can affect the individual's ability to carry out the activities of normal life and individuals with generalised

anxiety disorder have prominent anxiety which is persistent and undue. Symptoms including both physical and mental symptoms may last for months, recur regularly and be worsened by stressful events.²

The World Health Organisation estimated in 2004 that 1% of all disability adjusted life years lost in the world is due to post-traumatic stress disorder, obsessive-compulsive disorder and panic disorder combined.³ Prevalence of anxiety disorders in the UK in 2000 was as follows: mixed anxiety and depressive disorder 88/1000; generalised anxiety

Karen Pilkington
senior research fellow
School of Integrated
Health
University of
Westminster
London, UK

Graham Kirkwood
research assistant
Division of
Epidemiology
Public Health and
Primary Care Medicine
Imperial College
London, UK

[previously]
Research Council for
Complementary
Medicine
London, UK

Hagen Rampes
consultant psychiatrist
Barnet, Enfield &
Haringey Mental Health
NHS Trust
Northwest Community
Mental Health Team
Edgware, Middlesex
UK

Mike Cummings
medical director
British Medical
Acupuncture Society
London, UK

Janet Richardson
*reader in nursing and
health studies*
Faculty of Health and
Social Work
University of Plymouth
Plymouth, Devon, UK

Correspondence:
Karen Pilkington

K.Pilkington@
westminster.ac.uk

disorder 44/1000; all phobias 18/1000; obsessive-compulsive disorder 11/1000; and panic disorder 7/1000.⁴ Recent guidelines recommend that generalised anxiety disorder and panic disorder are treated with either selective serotonin reuptake inhibitors (SSRI), cognitive behavioural therapy or various self-help measures.⁵

A survey of UK general practitioners, however, suggested that 'stress' or anxiety constitutes an 'effectiveness gap' or an area of clinical practice in which available treatments are not fully effective.⁶ In fact, anxiety and other mental health problems such as depression and insomnia are amongst the most common reasons for individuals to seek treatment with complementary therapies. In 1998, Eisenberg et al reported that 42.7% of adults with anxiety in the US had used complementary therapies in the previous year, while Davidson and colleagues found that overall 25.3% of cohorts of patients in the UK and USA attending complementary medicine centres met the criteria for at least one anxiety disorder.^{7,8} A high rate of use of complementary therapies in the USA among adults who met criteria for common psychiatric disorders was reported by Unutzer et al, with respondents with panic disorder particularly likely to report use.⁹ Kessler et al reported that 56.7% of those with anxiety attacks had used complementary and alternative medicine (CAM) in the previous year.¹⁰ 65.9% of those seen by a conventional practitioner had also used CAM therapies to treat their anxiety and the perceived helpfulness of CAM therapies was similar to that of conventional therapies. Use of acupuncture was relatively low (0.7%) compared with that of relaxation techniques, herbal and nutritional supplements, massage and spiritual healing.

There has been considerable research interest in acupuncture for the management of a range of conditions, as demonstrated by the number of reviews currently listed on the Cochrane database (<http://www.nelh.nhs.uk/cochrane>). It has been suggested that the true scope of the effects of acupuncture are far from clear and the variety of mechanisms that contribute to many conditions suggest that other indications may be identified.¹¹ Anxiety is often associated with problems that are treated with acupuncture, such as pain, nausea, drug or nicotine addiction, and depression. However, a previous review of the literature on acupuncture for

anxiety and depression located only a single randomised controlled trial (RCT) which focused specifically on anxiety.¹² A more recent review of the evidence on various complementary therapies in anxiety disorders also located one RCT.¹³ The authors concluded that there was 'promising evidence that acupuncture can effectively reduce the symptoms of anxiety in individuals with anxiety neuroses' and that further investigation was justified.

The aim of this study was to evaluate the evidence on the efficacy of acupuncture for the treatment of anxiety and anxiety disorders by systematically reviewing the relevant research.

Methods

Searches

Searches were conducted on the following databases: CINAHL, Cochrane Central Register of Controlled Trials (CENTRAL), Cochrane Database of Systematic Reviews, Database of Abstracts of Reviews of Effects, EMBASE, MEDLINE (and PubMed), PsycINFO, Acubriefs, AMED, CISCOM archive. All searches were conducted between February and July 2004 and covered databases from their inception. The basic search terms for acupuncture included (exp acupuncture/ or exp acupuncture therapy/ or acupuncture.mp. or acupressure.mp. or electroacupuncture.mp) and those for anxiety were (exp anxiety/ or exp anxiety disorders/ or exp anxiety disorder/ or anx\$.mp). Additional terms were required on several databases. These terms were (agoraphobi* or (neurocirculatory next astheni*) or (obsessive next compulsive) or obsessive-compulsive or panic or phobi* or (stress next disorder*) or (combat next disorder*). Search strategies were adapted for each of the databases searched. Efforts were made to identify unpublished and ongoing research using relevant databases (UK National Research Register and US Clinicaltrials.gov website) together with experts in the field.

Selection of studies

Two reviewers (GK, KP) carried out this process independently, selecting articles based on title, abstract and indexing terms. Notes were compared and in cases of disagreement the full texts of these articles were also retrieved for examination prior to a final decision. Only controlled studies (randomised and non-randomised) were selected for inclusion in this

review. No language restrictions were imposed at the search and filtering stage and basic translations were obtained for any potentially relevant studies in languages other than English. Studies had to include participants (adults or children) with anxiety or an anxiety disorder who were treated with acupuncture (either traditional or Western medical) including ear acupuncture and electroacupuncture or acupressure. Studies of anxiety related to comorbid medical or physical conditions were excluded.

Data collection and analysis

Data were extracted systematically by two researchers (GK, KP) independently, using a specially designed data extraction form. Data extracted included study type, details of selection criteria and procedure, the participants, the intervention and any comparison or control intervention and outcome measures and results. The quality of the trials based on key criteria (randomisation, blinding and reporting of dropouts) was assessed independently by two researchers (GK, KP). Any disagreements or discrepancies were resolved by discussion. Additional criteria recommended by the NHS Centre for Reviews were also assessed.¹⁴ These included concealment of allocation and whether the following were conducted: check on blinding, comparison of baseline characteristics, power calculation, intention-to-treat (ITT) analysis, and information on compliance and co-interventions reported. Clinicians with relevant training and experience (an experienced Western medical acupuncturist, an acupuncturist with experience of traditional Chinese medicine [TCM] approaches and a psychiatrist) assessed studies for appropriateness of the acupuncture intervention, the control or comparator and outcome measures. For studies in languages other than English, initial data extraction was conducted by GK and KP and the quality assessment was carried out after translation and extraction of additional information.

Results

A total of 919 records were retrieved by the initial searches. A first screening of these and removal of duplicates resulted in the exclusion of 809 records as not relevant. Two previous systematic reviews of acupuncture in anxiety were located, each of which included a single trial. The first included a trial by Eich et al published in German,^{12,15} while the second

described a trial by Lui et al, which was reported in two publications.^{13,16,17} Of the remaining 108 records, the majority addressed anxiety related to an ongoing medical, physical or psychological condition (other than an anxiety disorder) or the measurement of anxiety levels in such patients, or were not clinical trials of effectiveness, or were not focused on mixed anxiety and depression, and were excluded. The full text versions of 24 potential trials of acupuncture in anxiety were retrieved for further analysis resulting in the exclusion of another 12 studies. A total of 12 studies remained: four randomised controlled trials (RCTs) and two non-randomised controlled clinical trials (CCTs) in patients with generalised anxiety disorder or anxiety neurosis;^{15,16,18-21} and six RCTs in patients with situational anxiety.²²⁻²⁷ The final group of excluded studies included trials without a control group,²⁸⁻³⁷ a presentation of techniques and theories on acupuncture in psychiatry,³⁸ and a study of transcutaneous electrical stimulation at acupuncture points in phobia and obsessive-compulsive disorder.³⁹

Details of the included studies are presented in Tables 1 and 2 with quality assessments based on Jadad criteria,⁴⁰ and the additional criteria recommended by the Centre for Reviews and Dissemination.¹⁴

Generalised anxiety disorder and anxiety neurosis

Randomised controlled trials

Liu et al conducted a large randomised controlled trial in which 240 patients with anxiety neurosis were allocated to one of three treatments: acupuncture (n=80), behavioural desensitisation (BD, n=80) and acupuncture combined with behavioural desensitisation (n=80).¹⁶ One to four courses of treatment were provided with a course consisting of 10 sessions. Acupuncture was given on alternate days using 3-6 points chosen from *Zusanli* (ST36), *Neiguan* (PC6), *Tianshu* (ST25), *Taichong* (LR3), *Shenshu* (BL23), *Mingmen* (GV4) and *Quchi* (LI11) plus four ear points, *Xin* (MA-IC), *Shen* (MA-SC), *Shenmen* (Heart), *Neifenmi* (MA-IC3). The acupuncture prescriptions were selected 'according to traditional therapy and authors' experience'. Behavioural desensitisation was provided twice weekly by Western-trained psychologists. Participants were reported to suffer from panic disorder or generalised

Table 1 Summary of studies: acupuncture or acupressure for clinical anxiety

Study	Design	Diagnosis (method)	Acupuncture treatment	Control	Outcome measure(s)	Results	Method scores*	Additional criteria*
Eich et al 2000 (German)	RCT N=56 Patients attending psychiatric clinic in German hospital	Minor depression (n=43), GAD (n=13) (ICD 10)	Acupuncture at 5 points (n=28) Total of 10 sessions	Sham acupuncture at points on head, hand and foot (n=28)	Response rate (CGI) HAMA, HAMD	Acupuncture 60.7%, sham 21.4% (P<0.01) after 10 sessions. NS after 5. GAD: 6/7 patients in acupuncture and 2/6 in sham group responded	R: 1 RM: 0 BP: 1 BA: 1 RA: 1	Baseline comparison: 1 Check on blinding: 0 Power calculation: 0 ITT: 1 Compliance: 0
Lanza 1986	CCT N=24 Setting unclear Duration: 6m-3y	Anxiety neurosis (unknown)	Acupuncture with electromyograph biofeedback (EMG BFB) (n=12) Treatment regimen unclear	EMG BFB only (n=12)	Improvement: MMPI, STAI X-1	Greater improvement in acupuncture group No P-values reported	R: 0 RM: 0 BP: 0 BA: 0 RA: 0	Baseline comparison: 0 Check on blinding: N/A Power calculation: 0 ITT: 0 Compliance: 0
Liu et al 1998a, b	RCT (triple arm) N=240 Setting unclear. Duration 2w-16y	Anxiety neurosis (Zung scores >50)	1) Individualised acupuncture only (n=80) 2) Acupuncture plus BD (n=80) On alternative days for total of 10 sessions (1-4 courses provided)	3) Behavioural desensitisation (BD) only (n=80)	Cure rates (clinical symptoms+ Zung scores)	Acupuncture 20%, Acupuncture/BD, 52.5%, BD 26.3%. Acupuncture/BD higher (P<0.01)	R: 1 RM: 0 BP: 0 BA: 0 RA: 0	Baseline comparison: 0 Check on blinding: N/A Power calculation: 0 ITT: 0 Compliance: 0 Co-intervention: Moxibustion
Wang et al 2003 (Chinese)	RCT N=39 Chinese hospital Duration: 6m-2+y	GAD (CCDM-III, HAMA scores >14, SAS/SDS scores >50)	Electroacupuncture (n=20) Once daily for six weeks	Trazodone 100-150mg per day in 2 doses (n=19)	Effectiveness rate (symptoms + HAMA)	Acupuncture 65%, drug 58% (difference NS)	R: 1 RM: 0 BP: 0 BA: 0 RA: 0	Baseline comparison: 1 Check on blinding: 0 Power calculation: 0 ITT: 0 Compliance: 0
Zhang et al 2003	RCT N=296 Inpatients and outpatients at mental health centre/hospital Duration: 1m-6y	Anxiety neurosis (CCMD-2, SAS-CR >50)	Acupuncture (n=157) 2 of these 4 methods: 1) Baihui (GV20), Neiguan (PC6), Renzhong (GV26) and Sanyinjiao (SP6) 2) 2-3 Back-shu points and 5 emotion points 3) 5 points for tranquilisation and controlling emotion 4) Chinese herbal injections at Back-shu points Once daily for 6 days with one day interval for total of 30 sessions	Doxepin 25mg three times daily then modified by response (n=139)	Cure rates: (clinical symptoms, SAS-CR)	Acupuncture 94.3%, drug 96.4% NS between groups (P>0.05)	R: 1 RM: 0 BP: 0 BA: 0 RA: 0	Baseline comparison: 0 Check on blinding: 0 Power calculation: 0 ITT: 0 Compliance: 0 Co-interventions: Chinese herbal injection (Tian Ma and Dang Gui)
Zhou 2003 (Chinese)	CCT N=100 Setting: unclear Duration: 2m-30y	Anxiety neurosis (CCMD-2-R [M])	Acupuncture plus combination of flupentixol and melitracen with oryzanol (n=50). Once daily for 10 days, 5 day interval, 3 courses	Combination of flupentixol and melitracen with oryzanol only (n=50)	Cure rates subjective assessment by doctors	Acupuncture plus drug 96%, drug only group 64% (P<0.01)	R: 0 RM: 0 BP: 0 BA: 0 RA: 0	Baseline comparison: 1 Check on blinding: 0 Power calculation: 0 ITT: 0 Compliance: 0

*Scoring: 0 = no/unknown, 1 = yes/adequate

Abbreviations: method scores: R (randomised), RM (method of randomisation), BP (blinding of patients), BA (blinding of assessors), RA (reporting of attrition);

Other abbreviations: w = week, m = month, y = year; CCDM/CCMD = China Criteria for Classification and Diagnosis of Mental Diseases; CGI = Clinical Global Impression; GAD = generalised anxiety disorder; HAMA = Hamilton Anxiety Scale; HAMD = Hamilton Depression Scale; ICD = International Classification of Disease; ITT = intention to treat; MMPI = Minnesota Multiphasic Personality Inventory; NS = nonsignificant; SAS-CR = Self-rating Anxiety Scale modified (no further details), SSDS = self-rating scale for depression, STAI-X-1 = State-Trait Anxiety Inventory (State);

Table 2 Summary of studies: acupuncture or acupressure for situational anxiety

Study	Design	Diagnosis (method)	Acupuncture treatment	Control	Outcome measure(s)	Results	Method scores *	Additional criteria*
Kober et al 2003	RCT N=36	Anxiety related to hospital transfer	Bilateral auricular acupressure at a 'relaxation' point (superior lateral wall of the triangular fossa) (n=17)	Bilateral auricular acupressure at a sham point (tip of the concha) (n=19)	VAS anxiety scale	Acupressure group less anxious on arrival at hospital (P=0.002)	R: 1 RM: 1 ^a BP: 1 BA: 1 RA: 1	Baseline comparison: 1 Check on blinding: 1 Power calculation: 1 ITT: 1
Lewis 1987	RCT (triple arm) N=90	Anxiety related to elective surgery	1) Auricular acupressure at zone of relaxation on earlobe (n=30) 2) Diazepam 10mg (n=30) 3) Progressive relaxation (n=30)	2) Diazepam 10mg (n=30) 3) Progressive relaxation (n=30)	Patient/observer assessment of anxiety. Dose of induction anaesthesia Physiological measures	Anxiety between groups NS. Reduction in sweating (acupuncture P<0.005), pulse rate (relaxation P<0.01).	R: 1 RM: 0 BP: 0 BA: 0 RA: 0	Baseline comparison: 1 Check on blinding: 0 Power calculation: 0 ITT: 0
Uskok 1995 (Italian)	RCT N=40	Pre-operative anxiety (gynaecological surgery)	Acupuncture bilateral at Neiguan, auricular Shenmen, Jarricot's anti-anxiety points (n=20)	Diazepam 10mg (n=20)	STAI Physiological measures	Acupuncture more effective (P<0.001)	R: 1 RM: 0 BP: 0 BA: 0 RA: 1	Baseline comparison: 1 Check on blinding: 0 Power calculation: 0 ITT: 0
Wang and Kain 2001	RCT (triple arm) N=55	Anxiety in operating room staff	1) Bilateral auricular acupuncture at Shenmen point (n=22) 2) At relaxation point (superior lateral wall of the triangular fossa) (n=15)	3) At a sham point (tip of the concha) (n=18)	STAI Physiologic measures	Relaxation group less anxious at 30 mins (P=0.007), 24 hrs (P=0.035) Other measures NS	R: 1 RM: 0 BP: 1 BA: 1 ^b RA: 0	Baseline comparison: 1 Check on blinding: 0 Power calculation: 0 ITT: 0
Wang et al 2001	RCT N=91	Preoperative anxiety	1) Bilateral auricular acupuncture at 3 TCM points (kidney, heart, Shenmen) (n=31) 2) At 3 relaxation points (relaxation point, tranquiliser point, master cerebral point) (n=32)	3) At three points unrelated to anxiety (finger, shoulder, extraneous points) (n=27)	STAI	Relaxation group significantly less anxious than control (P=0.01) TCM group NS.	R: 1 RM: 0 BP: 1 BA: 1 RA: 0	Baseline comparison: 1 Check on blinding: 0 Power calculation: 1 ITT: 0
Wang et al 2004	RCT N=67 pairs (mothers/children)	Anxiety in mothers of children who undergo surgery	Auricular acupuncture at 3 anxiety relieving (relaxation) points as above (n=34)	Auricular acupuncture at sham points (extraneous point, scaphoid fossa zone 2, wrist, scaphoid fossa zone 5, shoulder) (n=33)	STAI Physiological measures (mother), MYPAS (child) Other measures NS	Acupuncture: lower maternal anxiety: (P=0.014), lower children's anxiety: (P= 0.03).	R: 1 RM: 1 BP: 1 BA: 1 RA: 0	Baseline comparison: 1 Check on blinding: 0 Power calculation: 1 ITT: 1

*Scoring: 0 – no/unknown, 1 – yes/adequate

Abbreviations for method scores: R (randomised), RM (method of randomisation), BP (blinding of patients), BA (blinding of assessors), RA (reporting of attrition).

Other abbreviations: MYPAS – Modified Yale Preoperative Anxiety Scale; NS – nonsignificant; STAI – State-Trait Anxiety Inventory; VAS – Visual Analogue Scale.

Notes: ^a – sealed envelopes used but sequence generation not described; ^b – described as blinded but potential for unmasking

anxiety disorder and had Zung scores (a method of self assessment of anxiety with possible scores ranging from 20 to 80) greater than 50 initially. Outcome was measured by 'cure rates' which were based on 'disappearance of clinical symptoms' plus a Zung score of <45. The authors reported that the combined treatment group had a significantly greater improvement rate than the other two groups after a course of 10 sessions although all patients were reported to have improved: percentage cured 20% (acupuncture only), 26.3% (BD only) and 52.5% (combined therapy). The acupuncture provided was close to normal clinical practice and patients with these symptoms are very prevalent in practice. However, there was relatively little scope for individualisation as the points available for treatment were limited. Follow up was appropriate in length, but was only applied to a selected sample (20 per group) and the selection criteria were not explained. Overall, the quality of the methods, and adequacy of reporting of the methods, was not sufficient to draw firm conclusions, and the clinical significance of these results is unclear.

A well-designed RCT involving patients diagnosed by ICD 10 criteria with minor depression (n=43) or generalised anxiety disorder (n=13) was conducted by Eich et al.¹⁵ Participants were randomly allocated to receive either body acupuncture at five points (*Baihui* GV20, *Sishencong*, *Shenmen* HT7, *Neiguan* PC6, *Shenmai* BL62) or sham acupuncture for a total of 10 sessions provided by an experienced TCM practitioner. Treatment response was defined as a significant improvement in clinical global impression (CGI) with a score of two or three (values of more than three were defined as treatment failure). The authors report that the acupuncture group showed a significantly larger clinical improvement than sham ($P<0.05$) after 10 sessions but not after five sessions. There were significantly more responders in the acupuncture group compared with the sham group (60.7% vs 21.4%, $P<0.01$). Of those patients diagnosed with generalised anxiety disorder, six of seven in the acupuncture group were reported to have responded and two of six receiving sham acupuncture. Four of the verum group and eight of the sham group withdrew due to pain and restlessness.

Two Chinese studies compared acupuncture with drug therapy.^{18:19} The first was a small trial of 39 patients with generalised anxiety disorder diagnosed

according to the CCDM-III, the China Criteria for Classification and Diagnosis of Mental Diseases, equivalent to the DSM-IV.¹⁸ Electroacupuncture at four points (*Yintang*, *Baihui* GV20, *Xuanlu* GB5 and *Fengchi* GB20) for a total duration of 45 minutes daily was compared with a Western anti-anxiety drug (trazodone at 100-150mg per day). After six weeks of treatment, no differences in response either as anxiety measured on the Hamilton Anxiety scale (HAMA) or in cure rates were detected. Cure was defined as reduction of HAMA to <8 with no symptoms while a marked effect was defined as reduction in symptoms with HAMA reduction of 50% or more. In the acupuncture group, two of 20 patients were considered cured, with a marked effect on 11 while in the drug therapy group, one was 'cured' and there was a marked effect on 10. The electroacupuncture treatment used in this study involved considerable practitioner time (adjustments every 10 minutes) and is likely to be impracticable for daily use.

The second trial was over a shorter period of time (4-5 weeks) but involved a significantly larger sample (n=296).¹⁹ Acupuncture therapy was compared with doxepin in patients with anxiety neurosis diagnosed according to CCMD-II criteria. The acupuncture was based on semi-standardised TCM methods. Patients were treated with any two of four acupuncture treatment methods, one of which included herbs. Treatment was given once a day for six days per week for a total of 30 sessions. Outcomes were measured on the SAS-CR (described as a modified Self rating Anxiety Scale) and no significant differences were found between groups in SAS-CR scores or in total effective rates. Total effective rates, based on numbers of patients showing some improvement in clinical symptoms, were reported as 94.3% and 96.4% for the treatment and control groups respectively but the method of assessing improvement was not clearly described. Neither study demonstrated any difference between drug therapy and the acupuncture intervention in terms of effective rate/response. However, the first trial was possibly too small to detect a difference and blinding of patients was obviously impossible for both studies. The use of different acupuncture interventions together with herbs in some patients made interpretation of the effects of acupuncture impossible in the second trial.

Controlled trials (non-randomised)

Lanza compared acupuncture on four points based on TCM (*Xingjian* LR2; *Taichong* LR3; *Daling* PC7; *Baihui* GV20) combined with electromyograph biofeedback (EMG BFB) with EMG BFB alone in 24 patients with anxiety neurosis.²⁰ Outcomes were measured with MMPI (Minnesota Multiphasic Personality Inventory) and STAI X-1 (State Trait Anxiety Inventory, state subscale). However, although the authors suggest that there is some evidence of superior results for the combined intervention, the quality of reporting of this study is insufficient to draw any conclusions and use of the MMPI seems inappropriate.

Acupuncture therapy combined with drug therapy (a combination of flupentixol and melitracen with oryzanol) was compared with drug therapy alone in 100 participants diagnosed with anxiety neurosis by the CCMD2-R [M], the Chinese equivalent of the DSM-IV.²¹ Acupuncture was given daily for 10 days using a range of points (HT7, PC6, DU20, DU24, EX-HN1, EX-HN3, EX-HN5, EX-HN22, GB13, GB8, LR3, SP6, KI3, BL15, BL20, BL18, BL23) and the treatment consisted of three of these 10 day courses, with a five day break between courses. Cure rate was reported to be significantly greater in the acupuncture plus drug group than in the drug only group (96% vs 64%, $P < 0.01$). However, while the groups were well matched at baseline, the response was based on subjective assessment by physicians and the drug combination is not recommended in current treatment guidelines for anxiety.⁵ Two adverse events were reported for each group.

Situational anxiety

A series of trials have been conducted assessing the efficacy of acupuncture for anxiety related to the perioperative period. The first was an RCT involving 90 patients due to undergo elective surgery involving various procedures (gynaecological, general, urological, eye, ENT and dental surgery). Auricular acupressure was compared with diazepam and with progressive relaxation for preoperative anxiety.²³ No difference was demonstrated between the three interventions based on subjective assessment of anxiety by the patient and an observer. However, it is unclear whether the trial had sufficient power to detect a difference in this outcome. There was also no difference in doses of anaesthetic drug, systolic blood

pressure or pulse rate but there was a highly significant difference in palmar sweating ($P < 0.005$) and the authors suggest this indicates better control of anxiety with acupuncture.

Uskok et al also conducted an RCT comparing a single treatment with acupuncture 30 minutes before surgery with a single dose of diazepam for preoperative anxiety related to gynaecological surgery.²⁴ On this occasion, acupuncture was found to be more effective, based on STAI scores taken 30 minutes after treatment. In both the above studies, blinding of patients and carers was obviously not feasible and assessment in the latter study was by STAI only (a self reported outcome measure).

Wang and Kain compared bilateral auricular acupuncture at a relaxation point, a 'sham' point (tip of the concha) and at the *Shenmen* point in a small group of operating room staff.²⁵ Press needles were inserted and retained for 48 hours. Acupuncture at a relaxation point was found to be more effective at 30 minutes and at 24 hours, based on STAI and physiological measures, than the other two interventions, and better than the *Shenmen* intervention at 48 hours ($P = 0.042$). However, the sham intervention was likely to elicit a response since the point used was a secondary choice for treating anxiety. This is a potentially simple and safe intervention but there was the possibility for unmasking participants, and the study was conducted in hospital staff with borderline low or moderate anxiety levels.

In a second study, Wang and colleagues employed a similar technique but in this case used three TCM points, three relaxation points or three points unrelated to anxiety.²⁶ The results of this larger and adequately powered study ($n = 91$) suggested that auricular acupuncture at relaxation points was more effective based on STAI. No physiological measures were taken in this study and the effect sizes appear relatively small.

A similar study by Kober et al focused on anxiety related to hospital transfer.²² In a well designed trial, a single treatment of bilateral auricular acupressure at a 'relaxation' point was found to be more effective than bilateral acupressure using a sham point in patients suffering from gastrointestinal illnesses but with no pain. This appears a potentially simple and safe intervention but outcomes were measured using a visual analogue scale only and the trial was small ($n = 36$).

Summary points

Acupuncture is used to treat anxiety and anxiety disorders

This systematic review analysed 12 controlled trials

Four RCTs in generalised anxiety disorder are positive, but of poor quality and difficult to interpret

Six RCTs in perioperative anxiety show benefit, particularly using auricular acupuncture

The most recent study involved mothers of children about to undergo an operation.²⁷ Sixty-seven pairs of mothers and children were enrolled in the study which was well designed with adequate randomisation, allocation concealment and blinding of assessors. Auricular acupuncture at anxiety relieving points (n=34) was compared with auricular acupuncture at sham points (n=33) at least 30 minutes before induction of anaesthesia. Mothers were assessed using the STAI, while children were assessed by MYPAS (Modified Yale Preoperative Anxiety Scale). Maternal anxiety in the acupuncture group was significantly lower and children were also significantly less anxious.

Of the six RCTs described above, four used the STAI scale as the primary outcome measure.²⁴⁻²⁷ In Uskok's study, STAI scores fell from a mean of 55 to 45 although baseline scores were higher than those of the control group initially.²⁴ Wang and Kain report a percentage change from 100% at baseline to 85% at 30 minutes,²⁵ while in the 2001 study of Wang et al scores fell from 47 to 38 for the TCM points and 46 to 35 for the relaxation points (ie to approximately 80% of baseline scores).²⁶ In the 2004 study, the effect size appeared smaller (from 45 to 43) although the score increased in those in the control group over the same period.²⁷ Scores over 40 on the STAI are suggestive of moderate anxiety levels. A meta-analysis was not conducted because of the heterogeneity of the participant groups and interventions.

A separate assessment of adherence to the STRICTA guidelines was not conducted, but the data extraction and quality assessment processes indicated that – while needling details, treatment regimen and the control treatment were well-reported – the overall rationale was rarely presented comprehensively, and nor were details of the background, training and experience of the practitioners.

Discussion

Ten RCTs of acupuncture in anxiety were located, four of generalised anxiety disorder or anxiety neurosis and six of situational anxiety. Generally positive results were found for both types of anxiety but no studies of acupuncture for other anxiety disorders were located. It is difficult to interpret the findings of the studies in generalised anxiety disorder or anxiety neurosis because of the range of interventions against which acupuncture is compared and lack of details on methodology. The interventions also varied in terms of the degree of individualisation of treatment. In some cases cure rates appeared unrealistically high. Where acupuncture was compared with drug therapy, no difference was found,^{18,19} which could be due to the interventions being equally effective or to the studies being insufficiently powered for a valid assessment of equivalence. In the study comparing acupuncture with sham acupuncture, only a small number of the participants were diagnosed with an anxiety disorder, the majority suffering from mild depression.¹⁵

The quality of reporting of the studies of perioperative anxiety was generally better and the initial indications are that acupuncture, specifically auricular acupuncture, is more effective than acupuncture at a sham point. However, several studies used non-validated anxiety scales or an overall subjective assessment of effectiveness based on symptoms, and blinding could not be guaranteed as a check of blinding was only carried out in one study. It is also unclear how relevant the findings from studies in acute anxiety situations such as the preoperative period relate to chronic conditions such as generalised anxiety disorder.

In conclusion, there is currently insufficient evidence from research on acupuncture in the treatment of specific anxiety disorders for firm conclusions to be drawn. However, there are promising results in the management of situational anxiety and the positive findings reported for generalised anxiety indicate that further research is warranted. Studies are required to answer the question of whether acupuncture is efficacious for anxiety either as a sole treatment or as an adjunct to other established treatment approaches. In order to fully assess the efficacy of any acupuncture intervention for these conditions, studies need to address and report

Table 3 Research recommendations based on gap in the evidence identified by a systematic review of acupuncture in anxiety

Issues to consider	Generalised anxiety disorder (GAD)	Situational anxiety
E Evidence	4 RCTs and 2 CCTs of poor methodological quality in GAD	4 RCTs of acupuncture vs various control treatments in perioperative anxiety
P Population	Diagnosed GAD particularly if unresponsive to conventional treatment	Acute situational anxiety eg in perioperative situations
I Intervention	Optimal acupuncture intervention is unclear (expert consensus process may be required to develop active and sham treatments)	Single session of auricular acupuncture
C Comparison	Either sham acupuncture or routine care (appropriate drug therapy)	Acupuncture at sham point(s)
O Outcome	STAI or equivalent validated anxiety scale	As GAD plus physiological measures
T Time stamp	February 2007	As GAD
d Disease burden	Prevalence of anxiety disorders in the UK in 2000 was as follows: mixed anxiety and depressive disorder 88/1000, generalised anxiety disorder 44/1000	
t Timeliness	Duration of intervention recommended at least 30 days Length of follow-up recommended at least 6 months	Duration as appropriate eg prior to the procedure Length of follow-up short-term (pre to post procedure only)
s Study type	Appropriately powered RCTs but initial exploratory studies to define appropriate interventions are required	Appropriately powered RCTs

Abbreviations: CCT – controlled clinical trial; RCT – randomised clinical trial; STAI – State Trait Anxiety Index.

on a range of aspects of the therapy. These include: physiological aspects, such as how long needles should be left in body and which method of stimulation is to be preferred; and contextual aspects, for example, the philosophical background of the acupuncturist and the specific diagnostic framework used. Specific research recommendations are listed in Table 3, following the format proposed by Brown et al.⁴¹

Acknowledgements

The authors would like to thank: Anelia Boshnakova, Information Specialist, NLH CAM Specialist Library for advice and support with search strategies and searches; Mark Bovey, Acupuncturist and Co-ordinator, Acupuncture Research Resource Centre (ARRC), Thames Valley University, London for providing clinical comments; Hugh Maguire, Trials Search Co-ordinator, Cochrane Depression, Anxiety and Neurosis Group, King's College Institute of Psychiatry, London; Dr Volker Scheid, Research Fellow, School of Integrated Health, University of Westminster, London and Prof Jianping Liu and Dr Fei Yutong at Beijing University of Chinese Medicine for help with locating and translating studies in languages other than English; Veronica Tuffrey, Senior Lecturer, School of Integrated Health, University of Westminster for advice and comments on statistical issues; The Project Advisory Group and Specialist Advisory Group (mental health) for the NHS Priorities Project for advice and support on

the project. The NHS Priorities Project is funded by the Department of Health. The views and opinions expressed are those of the authors and do not necessarily reflect those of the Department of Health.

Reference list

- Churchill R, Barbui C, Furukawa T, Gilbody S, Hatcher S, Hazell P *et al*. Depression, Anxiety and Neurosis Group. *About The Cochrane Collaboration (Cochrane Review Groups (CRGs))* 2003; Issue 1. Art. No: DEPRESSN.
- Jenkins R. *Introduction to generalised anxiety*. WHO UK Collaborating Centre 2005. National Library for Health. Mental Health Specialist Library. <http://www.library.nhs.uk/mentalhealth/ViewResource.aspx?resID=79787&tabID=288> (accessed 8 May 2006).
- World Health Organisation. The world health report 2004 – changing history. <http://www.who.int/whr/2004/en/index.html> (accessed 8 May 2006).
- Office for National Statistics. *Psychiatric Morbidity among Adults living in Private Households, 2000: Summary Report*. London: HMSO, 2000.
- National Institute for Health and Clinical Excellence. Anxiety: management of anxiety (panic disorder, with or without agoraphobia, and generalised anxiety disorder) in adults in primary, secondary and community care. Clinical Guideline 22 (CG022). National Institute for Health and Clinical Excellence 2004. <http://www.nice.org.uk/page.aspx?o=cg022niceguideline> (accessed 8 May 2006).
- Fisher P, van Haselen R, Hardy K, Berkovitz S, McCarney R. Effectiveness gaps: a new concept for evaluating health service and research needs applied to complementary and alternative medicine. *J Altern Complement Med* 2004;10(4):627-32.
- Eisenberg DM, Davis RB, Ettner SL, Appel S, Wilkey S, Van Rompay M *et al*. Trends in alternative medicine use in the United States, 1990-1997: results of a follow-up national survey. *JAMA* 1998;280(18):1569-75.

8. Davidson JR, Rampes H, Eisen M, Fisher P, Smith RD, Malik M. Psychiatric disorders in primary care patients receiving complementary medical treatments. *Compr Psychiatry* 1998;39(1):16-20.
9. Unutzer J, Klap R, Sturm R, Young AS, Marmor T, Shatkin J et al. Mental disorders and the use of the alternative medicine: results from a national survey. *Am J Psychiatry* 2000;157(11):1851-7.
10. Kessler RC, Soukup J, Davis RB, Foster DF, Wilkey SA, Van Rompay MI et al. The use of complementary and alternative therapies to treat anxiety and depression in the United States. *Am J Psychiatry* 2001;158(2):289-94.
11. Rainone F. Acupuncture for mental health. In: Muskin PR, editor. *Complementary and alternative medicine and psychiatry*. (Review of Psychiatry, Vol 19). Washington: American Psychiatric Press; 2000. p. 67-105.
12. ARRC (Acupuncture Research Resource Centre). *Depression, Anxiety and Acupuncture. Briefing paper no 9* 2002.
13. Jorm AF, Christensen H, Griffiths KM, Parslow RA, Rodgers B, Blewitt KA. Effectiveness of complementary and self-help treatments for anxiety disorders. *Med J Aust* 2004;181(7 Suppl):S29-46.
14. NHS Centre for Reviews and Dissemination. Report Number 4. 2nd ed. *Undertaking Systematic Reviews of Research on Effectiveness*. York: NHS CRD; 2001.
15. Eich H, Agelink MW, Lehmann E, Lemmer W, Klieser E. [Acupuncture in patients with minor depression or generalized anxiety disorders – Results of an experimental study]. *Fortschr Neurol Psychiatr*.2000;68(3):137-44.
16. Liu GZ, Zang YJ, Guo LX, Liu AZ. Comparative study on acupuncture combined with behavioural desensitisation for treatment of anxiety neuroses. *Am J Acupunct* 1998;26(2-3):117-20.
17. Liu G, Zhang Y, Liu A. Observation of the curative effect of acu-moxibustion plus systematic desensitization on anxiety neurosis. *Shanghai J Acupuncture Moxibustion* 1998;17(4):17-8.
18. Chao-Ying W et al. The electroacupuncture treatment of 20 cases of anxiety disorder. *Hunan Journal of Chinese Medicine* 2003;3:26. (abstracted and translated by Wolfe HL. Anxiety Disorder & Electroacupuncture. Blue Poppy Press 2003).
19. Zhang H, Zeng Z, Deng H. Acupuncture treatment for 157 cases of anxiety neurosis. *J Tradit Chin Med* 2003;23(1):55-6.
20. Lanza U. The contribution of acupuncture to clinical psychotherapy by means of biofeedback (EMG-BFB) training. *Acupunct Electrother Res* 1986;11(1):53-7.
21. Zhou ZH, Yu WY, Wu ZH, Wu BX, Dai XY. [Clinical Observation on Treatment of Anxiety Neurosis with Combined Acupuncture and Medicine]. *Shanghai Journal of Acupuncture and Moxibustion* 2003; 22(6):9-10.
22. Kober A, Scheck T, Schubert B, Strasser H, Gustorff B, Bertalanffy P, et al. Auricular acupressure as a treatment for anxiety in prehospital transport settings. *Anesthesiology* 2003;98(6):1328-32.
23. Lewis GB. An alternative approach to premedication: comparing diazepam with auriculotherapy and a relaxation method. *Am J Acupunct* 1987;15(3):205-14.
24. Uskok M, D'Aquila MG, Buscaglia G, Porro B, Mereto N, Gastaldo P, et al. [Acupuncture versus diazepam as premedication in gynecological surgery]. *Gazz Med Ital* 1995;154(3):97-100.
25. Wang SM, Kain ZN. Auricular acupuncture: a potential treatment for anxiety. *Anesth Analg* 2001;92(2):548-53.
26. Wang SM, Peloquin C, Kain ZN. The use of auricular acupuncture to reduce preoperative anxiety. *Anesth Analg* 2001;93(5):1178-80.
27. Wang SM, Maranets I, Weinberg ME, Caldwell-Andrews AA, Kain ZN. Parental auricular acupuncture as an adjunct for parental presence during induction of anesthesia. *Anesthesiology* 2004;100(6):1399-404.
28. Apchel VY. Dependence of the antistressor effect of acupuncture on the functional state of aqualangers. *Hum Physiol* 1996;22(2):254-6.
29. De Nicola A, Donnarumma G, Sorrentino F, Russo G. [Therapeutic possibilities of acupuncture in anxiety neurosis]. *Annali di Neuropsichiatria Psicoanalisi* 1979;26(1-4):56-9.
30. Dong Jiang T. Research on the reduction of anxiety and depression with acupuncture. *Am J Acupunct* 1993;21(4):327-30.
31. Grenet Cordoves ES, Benavides Oramas L, Crespo Dominguez E, Salom Pino A. [Anxiety and acupuncture]. *Revista del Hospital Psiquiatrico de la Habana* 1988;29(2):263-72.
32. Guo N, Nie H. Electroacupuncture treatment for 30 cases of anxiety neurosis. *J Tradit Chin Med* 2004;24(2):124-5.
33. Hai RH, Chen XZ, Jing J. [Effects of electroacupuncture on personality and behavior pattern of the patient with generalized anxiety disorder]. *Chinese Acupuncture & Moxibustion* 2004;24(3):165-6.
34. Kochetkov VD, Dallakian IG, Mikhailova AA, Belitskaia RA, Afanas'eva VK. [Reflexotherapy of asthenic conditions in neuroses]. *Zh Nevropatol Psikhiatr Im S S Korsakova* 1988;88(2):102-6.
35. Lo CW, Chung QY. The sedative effect of acupuncture. *Am J Chin Med* 1979;7(3):253-8.
36. Markelova VF, Belitskaia RA, Mikhailova AA, Shumova OV. [Serotonergic and catecholaminergic indices in patients with neurotic and depressive disorders and changes in them as a result of reflexotherapy]. *Zh Nevropatol Psikhiatr Im S S Korsakova* 1986;86(11):1708-12.
37. Spence DW, Kayumov L, Chen A, Lowe A, Jain U, Katzman MA et al. Acupuncture increases nocturnal melatonin secretion and reduces insomnia and anxiety: a preliminary report. *J Neuropsychiatry Clin Neurosci* 2004;16(1):19-28.
38. Roccia L, Rogora GA. [Acupuncture and relaxation]. *Minerva Med* 1976;67(29):1918-20.
39. Yamashita T, Fujimoto K, Aoi K, Shimura E, Kubo K. A study of psychopathology in phobia and obsessive-compulsive disorder: through the treatment of exposure and response prevention by transcutaneous electrical stimulation. *Japanese. Seishin Shinkeigaku Zasshi* 1991;93(8):645-73.
40. Jadad AR, Moore RA, Carroll D, Jenkinson C, Reynolds DJ, Gavaghan DJ et al. Assessing the quality of reports of randomized clinical trials: is blinding necessary? *Control Clin Trials*.1996;17(1):1-12.
41. Brown P, Brunnhuber K, Chalkidou K, Chalmers I, Clarke M, Fenton M et al. How to formulate research recommendations. *BMJ* 2006; 333(7572): 804-6.

Copyright of *Acupuncture in Medicine* is the property of British Medical Acupuncture Society and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.