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Argentine tango dance compared to mindfulness meditation and a waiting-list control: A randomised trial for treating depression

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KEYWORDS
Depression;
Mindfulness;
Tango dancing;
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Summary
Objectives: To determine whether tango dancing is as effective as mindfulness meditation in reducing symptoms of psychological stress, anxiety and depression, and in promoting well-being.
Design: This study employed analysis of covariance (ANCOVA) and multiple regression analysis.
Participants: Ninety-seven people with self-declared depression were randomised into tango dance or mindfulness meditation classes, or to control/waiting-list.
Setting: classes were conducted in a venue suitable for both activities in the metropolitan area of Sydney, Australia.
Interventions: Participants completed six-week programmes (1½ h/week of tango or meditation). The outcome measures were assessed at pre-test and post-test.
Main outcome measures: Depression, Anxiety and Stress Scale; The Self Esteem Scale; Satisfaction with Life Scale, and Mindful Attention Awareness Scale.
Results: Sixty-six participants completed the program and were included in the statistical analysis. Depression levels were significantly reduced in the tango (effect size $d = 0.50$, $p = .010$), and meditation groups (effect size $d = 0.54$, $p = .025$), relative to waiting-list controls. Stress levels were significantly reduced only in the tango group (effect size $d = 0.45$, $p = .022$). Attending tango classes was a significant predictor for the increased levels of mindfulness $R^2 = .10$, adjusted $R^2 = .07$, $F(2,59) = 3.42$, $p = .039$.
Conclusion: Mindfulness-meditation and tango dance could be effective complementary adjuncts for the treatment of depression and/or inclusion in stress management programmes. Subsequent trials are called to explore the therapeutic mechanisms involved.

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Contents

Introduction

One in five Australians will at some time in their life experience a mental disorder, however, only one-third ever access effective treatment.[1] Some are reluctant to undergo traditional psychiatric treatment or to be identified as mental health patients, and therefore avoid treatment. Others may be unaware of available therapies, or find them difficult to access; others fail to respond to existing treatments.[2,3]

Moreover, individuals with self-reported anxiety and depression are reported to use complementary or alternative therapies more frequently, rather than mainstream treatments.[4] Thus, there is an urgent need for complementary and alternative therapies to address such issues. In this study we evaluated tango therapy as one possible alternative approach to alleviate individuals experiencing stress, anxiety and/or depression.

Recreational physical activity reduces disability and psychological distress in people with chronic disease, relative to those completing specific rehabilitation exercises but who report they did no recreational or sport activity,[5] suggesting that recreational activities may facilitate greater focus on physical and psychological well-being, whereas targeted rehabilitation exercises focus primarily on improving disability. Activities such as martial arts and dance typically require concentration on aspects of the present (e.g. learning new physical skills), and this is argued to indirectly improve psychological outcomes.[6]

Dance, in particular, is reported to be an effective adjunct to standard depression therapy.[7,8] It is suggested that the expressive characteristics of dance rather than the exercise itself may assist individuals to deal with feelings otherwise difficult to accept or express.[9] Music is also reported to be strongly associated with improvements in physical and mental health outcomes[10]; for example, it was recently shown to decrease patients' anxieties in an acute care medical setting.[11] Even music that is described as being melancholic, such as tango music, is proposed to generate positive emotions.[12] However, the combination of tango music and partnered dancing is suggested to improve emotional state.[13]

Tango is described as a 'walking embrace'; a form of dance that evolved in Argentina at the end of the 1800s. It is claimed that anyone who can walk can learn the tango.[14] It is an absorbing activity that promotes attention by demanding a strong connection with a partner,[15] since in a dance of about 3 min, the partners must attempt to move as one, a synchronized movement with one partner stepping where the other has just stepped.[16] Thus, an awareness of one's own body and that of the partner is required.

Leaders have to improvise, use leadership skills and take responsibility by selecting adequate steps according to the proficiency and physical characteristics of the partner; followers mostly walk backwards, and therefore need to trust the leader's judgement and accept their choice of steps[8] by concentrating on their body alignment and maintaining sufficient space between the feet.[16]

Toneatto and Nguyen[17] suggest that any activity requiring awareness of current experience is likely to interrupt an individual's thoughts about their past and fears about the future, so potentially lessening association between negative thoughts and possible affective symptoms. Tango is one activity that could achieve this goal, since it is an absorbing activity that requires significant skills acquisition,[8,16] and an awareness of current experience.[17] It also facilitates an involvement in music, exercise, and touch, all of which have previously been reported to be effective in alleviating psychological distress.[18–20] However, as yet tango has not been examined as a possible mindfulness-based treatment for affective symptoms.

Mindfulness is described as a process of observing thoughts and feelings as transient experiences that do not need to be eliminated or reacted to,[21] rather than permanent aspects of the self or reflections of reality.[22] This approach is suggested to facilitate one's detachment from negative thoughts, ruminations, and worries,[1] thus reducing the contingency between noxious stimuli (e.g. feeling stressed) and habitual distress. Importantly, this approach does not require the person to give up control; rather, it involves shifting attention away from aspects of life that cannot be controlled (i.e. distressing situations), to those which can be managed (e.g. emotional response to situation). It is this change in focus which is thought to underpin the observed reductions in symptom severity (e.g. depression, pain) seen in several recent studies.[21,23]

Putative mindfulness activities such as *meditation* have previously been reported to improve psychological well-being.[24] For example, Mindfulness-based Cognitive Therapy, which includes meditation as a component, has been shown to be effective in treating depression and residual depressive symptoms.[24,25] The intent of these therapies is *not* to eliminate sadness but to normalise a person's thinking patterns so that mild sadness does not escalate into a more severe state.[26]

Few potential therapies have been empirically tested as possible mindfulness-based therapies for depression,[27] especially those which may be applied *outside* the clinical context. Tango has yet to be examined in this regard, but it does share attributes common to the mindfulness treatments described above. Furthermore, prior research indicates that tango is effective in improving balance, socialisation, and self-esteem in the elderly,[28] walking speed, cadence, movement initiation, and motivation in Parkinson's disease patients,[29] and quality of life, adherence to rehabilitation programs, coordination, and equilibrium in myocardial infarction patients.[30] Moreover, several pilot studies have examined improvements in psychological well-being in vulnerable populations such as those with mental disabilities.[31] Thus, the stage is set to evaluate tango as a means of improving psychological health and wellbeing.

In the present study, we conducted a randomised-controlled-trial (RCT) of tango dance with two control groups: mindfulness meditation and waiting-list controls. In accordance with the limited available literature, we hypothesised that: (a) tango and meditation participants will show greater reductions in stress, anxiety, and depression levels between baseline (pre-test) and immediately after treatment (post-test), relative to waiting-list controls; (b) tango and meditation participants will show greater increases in self-esteem and satisfaction-with-life between pre-test and post-test, relative to waiting-list controls; and (c) there will be a relationship between group membership (i.e. tango, meditation, and control) and an increase in mindfulness after the 6-week program.

Methods

Participants

This study was conducted with full institutional human research ethics approval. Participants were recruited via advertisements asking for volunteers with self-reported stress, anxiety, and/or depression. They were invited to participate in a RCT evaluating tango dance relative to mindfulness meditation or waiting-listed control. They were advised that they could be allocated to one of those three groups. Advertisements were placed in local newspapers, medical centres, and technical colleges in the Sydney metropolitan area, and displayed on two websites (Mental Health Association: www.mentalhealth.asn.au and University of New England: www.une.edu.au). Inclusion criteria were age 18 years and over, and self-reported psychological distress. Exclusion criteria were pregnancy, and walking or balance problems.

We estimated power based on a previous study,[14] and G*Power.[32] To get power >.80 given an effect size of $f = 0.4$, with alpha = .05, and groups = 3 a total sample size of >63 would be needed.

Ninety-seven people responded to the advertisements. Those who met the inclusion criteria and wished to participate were randomly assigned (drawn from a hat) to one of three groups: tango dance ($n = 33$), meditation, ($n = 33$) or waiting-list control ($n = 31$). The sample was blinded since participants filled in the baseline questionnaires prior to randomisation to remove any anticipatory effects. Only 76 of the sample commenced the program (i.e. response rate = 78%). Ten people were unavailable due to work or other commitments. In addition, 10 people failed to attend 4 or more of the 6 sessions, and were excluded from analysis, leaving 21 tango dance, 16 meditation, and 29 waiting-list controls, see Fig. 1.[33]

Procedure

At the beginning of the study all participants were provided with detailed written information about the study, informed of the voluntary nature of their participation, and right to withdraw at any time. They were advised they would be offered a voucher of their choice for 4 sessions of either tango or meditation sessions, at the end of the study. Waiting-list controls were mailed the consent form and pre-test survey to be returned in the reply-paid envelope. The same survey was sent 6-weeks later (i.e. at post-test). Participants in the experimental groups (i.e. tango and meditation) privately signed consent forms and completed the pre-test survey at the beginning of the first class, and again following their sixth session (i.e. post-test).

The meditation and tango classes were each led by an experienced, registered instructor who volunteered their time and developed a special program for this study. Meditation classes were based on the mindfulness exercises proposed by John Kabat-Zinn.[34] Tango lessons were based on the Argentinean close-embrace tradition, requiring trained tango-helpers who also volunteered their time. All classes ran for 1½ h, as detailed below.

At the start of every meditation and tango session, participants were encouraged to leave the world behind and relax so as to pay full attention in class. They were advised the emphasis was on enjoying the experience rather than achieving a particular outcome (10-min). This was followed by a warm-up period (e.g. low-intensity stretching, 10-min), and then the 1-h class. Each class introduced new aspects of the activity; for example, the first meditation session focused on breathing, and later sessions on the mindfulness of eating, body scan, walking meditation, and music meditation.[34] In tango dance, each session focused on a different aspect of the dance; for example, the consciousness of walking, awareness of one's own and partner's body, resistance and transference of weight, and close-embrace. At the end of each session (wrap-up, 10-min), participants were asked to sign the sign-out sheet and if they wished, share their experiences or ask questions.

Measures

Participants were asked demographic information, and about their participation in exercise over the past month,

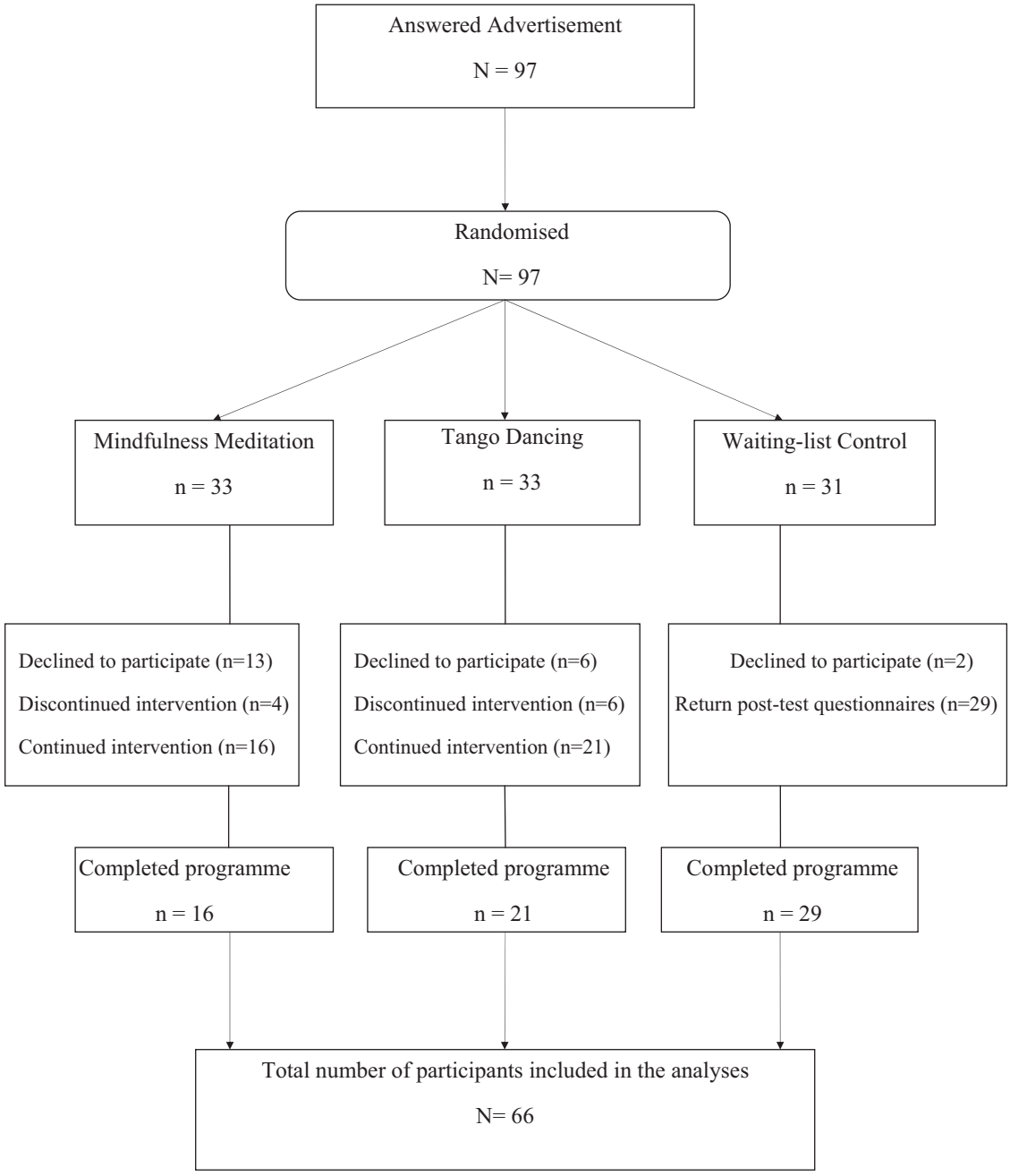

Figure 1 Flow-chart following participants through the randomised controlled trial. Revised template of the CONSORT.[33]

or engagement in other physical activities (yes/no); and if so, how often, from 1 (*every day*) to 7 (*<once a month*).

To assess the self-reported emotional states of stress, anxiety and depression, the DASS-21 scale[35] was used, employing a 4-point Likert scale ranging from 0 (*did not apply to me at all*) to 3 (*applied to me very much/most of the time*). The structure of the scale and subscales show moderate construct validity.[36] In the present study, internal consistencies were high with Cronbach's alphas of .92 for depression, .81 for anxiety and .86 for stress.

Each individual's judgment of their contentment with life was assessed using the Satisfaction with Life Scale (5-items),[37] using a 7-point Likert scale, with ratings from 1 (*strongly disagree*) to 7 (*strongly agree*). The scale has high internal consistency and excellent test-retest reliability.[38] In the present study, internal consistency was high with a Cronbach's alpha of .84.

The Rosenberg Self Esteem Scale (10-items),[39] is extensively used to assess this construct,[40] the items relating to positive and negative attitudes about oneself (5-items each), every question answered on a 4-point Likert scale ranging from 0 (*strongly disagree*) to 3 (*strongly agree*). The scale has high internal consistency[41]; in the present study, internal consistency for the scale was high with a Cronbach's alpha of .84.

Table 1 Means and standard deviations for key variables at pre-test, post-test ($N = 66$).

Outcome measure	Control ($n = 29$)		Meditation ($n = 16$)		Tango ($n = 21$)	
	M	*SD*	*M*	*SD*	*M*	*SD*
Measure (pre-test)						
Self-esteem	16.62	4.82	16.38	3.93	17.90	5.19
Satisfaction with life	15.80	5.73	16.00	5.85	17.79	7.15
Mindfulness	49.65	11.26	52.67	13.69	55.71	11.87
Depression	18.62	11.98	18.50	11.23	16.00	12.35
Anxiety	13.58	9.90	16.00	9.21	12.29	10.03
Stress	21.80	10.45	24.75	10.27	18.67	8.54
Measure (post-test)						
Self-esteem	17.15	4.93	18.50	4.90	19.30	5.98
Satisfaction with life	17.76	6.65	18.56	6.85	22.24	7.51
Mindfulness	51.81	14.42	57.20	12.77	62.00	12.25
Depression	16.92	9.74	10.63	12.47	8.76	9.64
Anxiety	11.92	10.00	11.25	11.33	5.71	7.05
Stress	19.85	9.85	19.00	10.15	12.48	7.53

Mindfulness was assessed using the Mindful Attention Awareness Scale (15-items). This scale assesses the frequency of mindful-states in everyday life situations. It distinguishes between people who practice mindfulness and those who do not.[42] Items are rated on a 6-point Likert scale ranging from 1 (*almost always*) to 6 (*almost never*). The scale has high internal consistency in adult samples.[43] In the present study, internal consistency for the scale was high with a Cronbach's alpha of .88.

Statistical analysis

All statistical analyses were conducted using SPSS version 15. The quantity of missing data was less than five percent in each variable. To answer the first and second hypotheses a one-way between-groups analysis of covariance (ANCOVA) was conducted on each dependent variable, to compare the effectiveness of the activities, relative to waiting-list controls. The independent variables were: group allocation (i.e. tango, meditation, waiting-list), and time (pre- vs. post-test). The dependent variables were post-test scores on stress, anxiety, depression, self-esteem and satisfaction with life, with the pre-test scores used as covariates. A multiple regression analysis was conducted to answer the third hypothesis; the criterion variable was mindfulness at post-test and the predictor variable was group membership (Tango vs. control and meditation and Meditation vs. control and tango).

Results

Participant ages ranged from 18 to 80 years ($M = 44.39$, $SD = 14.27$), and most (90.9%) were female. One-third (33.3%) were living with a partner, one-third (39.4%) were never married, and the remainder were widowed (9.1%), divorced or separated (18.2%). Most were well educated: two-thirds (66.6%) had a university degree (undergraduate or postgraduate), and the remainder had completed a trade certificate (12.1%), higher school certificate or equivalent (15.2%), or they left school by Year 10 (6.1%). Most were employed (74.2%, full- or part-time), with the remainder either unemployed/completing home duties (7.5%), unable to work (4.5%), retired (4.5%), or students (9.1%). A minority of participants (15.2%) indicated they did no regular exercise, but most (62.1%) exercised at least once a week, and some (22.7%) exercised at least once a day.

According to the DASS suggested cut-offs,[35] 40 of the 66 participants (60.6%) indicated they had moderate to severe depression at pre-test, with eight (12.1%) reporting mild depression. Forty-four (66.7%) participants indicated they

Table 2 Correlations between key variables at baseline ($N = 66$).

Measure	1	2	3	4	5
1. Self-esteem					
2. Satisfaction with life	.48**				
3. Mindfulness	.60**	.30*			
4. Depression	−.66**	−.36**	−.47**		
5. Anxiety	−.34**	−.23	−.33**	.59**	
6. Stress	−.36**	−.26**	.−46**	.61**	.80**

* $p < .05$ (one-tailed).
** $p < .01$ (two-tailed).

had moderate to extreme anxiety, with six (9.1%) reporting mild anxiety. Thirty-four (51.5%) participants reported moderate to severe psychological stress, with nine (13.6%) reporting mild stress.

Means and standard deviations of dependent variables are provided in Table 1. The correlations between these variables indicated that the participants were more likely to exhibit anxiety if they also reported high stress ($r = .80$, $p < .01$), whereas those reporting depressive symptoms were more likely to also report low self-esteem, as indicated by the negative correlation between both variables ($r = -.66$, $p < .01$). The next strongest correlation was between mindfulness and self-esteem ($r = -.66$, $p < .01$) in agreement with other studies that suggest that through mindfulness a person can learn not to judge, rather accept themselves, their own feelings and circumstances, see correlation Table 2.

Group comparisons

After controlling for baseline depression score, there was a statistically significant effect for depression at the end of the program $F(2,59) = 6.00$, $p = .004$, partial $\eta^2 = .17$. Post hoc tests revealed that tango and meditation group participants showed reduced levels of depression at post-test, relative to waiting-list controls [tango ($p = .010$), meditation ($p = .025$)]. The effect size (unbiased Hedges' g [d] measuring the mean difference between groups in standard deviation units) of both interventions was large compared to control, tango $d = 0.50$ and meditation $d = 0.54$.

After controlling for baseline stress score, there was a statistically significant effect for psychological stress at the end of the program $F(2,59) = 3.88$, $p = .026$, partial $\eta^2 = .12$. Post hoc tests revealed that only tango participants showed reduced levels of psychological stress at post-test ($p = .022$), relative to waiting-list controls. The effect size was a bit larger for tango ($d = 0.45$) than for meditation ($d = 0.37$). There were no statistically significant results in the remaining dependent variables, although small to moderate effect sizes towards improvement were observed for both the tango and meditation groups, but not the waiting-list control group. Improvement for anxiety was larger for tango ($d = 0.52$) than meditation ($d = 0.30$). The effect size for mindfulness was also larger for tango ($d = .32$) than for meditation ($d = 0.18$). Satisfaction with life improved more in the tango ($d = 0.36$) than meditation ($d = 0.09$) while self-esteem improved more for meditation ($d = 0.35$) than tango ($d = 0.17$).

The regression analysis indicated that group membership accounted for a significant 10% of the variance in the increase of mindfulness, $R^2 = .10$, adjusted $R^2 = .07$, $F(2,59) = 3.42$, $p = .039$. Being in the tango classes was a significant predictor $t(59) = 2.61$, $p = .012$ while being in the meditation classes was not, $t(59) = 1.25$, $p = .217$.

Discussion

This is the first RCT study examining tango dance as a possible mindfulness-based intervention for individuals with self-reported depression. The first hypothesis is partly supported as tango and meditation participants did show greater reductions in levels of depression between pre- and post-test, relative to waiting-list controls. The depression change score difference effect sizes were large and considerably larger than the overall effect size reported for antidepressants ($d = 0.31$),[3] although it is likely that this meta-analysis included a large proportion of patients with more severe depression. Nevertheless, tango participants also reported significant reductions in stress levels relative to meditation and waiting-list controls. This suggests that dynamic physical activities may be more effective in reducing psychological stress than static activities such as mindfulness meditation, which appears consistent with the results of Rohricht and Priebe,[44] who examined body-orientated activities in patients with schizophrenia. The results are also consistent with prior research indicating the effectiveness of tango dance in the clinical context in Canada,[28] United States,[29] and Argentina,[8,45] although no prior RCTs have been conducted in Australia, or have examined the effectiveness of tango in treating depression or other psychological symptoms. Conversely, results were non-significant for anxiety relative to the control group. The improvement of the tango and meditation participants failed to reach statistic significance, possibly since the control group showed some improvement. The second hypothesis was not supported as neither self-esteem or satisfaction with life results were significant, nevertheless, moderate effect sizes suggest that a larger sample may show differences in these variables and once again the improvements of the control group may have influenced these results. It is possible that, receiving attention and correspondence during the program, as well as the prospective free lessons afterwards, may have positively influenced the responses of the control group.

The third hypothesis was partly supported as the regression analysis showed that participants in the tango group reported greater increase in mindfulness at post-test, relative to meditation and waiting-list controls. This is an encouraging result, since it suggests that tango dance may be a possible mindfulness activity, perhaps more suitable for certain individuals than the putative mindfulness-based benefits of meditation.[24,25]

From an economic perspective, tango is an attractive option as a possible first-line or complementary therapy for depression and possible adjunct to stress management programs, since group-therapy approaches are generally cost-effective.[21,46] From a practitioner perspective, tango is a possible alternative, positive and practical approach to working with clients, instead of the usual clinical focus on negative thoughts which need to be changed.[47] From a cultural perspective, this and other studies indicate that Argentinean tango can be introduced into non-Latin cultures, similar to the way Eastern practices of meditation are now integrated into clinical and psychotherapeutic settings.

Finally, 97% of participants in the study chose to receive a tango dance voucher after the study, rather than a meditation voucher, suggesting the popular appeal of tango dance. This is an important consideration, since people tend to adhere to mindfulness-based programs more than other therapy approaches,[22] especially if the experience is intrinsically positive,[25] such as tango dance is reported to be.[8]

Limitations

The results of this study need to be interpreted with caution given several limitations. The sample was relatively small, although the power analysis indicated it was adequate, given the planned analyses. Most participants were well-educated females so the results may not be generalised to the general population. Information about clinical diagnoses (e.g. depression) or medications (e.g. antidepressants) was not collected. People were admitted to the study on the basis of these self-evaluations; however, self-reports have been shown to be more effective than clinical interviews in capturing sub-threshold anxiety.[48] Finally, this was an exploratory trial with restrictions preventing a follow-up being conducted, and therefore it is uncertain whether the benefits gained would continue beyond the cessation of the tango and meditation classes.

Conclusion

In conclusion, preliminary results suggest that tango dance is an innovative and promising approach, as effective as mindfulness meditation in reducing levels of self-reported depression. In addition, participating in the tango program was associated with increased levels of mindfulness and decreased levels of psychological stress. Further research is warranted to fully assess its potential benefits as a well accepted and cost-effective intervention.

Conflict of interest statement

No competing financial interests exist.

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