

1-2010

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Madeleine E. Hackney

Washington University School of Medicine in St. Louis

Gammon M. Earhart

Washington University School of Medicine in St. Louis

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Running Title: Social Dance in Mental Illness

Corresponding Author

Gammon M. Earhart, PhD, PT

Program in Physical Therapy, Washington University School of Medicine

Campus Box 8502

4444 Forest Park Blvd.

St. Louis, MO 63108

(314) 286-1425

Social Partnered Dance for People with Serious and Persistent Mental Illness: A Pilot Study

Madeleine E. Hackney Ph.D.¹ & Gammon M. Earhart, Ph.D., PT^{1, 2, 3}

1 Program in Physical Therapy, Washington University School of Medicine, St. Louis, MO
63108

2 Departments of Anatomy and Neurobiology, Washington University School of
Medicine, St. Louis, MO 63108

3 Department of Neurology, Washington University School of Medicine, St. Louis, MO
63108

Acknowledgements

We specially acknowledge Dionne Vernon for her assistance during dance lessons and testing. We also acknowledge Josh Funk, Callie Mosiman, Alan Anticevic and the Independence Center of St. Louis for their assistance with this project.

Abstract:

Social Partnered Dance for People with Serious and Persistent Mental Illness: A Pilot Study.

Individuals with serious mental illness (SMI) often experience isolation and poor health, but normalized social opportunities aid recovery. This study aimed to determine social dance's feasibility and effects on mood, functional mobility and balance confidence in 12 people with SMI. Participants danced once per week in 1-hour lessons for 10 weeks. Before and after lessons, participants were evaluated for gait velocity and with One Leg Stance, Timed Up and Go (TUG) and Six Minute Walk tests. Participants self-completed Beck Depression II and Beck Anxiety Inventories and the Activities-specific Balance Confidence Scale. Post-testing included an exit questionnaire assessing participant experiences. Participants significantly improved on the TUG ($p = 0.012$, effect size = 0.68), and demonstrated non-significant improvements in anxiety, depression, and balance confidence (effect sizes of 0.41, 0.54, and 0.64, respectively). Participants reported enjoying classes, and interest to continue. Social dance is feasible and may benefit mobility for those with SMI.

Key words: exercise, dance, mobility, depression

Introduction

Individuals with serious and persistent mental illness (SMI), i.e., schizophrenia, schizoaffective and affective disorders, have greater risk for heart disease, diabetes, and poor physical health than those unaffected (Smith et al., 2007). Individuals with SMI are also less physically active and those lacking regular social contact tend to be most inactive (Daumit et al., 2005). In fact, many report walking as their sole physical activity. However, along with pharmacological therapy, exercise interventions may provide physical, psychological and social benefits (Ellis et al., 2007) as regular exercise is associated with decreased likelihood of anxiety and depressive disorders (Goodwin 2003). Programs addressing physical health problems of those with SMI are needed (Smith et al., 2007), but little research quantifies effects of exercise interventions as a therapy for those with SMI (Ellis et al., 2007).

Those with SMI also exhibit impaired gait and postural stability. Individuals with schizophrenia and schizo-affective disorder have a greater degree of postural instability than age-matched healthy controls, possibly due to side effects of anti-psychotic medications and/or because of structural alterations to the cerebellum (Sullivan et al., 2004). Poor balance can lead to fear of falling and falls, but balance confidence is amenable to improvement through exercise and rehabilitative therapies (Myers et al., 1998).

Dance, which can improve balance and quality of life in neurologically impaired and older populations (Hackney & Earhart 2009 a, b), may positively affect lives in functionally meaningful ways: physical and emotional health, wellbeing, and improved ability to cooperate (Ravelin et al., 2006). Dance/Movement therapy (DMT) has been used therapeutically for individuals with SMI for many years. While the effects of improvisational DMT on those with SMI remain equivocal and need more research (Xia & Grant, 2009), social dance's effects have not been examined. This pilot study mainly aimed to evaluate the feasibility of social dance in a community setting designed to support individuals with SMI. As habitual social dancing is associated with superior balance, postural stability, and gait function in dancers compared to

age-matched non-dancers (Zhang et al., 2008), this study also aimed to determine whether and how social dance affects functional mobility, balance and balance confidence in people with SMI. We also investigated its effects on depression and anxiety..

Methods

The Human Research Protection Office at Washington University in St. Louis approved this work. Participants provided written informed consent before participation.

Participants

Participants were 12 members of the Independence Center of St. Louis, MO, which follows the Clubhouse model started in 1948 at the Fountain House and certified by the International Center for Clubhouse Development (ICCD, 2002). Fundamental Clubhouse principles are: 1) the clubhouse belongs to the members, 2) daily attendance is expected and affects other members, 3) members feel wanted as contributors, and 4) members feel needed (Warner et al., 1999). All Members of the Clubhouse must be at least 18 years of age and have a current diagnosis of a serious and persistent mental illness. In fiscal year 2008, 845 individuals (44% female) were served at the Clubhouse. 51% had a diagnosis of schizophrenia, 18% bipolar, 12% depression, 18% affective disorder, and 1% had other diagnoses (Independence Center, 2008). Study participants met the following inclusion criteria: 1) diagnosis of a serious and persistent mental illness, i.e. schizophrenia, schizo-affective disorder, bipolar, major depression and/or affective disorder, 2) otherwise normal central and peripheral neurological function, and 3) vision corrected to 20/40 or better. Exclusionary criteria included: 1) any unstable musculoskeletal or cardiac condition, and 2) history or evidence of other neurological deficit. Participants were recruited via flyers posted at the Independence Center, through information sessions provided at weekly Member meetings and via Clubhouse staff. Interested participants were invited to a screening before the intervention. Participants

answered screening questions personally, followed instructions during testing, demonstrated benefit from medication protocols, and were tested on medications at a standardized time to reduce effects of medication-related performance fluctuations. Blinded to study hypotheses, participants were told they were participating to further information about dance's effects in those with SMI and were instructed not to change their habitual exercise routines over the course of the study.

Intervention

Participants took part in 1-hour Salsa dance lessons once per week for ten weeks. Participants were required to attend at least 8 of 10 classes to be included in data analyses. Structured and progressive lessons involved a warm-up of vigorous Latin dance for 20 minutes and partnering for 40 minutes. Partners rotated every 5-10 minutes. An experienced ballroom dance instructor, who was also a personal trainer certified by the American Council on Exercise, instructed all dance classes.

Testing Protocol

A standardized script with specific instructions for each task was used for all measurements. Participants were tested at the same time of day for pre- and post-testing at the Independence Center fitness studio. Data files were coded for blinded ratings. All measures were completed by the investigators and skilled research assistants. A physical therapist was present at all testing. Participants were evaluated with the One Leg Stance test (OLS; Vellas et al., 1997) and the average of three trials of the Timed Up and Go test (TUG; Mathias et al., 1986). A 5m instrumented, computerized GAITRite walkway (CIR Systems, Inc., Havertown, PA) measured gait velocity of participants' preferred pace of forward walking. Participants performed three trials and these results were averaged. Participants rested adequately between trials and did not complain of fatigue. Participants completed a six-minute walk test (6MWT)

along a 50-foot path in a hallway and distance traveled was recorded (Guyatt et al., 1985). Participants completed standardized questionnaires: the Beck Depression Inventory-II, (BDI; Beck et al., 1996a, b), the Beck Anxiety Inventory (BAI) and the Activities-specific Balance Confidence Scale (ABC) (Powell et al., 1995). All measures were repeated in the post-intervention testing which also included an Exit Questionnaire that assessed participant experience. Participants ranked items on a scale of 1-5, (1 = strongly agree, 2 = somewhat agree, 3 = neither agree nor disagree, 4 = somewhat disagree, 5 = strongly disagree.) Item 1 asked if participants enjoyed participating. Items 2 through 7 asked if participants noted improvement in aspects of physical wellbeing. Item 8 asked if participants would continue with the classes if possible. Participants could report their impressions of the experience in an open-ended section and were requested to give their honest answers.

Statistical Analyses

Data from participants who did not complete at least 8 of the 10 lessons during the course of the study were not included in analyses. Effect sizes were calculated, paired t-tests were used to compare pre- and post-testing data, and Wilcoxon Signed Rank tests were used for non-parametric data. The significance level for each test was $p = 0.05$.

Results

Three female participants did not complete the study. Two were hospitalized for treatment of SMI and one withdrew after two lessons for undisclosed reasons. 9 participants (44% female) completed the study and only their data were included in analyses. Two individuals had major depression, 2 had bipolar disorder, 1 had generalized anxiety disorder, and 4 had schizophrenia. All were on individualized medication protocols, prescribed by a psychiatrist. The mean age was 47.9 ± 0.6 years, mean time with SMI was 19.2 ± 3 years, and 5 of the 9 were overweight. Significant improvements were noted in the TUG ($p = 0.012$). Non-

significant improvements were noted in the 6MWT, BDI, BAI, ABC, and forward gait velocity (Table I). On the Exit Questionnaire, participants reported enjoying the classes (median 1.0 (25%:1.0, 75%: 1.0) and noted improvements, particularly in coordination (1.0 (1.0, 2.0)), strength (1.0 (1.0, 2.0)), mood (1.0 (1.0, 2.0)) and endurance (1.0 (1.0, 2.0)). They noticed slightly lesser improvements in balance (2.0 (1.0, 2.0)) and walking (2.0 (1.0, 3.0)). Most indicated they would continue participating if possible (1.0 (1.0, 1.0))

Examples from the open-ended responses to this questionnaire follow:

What did you like best about the program?

Responses included: *“Kept me on my toes”*; *“Knowing you can teach old dogs new tricks-more confidence, less anxiety”*, and *“Learning dance, meeting people”*.

What did you like least about the program?

Responses included: *“The fact that it was only offered once a week (the duration I think could also have been extended by 15 minutes)”* and *“Ending the program, because I really enjoyed it so much”*.

Is there anything else you want to tell us about your experiences?

Responses included: *“I really had a blast and want to learn more!!”*; *“It was good for me, I stayed up”* and *“I had a great time”*.

Discussion

This pilot study is the first to demonstrate the feasibility and examine the effects of 8-10 hours of social dance in those with SMI. There was a significant improvement in functional mobility as measured by the TUG, a test of basic mobility in which participants rise from a chair, walk 10 feet forward, turn around, return to the chair and sit down. Other studies demonstrated that healthy older individuals (60-69 years) complete this task in approximately 8 seconds, which was exceeded by our cohort at pre-test (Steffen 2002). Post-intervention, participants decreased their time to better match those of similar age without SMI.

This study corroborates evidence that individuals with SMI may have diminished endurance and are slower when compared to unaffected individuals. Individuals with schizophrenia have a slower preferred gait velocity than healthy controls, largely due to reduced stride length (Putzhammer et al., 2005). On the 6MWT, our participants improved very slightly from the pre-test average of 464 m (Table I), but as norms for healthy older controls are between 490 m and 683 m (Steffen 2002), these participants may be impaired in endurance and/or balance. Normative values for preferred gait speed in individuals in their fifth and sixth decades are slightly faster than our participants' (~1.40 m/s vs. ~1.30 m/s). This study provides more evidence that interventions that improve mobility are warranted for individuals with SMI.

Some non-significant changes may have modest clinical significance. Our participants improved in balance confidence as measured by the ABC. Participants had a mean score of 75 at pre-test, indicating a moderate level of physical functioning and characteristic of elders in retirement homes and persons with chronic health conditions; however, at post-test, participants improved to a mean of 88 (effect size: 0.64), indicative of highly functioning, physically active older adults (Myers et al., 1998). On the BDI-II our participants decreased in score from approximately 18 to approximately 11 points (effect size: 0.54), exceeding the minimally important clinical change of at least five points (Hiroe et al., 2005). Also, participants improved from a moderate to a mild classification of depression (Beck et al., 1996b). Similar non-significant improvement was noted in BAI (effect size: 0.41).

Therapies for those with psychosis remain imperfect, and adjunct therapies are needed. Xia & Grant (2009) found no evidence to support or refute the effectiveness of DMT for schizophrenia, but as only one study met their criteria they keenly demonstrated the lack of randomized controlled studies on the effectiveness of dance for those with SMI. As this study's dance program was patterned after social dance classes offered in the general community, we demonstrate the feasibility of a 'normalized' social dance program for individuals with SMI. This

program may be most effective for those with SMI who are stabilized in their medication program, and are actively involved in restoring function and independence to their lives.

Intervention effectiveness is contingent on participant compliance. Individuals with SMI have a high dropout rate from exercise programs. Motivation appears crucial to a physical activity's success as its lack is a determining factor for attrition (Archie et al., 2007). In this study, 3 of 12 participants dropped out; however, 2 of those participants were lost to hospitalization. Participants who completed the program appear to have been motivated, as most indicated they enjoyed classes and expressed interest in continuing. Open-ended responses show the program's positive impact on their lives, by learning new things, and being part of a fun group activity.

Conclusion

Participants with SMI who received 8-10 hours of instruction in progressive salsa lessons significantly improved in functional mobility and showed tendencies toward improvement on standard clinical measures of endurance, balance confidence, depression and anxiety. Limitations include a small sample size and lack of information about longer-term retention of gains and transfer of effects to daily activities. Given a lack of statistical power, interpretation of some null findings is difficult. A small sample size and lack of control may misrepresent the potential impact of this innovative program. However, this pilot work provides data to support future controlled studies, with larger samples, concerning a topic that needs rigorous investigation as an adjunct therapy for treatment of SMI. As exercise is used more frequently in the mental health field, more research is necessary to enable comprehensive evidence-based practice (Ellis et al., 2007). Exercise compliance is difficult to achieve in clinical and research settings, but dance may be particularly effective as it interests and engages many. Social dance may promote adherence in those with SMI while incorporating key elements of successful exercise programs: motivation, cardiovascular and functional mobility challenge.

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Table I: Measures of Mobility, Balance confidence, Depression and Anxiety	Pre	Post	Effect Size
Timed Up and Go (s)	8.2 ± 0.9	6.8 ± 0.4 ^{w*}	0.68
One Leg Stance (s)	27.2 ± 8	27.3 ± 9 ^w	0.00
6 minute walk test (m)	464 ± 16.7	470 ± 20.5	0.11
Forward Gait Velocity (m/s)	1.28 ± 0.02	1.31 ± 0.02	0.10
Beck Depression Inventory	18.3 ± 4.0	11.7 ± 4.2	0.54
Beck Anxiety Inventory	17.8 ± 4.0	12.8 ± 3.9	0.41
Activities-specific Balance Confidence Scale (out of 100) ^	75 ± 9.0	88 ± 4.5 ^w	0.64

Values are means ± SEs, N = 9. Paired t-tests determined significance of changes from pre to post. ^wWilcoxon Signed Rank Test, * = statistically significant change, ^ greater scores indicate more balance confidence.