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Anxiety

Overview

Background

Accurate information about the incidence and prevalence of anxiety disorders is difficult to obtain; a survey by the Office of National Statistics (ONS 2000) found that 164 people per 1,000 had a neurotic disorder in the week before interview, which represents about 1 in 6 of all adults. They found that the most prevalent neurotic disorder among the population as a whole was mixed anxiety and depressive disorder (88 people per 1,000).

Anxiety disorders include generalised anxiety disorder, panic disorder, phobias, obsessive compulsive disorder (OCD) and post traumatic stress disorder (NICE 2007; Clinical Evidence 2007). They can be chronic and cause considerable distress and disability; if left untreated, are costly to both the individual and society (NICE 2007). As well as emotional symptoms such as worry, disturbed sleep, irritability and poor concentration, anxiety can cause physical symptoms such as sweating, nausea, diarrhoea, dry mouth, palpitations, shortness of breath, dizziness, cold hands, muscle tension and aches, trembling and twitching (American Psychiatric Association, 2000; WHO 2007). Also, the symptoms of many physical conditions can become worse with stress, for example, irritable bowel syndrome, migraines and tension headaches, and back pain (Clinical Evidence 2007).

Treatments recognised as useful for anxiety disorders include psychological therapies such as cognitive behavioural therapy (CBT) and applied relaxation, and medication such as some antidepressants and benzodiazepines (NICE 2007). All the drug treatments have side effects, and many may cause withdrawal or discontinuation symptoms (British National Formulary 2009).

Clinical Evidence

There is surprisingly little research with a primary focus on acupuncture for generalised anxiety disorder. Those studies published so far are mostly small and methodologically flawed, hence the reluctance of reviewers to draw conclusions (Pilkington 2010; Pilkington 2007). The best evidence for acupuncture's effectiveness (Pikington 2010; Pilkington 2007) comes in specific acute anxiety situations such as around medical operations (Mora 2007; Wang 2007; Gioia 2006) or dentistry (Karst 2007).

There are also preliminary positive findings for treating chronic anxiety associated with post-traumatic stress disorder (Hollifield 2007), substance misuse (Chae 2008; Courbasson 2007; Grusser 2005), eating disorders (Fogarty 2010), hyperventilation (Gibson 2007), asthma (Scheewe 2008), insomnia (Nordio 2008), post-stroke ((Wu 2008),

musculo-skeletal pain (Hansson 2007; He 2005) and various other conditions where anxiety has been measured as a secondary rather than primary outcome.

Acupuncture can be safely combined with conventional treatments such as medication or psycho-educational therapy, possibly enhancing their beneficial effects (Courbasson 2007) and reducing unwanted side-effects (Yuan 2007).

Although the overall evidence is patchy, it does lie promisingly in a positive direction, and, given the very low level of side effects and lack of demonstrably superior outcomes from other interventions, acupuncture could be considered as one possible therapeutic option alongside the existing repertoire. (See references).

Potential Mechanisms

In general, acupuncture is believed to stimulate the nervous system and cause the release of neurochemical messenger molecules. The resulting biochemical changes influence the body's homeostatic mechanisms, thus promoting physical and emotional well-being. Research has shown that acupuncture treatment may specifically benefit anxiety disorders and symptoms of anxiety by:

- Acting on areas of the brain known to reduce sensitivity to pain and stress, as well as promoting relaxation and deactivating the 'analytical' brain, which is responsible for anxiety and worry (Hui 2010).
- Regulating levels of neurotransmitters (or their modulators) and hormones such as serotonin, noradrenaline, dopamine, GABA, neuropeptide Y and ACTH; hence altering the brain's mood chemistry to help to combat negative affective states (Lee 2009; Samuels 2008; Zhou 2008; Yuan 2007).
- Stimulating production of endogenous opioids that affect the autonomic nervous system (Arranz 2007). Stress activates the sympathetic nervous system, while acupuncture can activate the opposing parasympathetic nervous system, which initiates the relaxation response.
- Reversing pathological changes in levels of inflammatory cytokines that are associated with anxiety (Arranz 2007)
- Reversing stress-induced changes in behaviour and biochemistry (Kim 2009).

References

Research	Conclusion
Reviews	
Pilkington K. Anxiety, depression and acupuncture: A review of the clinical research. Auton Neurosci. 2010 Oct 28;157(1-2):91-5.	Updated the 2007 anxiety review and located 3 further Chinese trials for generalised anxiety disorder. These found acupuncture to be similarly effective to drugs but had small sample sizes. Overall the review concluded that the trials are too heterogeneous and of insufficiently high quality to be able draw firm conclusions. There is promising evidence for acute, short-term anxiety but the relevance of this to chronic anxiety conditions is unknown.
Samuels N et al. Acupuncture for psychiatric illness: a literature review. Behav Med 2008; 34: 55-64.	A literature review of acupuncture for psychiatric illness, which presents research that found acupuncture to increase central nervous system hormones, including ACTH, beta-endorphins, serotonin, and noradrenaline. It concludes that acupuncture can have positive effects on depression and anxiety.
Pilkington K et al. Acupuncture for anxiety and anxiety disorders – A systematic literature review. Acupuncture in Medicine 2007; 25: 1-10.	A systematic review (search to July 2004) including 12 controlled trials that evaluated the evidence for the efficacy of acupuncture in the treatment of anxiety and anxiety disorders. Ten of the trials were randomised, four focused on acupuncture in generalised anxiety disorder or anxiety neurosis, and 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. The reviewers concluded that there are positive findings for acupuncture in the treatment of generalised anxiety disorder or anxiety neurosis but that there was insufficient evidence for firm conclusions, and that there was some limited evidence in favour of ear acupuncture for perioperative anxiety.
Clinical studies	
Wang JJ et al. [Randomized controlled study on influence of acupuncture for life quality of patients with chronic fatigue syndrome]. Zhongguo Zhenjiu 2009a; 29: 780-4.	A randomised controlled trial to observe effects of acupuncture on quality of life in 70 patients with chronic fatigue syndrome. Patients were allocated to treatment with 'real' acupuncture or sham acupuncture, three times a week. Individuals' own perception of their health condition and total score were significantly improved after treatment in the observation group (all $P<0.05$). There were no adverse effects reported. The researchers concluded that acupuncture can improve the quality of life of patients with chronic fatigue syndrome.

Research	Conclusion
Clinical studies	
Wang JJ et al. [Randomized controlled clinical trials of acupuncture treatment of chronic fatigue syndrome]. [Chinese]. Chen Tzu Yen Chiu Acupuncture Research 2009b; 34: 120-4.	In the same trial, the researcher observed the effects of acupuncture on the amount of fatigue experienced by the patients. After the treatments, this had decreased significantly from baseline in both groups. Real acupuncture resulted in a greater reduction in mental fatigue than sham acupuncture, but the change in physical fatigue was similar in the two groups. The researchers concluded that acupuncture can relieve physical and mental fatigue in patients with chronic fatigue syndrome.
Wang JJ et al. [Randomized controlled clinical trials of acupuncture treatment of chronic fatigue syndrome]. [Chinese]. *Chen Tzu Yen Chiu Acupuncture Researc*h 2009b; 34: 120-4.	In the same trial, the researcher observed the effects of acupuncture on the amount of fatigue experienced by the patients. After the treatments, this had decreased significantly from baseline in both groups. Real acupuncture resulted in a greater reduction in mental fatigue than sham acupuncture, but the change in physical fatigue was similar in the two groups. The researchers concluded that acupuncture can relieve physical and mental fatigue in patients with chronic fatigue syndrome.
Yiu YM et al. A clinical trial of acupuncture for treating chronic fatigue syndrome in Hong Kong. *Journal of Chinese Integrative Medicine* 2007; 5(6): 630-3.	A randomised controlled trial to evaluate the efficacy of acupuncture in 99 patients with chronic fatigue syndrome. Patients were allocated to 'real' or sham acupuncture. Improvements in physical and mental fatigue and quality of life were seen in both groups, but the improvements in the treatment group were significantly bigger than in the control group ($p<0.01$ to <0.05). No adverse events occurred. The researchers concluded that acupuncture is a safe, effective treatment for chronic fatigue syndrome.
Li Y et al. The therapeutic effects of electrical acupuncture and auricular-plaster in 32 cases of chronic fatigue syndrome. *Journal of Traditional Chinese Medicine* 2006; 26(3): 163-4.	A randomised controlled trial to compare the therapeutic effects of electroacupuncture and auricular-plaster therapy against oral hydrocortisone in 64 patients with chronic fatigue syndrome (CFS). The total effective rates were 93.75% in the acupuncture group and 75.00% in the control group, with a statistically significant difference between the two groups ($P<0.05$). The researchers concluded that electroacupuncture and auricular-plaster therapy may show a better anti-fatigue effect than that of hydrocortisone.

Research	Conclusion
Clinical studies	
Huang Y et al. Clinical observation on the effects of Bo's abdominal acupuncture in 40 cases of chronic fatigue syndrome. *Journal of Traditional Chinese Medicine* 2008; 28(4): 264-6.	An observational study on the effect of acupuncture in 40 patients with chronic fatigue syndrome. Treatment was given once a day for 2 weeks, and scores for symptoms and fatigue were compared before and after treatment. After treatment, scores for symptoms, mental condition and neural feeling associated with fatigue were significantly reduced (P<0.01-0.05). The researchers concluded that acupuncture has a good general effect on the complex symptoms of chronic fatigue syndrome, especially on lassitude, anorexia, insomnia, amnesia, diarrhoea, and general pain.
Guo J. Chronic fatigue syndrome treated by acupuncture and moxibustion in combination with psychological approaches in 310 cases. *Journal of Traditional Chinese Medicine* 2007; 27(2): 92-5.	An observational study on the clinical therapeutic effect of acupuncture and moxibustion combined with a psychological approach on chronic fatigue syndrome in 310 patients. In all, 275 patients (88.7%) were clinically cured, 28 cases (9%) improved, and 7 cases (2.3%) did not get better. The researchers concluded that acupuncture plus moxibustion combined with a psychological approach is an effective therapy for chronic fatigue syndrome.
Physiology studies (animals and humans)	
Cheng CH et al. Endogenous Opiates in the Nucleus Tractus Solitarius Mediate Electroacupuncture-induced Sleep Activities in Rats. *Evid Based Complement Alternat Med* 2009 Sep 3. [Epub ahead of print]	Animal study investigating the involvement of the NTS opioidergic system in electroacupuncture-induced alterations in sleep, the findings of which suggested that mechanisms of sleep enhancement may be mediated, in part, by cholinergic activation, stimulation of the opiodergic neurons to increase the concentrations of beta-endorphin and the involvement of the μ-opioid receptors.
Komori M et al. Microcirculatory responses to acupuncture stimulation and phototherapy. *Anesth Analg* 2009; 108(2): 635-40.	Experimental study on rabbits, in which acupuncture stimulation was directly observed to increase diameter and blood flow velocity of peripheral arterioles, enhancing local microcirculation.
Zhao ZQ. Neural mechanism underlying acupuncture analgesia. *Prog Neurobiol* 2008; 85(4): 355-75.	Review article that discusses the various peripheral and central nervous system components of acupuncture anaesthesia in detail.

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Physiology studies (animals and humans)	
Kavoussi B, Ross BE. The neuroimmune basis of anti-inflammatory acupuncture. Integr Cancer Ther 2007; 6(3): 251-7.	Review article that suggests the anti-inflammatory actions of traditional and electro-acupuncture are mediated by efferent vagus nerve activation and inflammatory macrophage deactivation.
Physiology studies (animals and humans)	
Spence et al. Acupuncture increases nocturnal melatonin secretion and reduces iInsomnia and anxiety: a preliminary report. J *Neuropsych Clin Neurosciences* 2004; 16: 19-28.	Study in 18 anxious adults with insomnia that found a significant ($p = 0.002$) nocturnal increase in endogenous melatonin secretion after 5 weeks of acupuncture, as well as significant improvements in polysomnographic measures of sleep onset latency ($p = 0.003$), arousal index ($p = 0.001$), total sleep time ($p = 0.001$), and sleep efficiency ($p = 0.002$).
Zijlstra FJ et al. Anti-inflammatory actions of acupuncture. *Mediators Inflamm* 2003; 12(2): 59-69.	Review article that suggests a hypothesis for anti-inflammatory action of acupuncture: Insertion of acupuncture needles initially stimulates production of beta-endorphins, CGRP and substance P, leading to further stimulation of cytokines and NO. While high levels of CGRP have been shown to be pro-inflammatory, CGRP in low concentrations exerts potent anti-inflammatory actions. Therefore, a frequently applied 'low-dose' treatment of acupuncture could provoke a sustained release of CGRP with anti-inflammatory activity, without stimulation of pro-inflammatory cells.
Wu MT et al. Central nervous pathway for acupuncture stimulation: localization of processing with functional MR imaging of the brain–preliminary experience. *Radiology* 1999; 212: 133-41.	Experimental study using fMRI to characterise the central nervous system pathway for acupuncture stimulation, which found that acupuncture activates structures of descending antinocioceptive pathway and deactivates areas mediating pain modulation.
Pomeranz B. Scientific basis of acupuncture. In: Stux G, Pomeranz B, eds. Acupuncture Textbook and Atlas. Heidelberg: Springer-Verlag; 1987: 1-18.	Needle activation of A delta and C afferent nerve fibres in muscle sends signals to the spinal cord, where dynorphin and enkephalins are released. Afferent pathways continue to the midbrain, triggering excitatory and inhibitory mediators in spinal cord. Ensuing release of serotonin and norepinephrine onto the spinal cord leads to pain transmission being inhibited both pre- and postsynaptically in the spinothalamic tract. Finally, these signals reach the hypothalamus and pituitary, triggering release of adrenocorticotropic hormones and beta-endorphin.