Efficacy of Fifteen Emerging Interventions for the Treatment of Posttraumatic Stress Disorder: A Systematic Review

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Although there is an abundance of novel interventions for the treatment of posttraumatic stress disorder (PTSD), often their efficacy remains unknown. This systematic review assessed the evidence for 15 new or novel interventions for the treatment of PTSD. Studies that investigated changes to PTSD symptoms following the delivery of any 1 of the 15 interventions of interest were identified through systematic literature searches. There were 19 studies that met the inclusion criteria for this study. Eligible studies were assessed against methodological quality criteria and data were extracted. The majority of the 19 studies were of poor quality, hampered by methodological limitations, such as small sample sizes and lack of control group. There were 4 interventions, however, stemming from a mind–body philosophy (acupuncture, emotional freedom technique, mantra-based meditation, and yoga) that had moderate quality evidence from mostly small- to moderate-sized randomized controlled trials. The active components, however, of these promising emerging interventions and how they related to or were distinct from established treatments remain unclear. The majority of emerging interventions for the treatment of PTSD currently have an insufficient level of evidence supporting their efficacy, despite their increasing popularity. Further well-designed controlled trials of emerging interventions for PTSD are required.

Although eye movement desensitization and reprocessing and trauma-focused cognitive–behavioural therapy interventions such as prolonged exposure and cognitive processing therapy have established efficacy for posttraumatic stress disorder (PTSD; Australian Centre for Posttraumatic Mental Health, 2013) dropout rates and nonresponse rates are as high as 54% and 44%, respectively, and PTSD remains a difficult disorder to treat (Bradley, Greene, Russ, Dutra, & Westen, 2005; Schottenbauer, Glass, Arnkoff, Tendick, & Gray, 2008). As such, therapies that offer novel or broad approaches to treating PTSD continue to appear, and although many have generated a positive reception in the media, including recent articles on music therapy in The Guardian (e.g., Alberge, 2013) and canine therapy in The New York Times (e.g., Dao, 2012), their efficacy remains unknown. A systematic review investigated complementary and alternative therapies as defined by the National Center for Complementary and Alternative Medicine, including dietary supplements, mind–body techniques, and spiritual-healing techniques (Wahbeh, Senders, Neuendorf, & Cayton, 2014). The review assessed studies published prior to 2012, but did not assess several new interventions for PTSD. The aim of this systematic review was to assess the current evidence investigating the effectiveness of 15 emerging interventions for the treatment of adults with PTSD. Emerging is defined as an intervention that is either a recently developed intervention or an established intervention used in a novel way for the treatment of PTSD. A description of these interventions can be found in the online supplementary material.

Method

Selection of the emerging interventions was determined in consultation with five Australian trauma experts who were asked to consider the “current most popular, novel, and/or emerging interventions for the treatment of PTSD.” Trauma experts were asked to draw on their own experiences and knowledge of interventions that were frequently being drawn to the attention of government agencies and other relevant bodies for potential to fund. Trauma experts were also asked to nominate specific types of interventions (e.g., meditation), rather than the broad schools they fall under (e.g., relaxation) to allow direct comparisons between studies. A list was compiled and all treatments nominated by at least two trauma experts were selected for inclusion (N = 15). The interventions selected were acceptance and commitment therapy, acupuncture, art therapy, canine therapy,
emotional freedom technique (EFT), equine therapy, mantra-based meditation (MBM), mindfulness-based stress reduction, music therapy, outdoor therapy, rewind therapy/technique, thought field therapy, traumatic incident reduction, visual kinaesthetic dissociation, and yoga. A meta-analysis was not possible due to the fundamental differences in intervention types and potential therapeutic outcomes.

Search Strategy

EMBASE (Excerpta Medica database), MEDLINE (PubMed, U.S. National Library of Medicine, National Institutes of Health database), and PsycINFO (American Psychological Association database) were searched for peer-reviewed literature published from 2003 to August 2014. Each of the three databases were single searched for the following combinations of keywords: acceptance and commitment therapy OR ACT or acupuncture OR adventure therapy OR nature therapy or outward bound therapy OR outward bound OR wilderness expedition OR wilderness activity OR expedition OR art therapy OR canine therapy OR dog therapy OR dog*assisted therapy OR dog treatment OR horse therapy OR horse*assisted therapy OR horse treatment OR animal therapy OR equine therapy OR meditation OR transcendental meditation OR mantra* mediation OR mindfulness therapy OR mindfulness OR mindfulness-based stress reduction OR MBSR OR power therapy OR emotion freedom therapy OR emotion freedom technique OR thought field therapy OR traumatic incident reduction OR visual kinaesthetic dissociation OR rewind therapy OR rewind technique OR yoga OR yoga therapy OR yoga treatment AND posttraumatic stress disorder OR PTSD OR acute stress disorder OR ASD. Additional searches were carried out by hand-searching reference lists.

Study Selection

Study methodology was not restricted to randomised controlled trials (RCTs) to be inclusive. Studies were included if they investigated an intervention of interest, were published in English, involved adults (≥18 years), the sample majority (≥70%) was diagnosed with acute stress disorder or PTSD, and outcome data were reported for symptom severity or diagnosis. Studies were excluded if participants were receiving concurrent psychological treatment in addition to the intervention of interest. Two reviewers independently assessed all potentially relevant articles for inclusion and two blinded independent reviewers checked 10%.

Quality Assessment

Although the Cochrane method for assessing quality and risk of bias is the gold standard for RCTs, there is no such scale for nonrandomised studies (Higgins & Green, 2008). Instead, a modified quality and bias checklist was used (National Health and Medical Research Council, 1999). Two independent reviewers assessed studies for risk of bias on method of treatment assignment, control of selection bias, blinding of assessor (where relevant), and outcome assessment. The Grading of Recommendations Assessment, Development and Evaluation (GRADE) Working Group system for grading the overall quality of the evidence for each intervention was used (GRADE Working Group, 2004). The GRADE system adopts a systematic, transparent, and explicit approach to making judgements about the quality of the evidence. The GRADE system consists of four levels of evidence quality: high, moderate, low, and very low. Studies are reviewed on design, quality, consistency of findings, and directness, or the extent to which the evidence maps onto the population or intervention of interest.

Results

Figure 1 shows the yield at all stages of the review. After removing duplicates from an initial yield of 1,856 studies, 1,037 records were screened on title and abstract and 126 were deemed eligible for full-text review. The primary reasons articles excluded were (in order of frequency) (a) no quantitative outcome data using PTSD measures were reported in the study; (b) the study did not use an intervention of interest or the study utilised a modified version of an intervention of interest; (c) the study sample was under 18 years of age; and (d) the study sample was receiving an active concurrent treatment in addition to the intervention of interest. After the full-text review stage, 19 studies were deemed eligible for inclusion. Acceptance and commitment therapy, art therapy, EFT, music therapy, outdoor therapy, and visual kinaesthetic dissociation all had one study eligible for inclusion. The remaining studies were acupuncture (n = 2), MBM (n = 6), mindfulness-based stress reduction (n = 2), and yoga (n = 3). Five interventions (canine therapy, equine therapy, rewind therapy/technique, thought field therapy, and traumatic incident reduction) had no studies eligible for inclusion. No studies were published prior to 2007 and 58% were published in 2013–2014. Methodologies varied between studies, ranging from case studies to RCTs. Interventions lasted between 6 days and 12 months. Overall, the studies were small with sample sizes ranging from 1 to 94. Over half of the studies used veteran/military samples (n = 11) and two recruited refugee samples. Mean age of participants ranged between 30 to 62 years old. Eight studies had all male samples, whereas only two studies had all female. Trauma exposure was predominately combat-related (n = 8) or mixed traumatic events (n = 7), with one study reporting child abuse and three studies reporting that trauma exposure had occurred, but not explicitly stating what type. An overview of each study is presented in online supplementary material.

Quality Assessment

The average risk of bias was high, which was largely due to the low-quality design or methodology of the studies, such as noncontrolled designs, small sample sizes, and high dropout.
Total records retrieved through database searching \((N = 1,856)\)

Records excluded \((n = 819)\)
Reason for exclusion: duplicate records

Records screened \((n = 1,037)\)

Records excluded \((n = 931)\)
Primary reasons for exclusion: Not an intervention of interest; sample was under 18 years of age

Full-text articles assessed for eligibility \((n = 126)\)

Full-text articles excluded \((n = 101)\)
Primary reasons for exclusion: no quantitative PTSD outcome measures reported, a modified form of an intervention of interest was used, population received concurrent active psychological treatment

Articles included in review \((n = 19)\)

Figure 1. Flowchart of search for studies. PTSD = posttraumatic stress disorder.

rates. No interventions were assessed as high quality using the GRADE system. Four interventions were assessed as moderate quality. The remaining interventions had low- to very low-quality evidence. All details of quality assessments can be found in the online supplementary material. Key findings for the four interventions assessed as moderate quality are summarised below.

Two studies investigated acupuncture: one medium-sized \((N = 84)\), good-quality RCT comparing acupuncture to group cognitive–behavioural therapy and a waitlist control found significantly lower rates of PTSD in both intervention groups at posttreatment compared to controls, with no difference between treatment groups (Hollifield, Sinclair-Lian, Warner, & Hammerschlag, 2007). Improvements were maintained at 3-month follow-up. A second very small \((N = 5)\) study claimed randomization, but contained insufficient information to assess accurately (Cronin & Conboy, 2013).

One small-sized \((N = 46)\) RCT with a high dropout rate and no control data at 3-month follow-up investigated the EFT compared to a delayed intervention control and found a significant reduction in PTSD symptoms (Karatzias et al., 2011).

Six studies investigated mantra-based meditation: two RCTs (Bormann, Thorp, Wetherell, & Golshan, 2008; Bormann, Thorp, Wetherell, Golshan, & Lang, 2013); one case-controlled study (Rees, Travis, Shapiro, & Chant, 2013); and three uncontrolled studies (Barnes, Rigg, & Williams, 2013; Rees, Travis, Shapiro, & Chant, 2014; Rosenthal, Grosswald, Ross, & Rosenthal, 2011). One large \((N = 146)\), good-quality RCT found that both MBM combined with treatment as usual (TAU; medication and case management), and TAU alone reduced PTSD symptoms, with greater reductions in the intervention group (Bormann et al., 2013). A second small \((N = 29)\), moderate-quality RCT found that MBM reduced PTSD symptoms (Bormann et al., 2008). The remaining four studies had methodological limitations.

Three studies investigated yoga: two RCTs and one uncontrolled study. A small-sized \((N = 38)\), moderate-quality RCT found improvements in PTSD symptoms, but no differences between yoga and controls (Mitchell et al., 2014). A medium-sized \((N = 64)\), good-quality RCT found significant improvements in PTSD symptoms for both yoga and controls, with the yoga group exhibiting significantly greater improvements
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van der Kolk et al., 2014). The third uncontrolled study had methodological limitations.

Discussion

The aim of this review was to assess the current level of evidence for popular emerging interventions for PTSD. Four interventions had been tested in RCTs that met criteria for sufficient quality: acupuncture, EFT, MBM, and yoga. Acupuncture was shown to be superior to a control condition and comparable to cognitive–behavioural therapy. EFT was shown to improve PTSD symptoms comparably to an eye movement desensitization and reprocessing condition. MBM combined with TAU was shown to improve PTSD symptoms significantly more than TAU alone; yoga was shown to improve PTSD symptoms significantly more than control conditions. Each of these four interventions only had a single RCT that qualified as low risk of bias; none of the studies had large sample sizes or significant follow-up periods. Furthermore, the MBM and yoga studies recruited veteran, predominately male samples, which limited their generalizability. On the basis of the GRADE quality assessment, however, all four interventions were ranked as having moderate evidence for their relative effect on PTSD severity.

These interventions, although diverse, also share common features: They are theoretically grounded in mind–body philosophies; they do not directly address cognitions or emotions; and they do not involve talking therapy. The exact therapeutic mechanisms, however, underlying each intervention remain unclear. Yoga and MBM feature relaxation, which may reduce the somatic or hyperarousal aspects of PTSD (van der Kolk et al., 2014), and mindfulness, which involves paying attention to distressing thought and emotions in a nonjudgemental way, which may involve an element of exposure therapy. Acupuncture and EFT are similar in that both involve manipulating purported meridians, through needles and fingertapping, respectively. Despite research showing that acupuncture can be effective in treating some conditions, the mechanisms behind the effect remain unclear (World Health Organization, 2002). Researchers have proposed that the manipulation of meridians releases neurochemicals that improves mood or reduces hyperarousal (Karatzias et al., 2011). A similar mechanism may be in play with EFT. Alternatively, the active component of EFT may be similar to established, trauma-focused treatments, in that it involves an element of exposure therapy as the individual is asked to elicit the traumatic memory, albeit much more briefly than in prolonged exposure (Karatzias et al., 2011). Whether the exposure element, meridian stimulation, a combination of these, or some other element is the active component of EFT remains unknown.

Despite some promising findings, the majority of emerging interventions investigated in this review had insufficient levels of evidence supporting their efficacy. If efficacy can be demonstrated, the role of popular emerging interventions could become important. They might be a viable alternative to the high rates of treatment nonresponse and dropout for established treatments, or they could be used to prepare those not yet ready to engage with trauma-focused therapy (Gelkopf, Hasson-Ohayon, Bikman, & Kravetz, 2013). They often focus on the somatic rather than the traumatic aspects of PTSD, meaning treatment itself is less likely to produce increases in distress. RCTs with larger sample sizes and longer follow-up periods are needed to clearly establish the efficacy of these emerging interventions; additional dismantling studies as well are required to pinpoint the active components of these therapies.

The review findings should be considered alongside the study’s limitations. Non-English language, non peer reviewed, and potentially relevant articles that were published prior to the defined search period were omitted. Studies in which active psychological treatment was concurrent with the intervention were also excluded to accurately delineate the unique contribution of the emerging intervention on PTSD symptoms. Many emerging interventions, however, may be used as adjunctive or complementary treatments to established PTSD treatments. Lastly, we did not use meta-analysis methodology to synthesise the results in a statistical way.

The evidence from this review suggested that many of the claims made by proponents of emerging treatments for PTSD were unsubstantiated. Critically, the theoretical justification for how interventions can actively improve PTSD must be established. High-quality trials are required before these treatments can move from popular opinion into evidence-based medicine. Medical research funding bodies are urged to create opportunities for rigorous testing of promising interventions.

References


