

Tango programme for individuals with age-related macular degeneration

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Abstract

Recent research shows that tango dance is an absorbing and effective strategy to reduce levels of depression, while also increasing well-being. This study investigates the feasibility, acceptability, and adherence to a tango programme for individuals with age-related macular degeneration (ARMD). Depression is closely intertwined with the ARMD diagnosis, since the loss of central vision has a profoundly negative impact on the person's quality of life. Seventeen participants were randomised to tango dance (1.5 h, 2 times/week for 4 weeks) or wait-list control condition. Demographic questions and *Visual Function Questionnaire* were taken at pre-test. Self-rated symptoms of depression, self-esteem, and satisfaction-with-life were assessed at pre-test and post-test. Tango group participants showed significant reductions in depression and significantly increased satisfaction-with-life and self-esteem at post-test relative to the controls, and reported physical improvement, including increased balance. Tango dance was demonstrated to be a feasible and positive activity for this population.

Keywords

Age-related macular degeneration, dance, depression, visual impairment

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Introduction

Age-related macular degeneration (ARMD) is a chronic and progressive medical condition that results in severe vision loss (Mitchell & Bradley, 2006). It is the most common cause of blindness in adults over the age of 65 years (Seddon & Chen, 2004; World Health Organisation [WHO], 2004), and it has a profound negative impact on people's lives and mental health (Brennan et al., 2011; Rovner & Casten, 2008). The macula is a highly specialised part of the retina that is used to read and write, to recognise faces, and for other valuable activities that require fine vision (Mitchell & Bradley, 2006). Macular degeneration is caused when the cells of the macula deteriorate, causing loss of central vision (Morris, Imrie, Armbrrecht, & Dhillon, 2007). People with advanced ARMD may still be able to use their residual peripheral vision, but they may be unable to accomplish daily living tasks (Hooper, Jutai, Strong, & Russell-Minda, 2008). In addition to poor vision, seniors with ARMD tend to experience impaired balance and increased risk of falling (Ivers, Cumming, Mitchell, & Attebo, 1998) that can lead to a decrease in physical activity (Elliott et al., 1995), thereby impacting adversely on autonomy and quality of life (Scott, Smiddy, Schiffman, Feuer, & Pappas, 1999).

As a result of these impairments, many people with ARMD will experience restriction in their mobility (e.g. inability to drive, limited walking) as well as *perceived* restrictions (e.g. fear of falling). These restrictions contribute to *social isolation* (Brennan et al., 2011; Crews & Campbell, 2001). The impairments in vision may also limit primary means of social interaction (e.g. inability to recognise faces or facial cues) and limit the extent to which they can use visual feedback to relate to the world, putting them at greater risk of disability (Mendes de Leon, Glass, & Berkman, 2003; Rovner & Casten, 2002; Tolman, Hill, Kleinschmidt, & Gregg, 2005) and cognitive decline (Zunzunegui, Alvarado, Del Ser, & Otero, 2003).

Therefore, a diagnosis of permanent visual loss is often perceived as a handicap that can instigate feelings of helplessness, inadequacy, loneliness, dependency, and a lack of autonomy, which is reported to adversely impact on hobbies and socialisation, potentially leading to depression (Horowitz, Reinhardt, Boerner, & Travis, 2003). Clinical depression is a common comorbid diagnosis in people with ARMD, with a prevalence of approximately 33 percent. (Burmedi, Becker, Heyl, Wahl, & Himmelsbach, 2002; Casten, Rovner, & Tasman, 2004) Thus, a large number of people with ARMD are at risk of depressive symptoms and emotional distress (Brody et al., 2001; Desrosiers et al., 2009), and these rates are similar to those for seniors with other chronic disorders, although they are higher than the rates in older adults who are not medically ill (Horowitz & Reinhardt, 2006). Individuals with ARMD who become depressed due to their visual condition are more likely to be functionally disabled as a consequence of their vision loss, than those who are not depressed (Rovner & Casten, 2001); that is, depression and the visual impairment caused by macular degeneration can separately contribute to disability, but severity of depression is a better predictor of disability than visual acuity (Banerjee, Kumar, Kulhara, & Gupta, 2008).

At present there is no approved treatment by health authorities for geographic atrophy ARMD, the dry form (McConnell & Silvestri, 2005; Querques, Avellis, Querques, Bandello, & Souied, 2011), although there are available treatments for choroidal neovascular ARMD, the wet form, a less common type of the disease. Such treatments can include laser photocoagulation and the use of antivascular endothelial growth factor (anti-VEGF) drugs. These treatments may stabilise the patient's vision, although often their vision remains significantly impaired (Hooper et al., 2008). Therefore, nonmedical supportive interventions are essential. Problem solving treatment (PST) has been shown to be effective in preventing depression in persons with ARMD who are at risk (e.g. recent decline in vision and new functional loss), but the benefits are short term (Casten &

Rovner, 2008; Rovner & Casten, 2008). The opportunity to identify and express emotional issues enables a reduction in emotional distress and increased self-efficacy, for example, in focus groups or short-term self-management intervention programmes (Brody et al., 1999; Owsley et al., 2006). Standard exercise interventions have been administered to older adults, but there has been significant attrition in exercise-based studies, approximately 35 percent in the first 3 months up to 76 percent within the year (Jancey et al., 2007; Schmidt, Gruman, King, & Wolfson, 2000), suggesting that the programmes were too difficult or did not sufficiently engage the population sample. Given that currently there are few other options for treatment, new strategies that can integrate many approaches are imperative, for instance, therapies that can improve mobility, mood, confidence, and extent of social interaction (Brody et al., 2001; Owsley et al., 2006). Seniors with visual impairment do report that out of a list of 10 possible activities, the loss of *dancing* most significantly and adversely impacted on their quality of life and sense of well-being (Good, 2008). Tango dance is an activity that has previously been shown to reduce self-reported levels of depression (Pinniger, Brown, Thorsteinsson, & McKinley, in press), anxiety, and stress, while also increasing satisfaction-with-life (SWL) and sense of self-efficacy, in a variety of clinical and non-clinical populations (Pinniger, Thorsteinsson, Brown, & McKinley, in press). It is also reported to significantly enhance cardiovascular fitness (Keogh, Kilding, Pidgeon, Ashley, & Gillis, in press; Peidro et al., 2002), balance, mobility, and strength in the elderly (McKinley et al., 2008), and it has been shown to be an appropriate and beneficial activity for use by people with Parkinson's disease (Earhart, 2009; Hackney & Earhart, 2009a, 2009b).

At first glance, tango dance may appear to be too challenging for individuals with vision impairment. However, tango was specifically selected as it can be readily modified to address the difficulties experienced by visually impaired people. Tango is a complex activity that requires total focus and awareness of the movements of the tango-leader (who is sighted). In practice, this is best achieved if the tango-follower keeps *closed eyes during the dance*, so as to facilitate a closer connection with the movement of his or her partner (Nau-Klapwijk, 2006).

Tango is also performed within an *embrace* or 'frame' that provides support and confidence to the tango-follower; for example, the tango-leader can widen the stance and thereby broaden his or her base to stabilise the follower, and/or use light touch to provide helpful sensory information about navigating through space (e.g. upcoming changes in direction and/or speed), to meet any challenges posed by poor vision or balance problems (Nilsagård, Denison, Gunnarsson, & Boström, 2009; Porosińska, Pierzchała, Mentel, & Karpe, 2010). This information, along with the eight basic tango steps, can be used in many possible combinations so as to make the dance more or less challenging for the participants, depending on their confidence and ability. Thus, the level of challenge and comfort can be individualised to accommodate the needs of individual clients, promote their enjoyment and sense of achievement, and encourage their adherence to the activity (Tenenbaum, Fogarty, & Jackson, 1999). Finally, tango dance emphasises a *fluid gait*, walking in many directions and increasing step length and velocity. All of these aspects of gait may be impaired in people with ARMD, including slower gait velocity, and greater hesitance, relative to their sighted peers (Hassan, Lovie-Kitchin, & Woods, 2002; Meyers, Fletcher, Meyers, & Sherk, 1998). By contrast, rehabilitation programmes using *standard* exercise are often reported to be *not* challenging enough, which may contribute to poorer treatment adherence for these activities (Peidro & Comasco, 2007).

To date, the use of dance classes for visually impaired people has been anecdotal and testimonial in nature (Judge, 2003). To ensure there is a more solid foundation on which to employ dance therapies in this population, quantitative and qualitative research is required; in particular, there is

a need to develop appropriate protocols outlining the lesson plans, music, and environment that are most suitable and effective for people with ARMD. Thus, in this study, we examined the feasibility and utility of using tango dance with a sample of elderly people with ARMD.

This study is part of an international project evaluating tango dance in Canada and Australia. To our knowledge, this is the first time tango dance has been employed as a strategy to improve well-being in people with ARMD using a randomised controlled trial design. The results presented here are those obtained from the Australian study. The Canadian study has been reported elsewhere (Témisjjan et al., 2012). In line with the prior relevant literature, we expect that (1) tango dance will be a feasible and acceptable activity for people with ARMD, (2) tango dance participants will show greater reduction in depression levels relative to wait-list controls, and (3) tango dance participants will show greater improvements in self-esteem and SWL relative to wait-list controls.

Method

Participants

This study was conducted with full institutional human research ethics approval from the University of New England, Australia. Participants were primarily recruited from a pool of clients at two Sydney centres: the Macular Degeneration Foundation and Vision Australia. The organisations distributed information about the study to individuals who met the study inclusion criteria. Short advertisements were also placed in two local Sydney newspapers.

Inclusion criteria. People diagnosed with ARMD (acuity of 6/48–6/120), 65 years of age or older, experiencing feelings of sadness or depression, and wishing to improve their mood and well-being were included in the study.

Exclusion criteria. People with unstable cardiovascular conditions, history of stroke, walking or balance problems (e.g. vertigo, leg weakness) that might affect their capacity to participate in the activity, auditory or cognitive disorders that could significantly affect mobility or the ability to follow instructions, and other significant ocular disorders, such as cataracts or glaucoma, were excluded from the study.

Since this was a *feasibility* study, only a small group of participants was recruited. Ten participants is also the maximum number that can be accommodated in a single tango session to enable the tango instructor to provide adequate attention to each participant. A total of 22 people responded to the advertisements, of whom 5 did not meet the inclusion criteria, as they had a comorbid vision diagnosis, leaving 17 participants. They were randomly assigned to one of two groups: tango dance ($n = 8$) or wait-list control ($n = 9$). All participants commenced the study programme, and none dropped out of the study.

Procedure

Study design. This was a randomised controlled, feasibility study with pre- and post-measures.

Interested vision-impaired people who were identified by the two organisations as meeting the study inclusion criteria were asked to contact the researcher for details about the study programme; thus, the method of recruitment was indirect. The study was explained to potential participants, including the randomisation procedure (drawn from a hat) and its implications, time commitment, the voluntary nature of participation, and their right to withdraw at any time. The introductory

information session was held at a community centre in the Sydney metropolitan area, where the dance sessions would take place.

At this session, they met the tango teacher and had the opportunity to familiarise themselves with the venue. The location was chosen because it had easy street-level access, a ramp, the dance studio and amenities were at the ground level, and there was plenty of natural sunlight entering the building. All their questions regarding the study were answered, and then they were asked to sign the consent form. Because it was intended to videotape some sessions in order to evaluate their expected progress, participants were also asked to sign a permission form for the videotape. Once the forms were signed, volunteers assisted with the completion of the questionnaires by reading the questions aloud and completing the responses as indicated by the participants. The pre-test questionnaires included demographics, visual functioning (the Visual Function Questionnaire [VFQ-25]), and their recent experiences of depression (the Geriatric Depression Scale [GDS]), SWL, and self-esteem (the Rosenberg Self-Esteem Scale [SES]). Each questionnaire had a unique identifier (i.e. study number) at the top of each page that was used to link individual participant responses between the pre- and post-test assessments. The following day participants were randomly allocated to one of the two groups: tango dance or wait-list control, and they were informed of the result. Participants in the wait-list control group were offered future free tango lessons after the study programme was completed.

The post-test questionnaires were administered at the end of the final tango session for the tango group, again using the volunteers. Tango participants were also asked a combination of semi-directed and open-ended questions about the intervention (e.g. what they thought of the programme, positive or negative experiences).

For the participants in the wait-list control, the post-test questionnaires were read aloud during a telephone interview by a volunteer, who then filled in the responses for them.

The tango sessions were taught by an experienced tango instructor and the same skilled volunteers as had been used in our prior studies. The teaching team attended two workshops at which macular degeneration and its consequences were explained, and also the adaptations to the existing tango dance protocols needed to meet the specific visual and balance requirements of this population. These adaptations were rehearsed by the teaching team during the second workshop.

Tango sessions ran for 1.5 h/session, twice a week for 4 weeks. The dance instructions relating to posture and the steps were verbally descriptive, for example, 'Imagine that a string of ribbon is attached to the top of your head, pulling towards the ceiling and making you a little bit taller'. Only the instructor spoke during these sessions so as to limit any verbal interference and permit the participants to focus on the task at hand. The instructor and teaching team wore high-contrast coloured clothing so as to increase their visibility to the participants, and the music had a clear, strong, and consistent beat.

At the start of the tango sessions, participants were encouraged to leave the world behind and relax, so as to pay full attention in class. This was followed by a warm-up period during which the individual dance components were practised, for example, transference of weight from left to right foot in time with the music, with the instructor accentuating the beat by clapping. In later classes, the warm-up was expanded to include forward, back, side-to-side, and rebound steps. This was followed by 1 h of dance class, with a 10-min break at the halfway point.

Each class began with approximately 10 min of walking, *la caminata*, which is the custom of standard tango classes. In the first two sessions, dancing occurred in a straight line and the teaching assistants walked side by side the study participants, ensuring that they maintained the correct posture and balance. In the later sessions, the 'exercise position' was adopted, in which the leader stands in front of the partner and holds him or her by the upper arm, with the tango-follower's

hands placed on the leader's chest. Using this position, the tango followers spend most of their time walking backwards and focusing their attention on the movement of the tango-leader. Finally, participants moved in an anticlockwise direction around the dance floor, and variations in the back step were introduced (e.g. pause and change weight pattern), so that the dance became less predictable and more challenging. At this stage, they also adopted the 'open embrace' dance position, and the type of music was changed in each dance.

At the end of each session (wrap-up, 10 min), participants were asked to share their experiences or ask any questions they had of the instructor or assisting team.

Measures

VFQ-25. This scale has been widely used in ARMD studies (Clemons, Chew, Bressler, & McBee, 2003; Dong et al., 2004; Miskala et al., 2003). It was designed to measure vision-related function and well-being in individuals with ocular disease (Mangione et al., 1998; Mangione et al., 2001). The scale is reported to show high sensitivity, making it particularly suitable as a screening measure (Stelmack, Stelmack, & Massof, 2002), with a Cronbach's alpha coefficient of .81 and subscales ranging from .67 to .92 (Orr et al., 2011). In this study, internal consistency for the scale was high with a Cronbach's alpha of .91 for the total score and subscales scores ranging from .47 to .90.

SWL scale. This 5-item scale (Diener, Emmons, Larsen, & Griffin, 1985) is designed to assess global perceptions of well-being and contentment with life. The scale has high internal consistency with Cronbach's alphas ranging from .87 to .92 in a similar age cohort (McAuley et al., 2000) and excellent test-retest reliability (Schutte & Malouff, 1995). It has been shown to be sensitive to changes induced by tango dancing in seniors (Jacobson, McKinley, & Rainville, 2006) and people with mild to moderate depression (Pinniger, Thorsteinsson, et al., in press). In this study, the Cronbach's alpha coefficient was .81.

Self-esteem was assessed using the SES 10 items (Rosenberg, 1965), which has been extensively used to assess self-reported positive and negative attitudes about oneself (Martin-Albo, Nuñez, Navarro, & Grijalvo, 2007). The scale has high internal consistency with a Cronbach's alpha of .92 (Ciarrochi & Bilich, 2006). In this study, internal consistency for the scale was high with a Cronbach's alpha of .86.

GDS-short version. This 15-item scale (Sheikh & Yesavage, 1986) assesses depressive state in the elderly, with high scores indicating worse depression and scores ranging from 0 to 15. It has well-established cut-off points that indicate the likelihood of major depression and the risk of depressive symptoms. The scale has high internal consistency with a Cronbach's alpha of .82 in a sample of patients with ARMD (Wahl et al., 2006). In this study, internal consistency for the scale was high with a Cronbach's alpha of .80.

Data to assess the feasibility and acceptability of the activity were obtained from the attendance form, the participants' feedback, and the observed progression of participants documented by the videotape that recorded four sessions (second and eighth sessions, the workshop session, and one of the subsequent monthly sessions).

Qualitative analysis

The responses to the semi-directed questions about the tango dance sessions by participants at the end of the study programme were assessed using a strengths, weaknesses, opportunities, and threats

(SWOT) analysis in order to aid in the design of future studies and programmes (Jyothi, Babu, & Krishna, 2008). Common content analysis was used on the open-ended questions to identify key categories/themes, using open coding (Shannon & Hsieh, 2005).

Statistical analysis

All statistical analyses were conducted using SPSS (version 18). Analyses of covariance (ANCOVAs) were conducted on each dependent variable, to assess the effectiveness of tango dance, relative to wait-list controls. The independent variables were group allocation (i.e. tango or wait-list) and time (pre- vs post-test). The dependent variables were post-test scores on depression, self-esteem, and SWL, with the pre-test scores used as covariates in all analyses. An independent-sample *t*-test was used on the VFQ-25 scale obtained at baseline to compare the scores of the tango group with those of the wait-list controls to verify the homogeneity of the sample in visual functioning.

Results

All the participants were female, and most were well educated, with 62 percent of the sample having completed some form of tertiary education. The mean age of participants was 79.4, and 88 percent of the sample were 75 years or older. Most of the participants were widowed, and all but two lived alone.

There was 100 percent adherence to the programme as none of the participants dropped out of the activity or the waiting-list controls. However, two participants did miss one session each due to medical appointments; otherwise, participants attended all sessions and the videos recorded the progressive learning of all participants, indicating that the activity was feasible and well accepted.

An independent-sample *t*-test showed that there was no significant difference in the VFQ-25 scores at baseline for the participants in the tango group ($M = 30.89$, $SD = 6.50$) and in the control group ($M = 24.20$, $SD = 8.80$), $t(11) = 1.46$, $p = .17$ (two-tailed).

An ANCOVA showed that there was a statistically significant group effect. That is, in comparison with the waiting-list controls, the tango group showed greater reduction in *depression*, $F(1, 14) = 15.65$, $p = .001$, partial $\eta^2 = .53$, and increases in *self-esteem*, $F(1, 14) = 115.95$, $p < .001$, partial $\eta^2 = .89$, and *SWL*, $F(1, 14) = 18.65$, $p = .001$, partial $\eta^2 = .57$.

Qualitative information

SWOT analysis. Participant feedback on the strengths of the programme indicated that the structure of the dance programme was well accepted; there was unanimous agreement that the timing of the session (11 a.m.), intensity (twice a week for 4 weeks), and duration (1.5 h) of the programme were convenient. All participants commented that they wished to continue with the activity after the end of the study programme. Most participants mentioned that the main benefits were their improvements in balance and their enjoyment of the activity. Most participants reported that what they liked best about the activity was the challenge and satisfaction of achievement, while several people made positive remarks about the tango team and music. Weaknesses most frequently mentioned included insufficient time for socialising. One participant suggested a broader music selection and another mentioned that transportation was difficult. Opportunities included primarily the possibility of developing tango programmes to be offered to seniors with visual impairments at many community centres. Since all participants wished the programme to continue, the entire

tango team volunteered their services for free monthly classes that are still ongoing after 1 year. The major threat seemed to be knee problems; two participants pointed out that the major obstacles to learning the tango were problems with their knees.

Content analysis. Three major themes emerged, which were improved balance, social integration, and self-esteem. Half the participants remarked that ‘my balance has improved since I started tango dancing’. Social integration was identified by such phrases as, ‘We are all treated as equals’ and ‘partaking of life again’. Self-esteem was expressed as, ‘I want to show the videotapes to my friends and family so they can see what I am doing’.

Discussion

Argentine tango dance was found to be an appropriate, enjoyable, and beneficial activity for people with ARMD. Qualitatively, the participants described being totally absorbed in the activity and found it stimulating and challenging. This latter aspect was reported to be one of the most attractive aspects of the study programme. Participants in the tango dance group showed greater improvements in depression, self-esteem, and SWL relative to wait-list controls. Such outcomes are consistent with prior research findings that recreational physical activities can reduce disability levels and affective symptoms (e.g. anxiety, depression) in people with chronic illness to a greater degree than that seen in people who complete specific rehabilitation exercises (Hurwitz, Morgenstern, & Chiao, 2005).

However, dance has rarely been tested in seniors (Judge, 2003), and the use of tango for people with ARMD or poor vision has not previously been evaluated. Nonetheless, the results are consistent with the reported benefits of tango dance in people with Parkinson’s disease (Hackney & Earhart, 2009a; Hackney, Kantorovich, Levin, & Earhart, 2007) who may experience similar problems (e.g. balance impairment). Such programmes may present an image of possible independence and provide the potential for inclusion in social activities. For example, one participant reported that the activity made them all feel ‘we were treated as equals’, suggesting this activity normalised their sense of self in relation to others and provided them with opportunities for personal growth and ‘partaking of life again’. The significant increase in self-esteem in the tango cohort was reflected in the almost unanimous desire by the participants wanting to videotape their involvement in the activity so that they could show their family and friends, suggesting that they had developed a true sense of pride in their dance achievements.

Although we did not examine physical changes in this study, most of the study participants mentioned that their balance had improved after the activity. Balance is a key factor in remaining independent and avoiding falls (Tinetti, Speechley, & Ginter, 1988), especially when a person is turning and impairment of these abilities is associated with hip fractures (Judge, 2003). Nonetheless, objective improvements in balance were demonstrated after people with Parkinson’s disease (Hackney et al., 2007) and seniors with high risk of falling (McKinley et al., 2008) participated in tango programmes. Additionally, learning to pivot while turning is an important focus of tango dance. Older adults who experience difficulties in turning do not normally use a pivot strategy (Judge, 2003). Thus, tango dance might be expected to improve this ability, since pivoting is always used to change the direction of the steps. Other exercises that may improve balance include transference of weight, walking backwards, and walking diagonally to the side, all of which are employed in dancing tango.

However, further studies are needed to evaluate tango dance using a larger sample and a broader array of control groups, including an activity-based control group such as a standard exercise

programme. Additionally, there is a need to identify the main barriers preventing people with ARMD engaging in such activities. Moreover, participant feedback indicated that the programme might be improved if extra time was given to socialising. Better social integration has been a positive outcome of other research programmes involving people with visual impairment (Harshbarger, 1980) and is therefore an issue to be considered when designing future tango programmes. Providing a continuing programme is also desirable to enable the participants to have ongoing access to this activity as well as their new friendship network.

Study limitations

The results of this study are encouraging, but certain limitations need to be taken into account. For example, the sample size was small, and all the participants were female. Although most studies report a higher prevalence of ARMD in females (Klein, Klein, & Linton, 1992), other studies argue that there is no gender difference, at least in the early stages of ARMD, implying that the increased life expectancy in females may be the cause of this overrepresentation (Morris et al., 2007). Nevertheless, attempts to encourage increased male participation could be made in future studies.

In addition, it may be difficult for some people to admit the extent of their depression, especially when it needs to be conveyed verbally to another person, as in the case of this study, although this data collection approach was used for both groups of participants. More bias might have been introduced if family or friends who knew the participants assisted them in filling in the questionnaires. A larger print of the questionnaires was offered to the participants; however, they all preferred the option of assistance with filling in the study questionnaires.

Finally, there was no planned follow-up assessment of the participants in this feasibility study. It was through the initiative of the participants and the willingness of the teaching team that the classes have continued for a year since the study terminated.

Conclusion

Participants' improvements in depression, self-esteem, and SWL, and the positive feedback, along with their adherence to the programme, suggest that tango dance is a feasible, well-accepted activity for this population. It can enhance mood and is perceived to improve balance. These outcomes suggest that innovative and enjoyable activities that are challenging are more likely to maintain adherence to programmes for people with ARMD.

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Declaration of conflicting interests

The authors declare that they do not have any conflict of interest.

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