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Review article

Impacts of dance on non-motor symptoms, participation, and quality of life in Parkinson disease and healthy older adults

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ABSTRACT

Evidence indicates exercise is beneficial for motor and non-motor function in older adults and people with chronic diseases including Parkinson disease (PD). Dance may be a relevant form of exercise in PD and older adults due to social factors and accessibility. People with PD experience motor and non-motor symptoms, but treatments, interventions, and assessments often focus more on motor symptoms. Similar non-motor symptoms also occur in older adults. While it is well-known that dance may improve motor outcomes, it is less clear how dance affects non-motor symptoms. This review aims to describe the effects of dance interventions on non-motor symptoms in older adults and PD, highlights limitations of the literature, and identifies opportunities for future research. Overall, intervention parameters, study designs, and outcome measures differ widely, limiting comparisons across studies. Results are mixed in both populations, but evidence supports the potential for dance to improve mood, cognition, and quality of life in PD and healthy older adults. Participation and non-motor symptoms like sleep disturbances, pain, and fatigue have not been measured in older adults. Additional well-designed studies comparing dance and exercise interventions are needed to clarify the effects of dance on non-motor function and establish recommendations for these populations.

Contents

Abbreviations: PD, Parkinson disease; QoL, quality of life; MDS-UPDRS, Movement Disorders Society Unified Parkinson Disease Rating Scale; ADLs, activities of daily living; PDQ-39, Parkinson's Disease Questionnaire-39; SF-12, 12-Item Short Form Health Survey; SF-36, 36-Item Short Form Health Survey.

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1. Introduction

According to the U.S. Department of Health and Human Services, there were 39.6 million people in the United States over the age of 65 in 2009, and this is expected to grow to 72.1 million by 2030 (19% of the population) [1]. Parkinson disease (PD) is a common neurodegenerative disorder that predominantly occurs in older adults, and over 1 million Americans have PD. People with PD experience various motor and non-motor symptoms, and there is substantial overlap in the symptoms and co-morbidities experienced by PD and aging populations.

Despite considerable evidence that exercise provides important benefits in older adults [2–4] and PD [5–7], 60% of Americans over 65 years old do not achieve the recommended amounts of physical activity [8]. In PD, physical activity is further reduced compared to healthy older adults [9,10]. Current pharmacological and surgical therapies do not sufficiently address all motor and non-motor deficits in PD [11], and non-motor symptoms in particular tend to be overlooked or undertreated [12]. Exercise may serve as an important adjunct therapy to confer additional benefits.

Barriers to exercise in older adults include discomfort in social situations, dependence on an instructor, physical discomfort, fear of falling, comorbidities, affordability, competing priorities, apathy, and belief that exercise was not needed and not beneficial [13]. Social interactions, encouragement, and belief that exercise could improve independence, physical health, and mental well-being are facilitators of exercise in this population [13]. Beliefs that exercise would not be beneficial, a lack of time, and fear of falling are barriers to exercise in PD [14]. Dance is an accessible and appealing form of exercise. The supportive, social nature of dance classes and use of dance instructors are important features that help overcome some of these barriers in older adults.

Prior review articles summarize the effects of dance in PD or older adult populations separately. However, few comparisons have been made between these two bodies of literature despite the potential for identification of relevant metrics and translation of findings. One previous review on dance in PD and older adults focused on motor outcomes but did not cover important non-motor symptoms such as mood dysfunction, impaired cognition, reduced participation, and lower quality of life (QoL) [15]. In this review, we synthesize results from dance interventions in PD and healthy older adults to determine literature gaps and inform future study.

2. Selection of studies

We searched PubMed from inception through July 2015. To identify articles in PD, we searched for the terms parkinson* and danc* (* denotes wildcard character) within the article text. For healthy older adults, the search terms were (elderly or older or senior) and danc*. We included peer-reviewed, controlled studies in English. We limited this review to studies reporting the effects of dance interventions on mood, cognition, other non-motor functions, participation, and QoL in PD and/or healthy older adults. An initial search returned 240 articles in older adults and 68 articles in PD. Excluded studies are detailed in Table 1. Ten articles in PD and ten articles in older adults were included in this review (Table 2).

Table 1
Selection of studies and exclusions.

	Healthy older adults (*n* studies)	People with PD (*n* studies)
Initial search results	240	68
Exclusions	229	57
Review articles	28	14
Not conducted in human participants	2	0
Not conducted in older adults/PD	28	2
Protocols or focus group descriptions	11	6
Case studies	3	3
Irrelevant article types[a]	9	8
No multi-session dance intervention	77	11
Cross-sectional studies	27	0
Single-group study designs	9	7
Participants with specific impairments[b]	15	0
Meta-analysis	0	1
No measures of non-motor function	19	3
Full text article not available	2	3
Included studies	10	10

[a] Irrelevant article types included corrections, commentaries, summaries, and interviews.
[b] Five PD, one stroke, one dementia, one multiple sclerosis, one metabolic syndrome, one chronic lower extremity pain, one mixed urinary incontinence, three obesity, and one visual impairment.

3. Discussion

3.1. Dance intervention parameters

In PD, tango was most frequently chosen for interventions [16–21]. Ballroom [16], Irish Set [22], video game-based [23], and programs with various dance styles [24,25] were also examined. Though tango targets impairments in PD including backward walking, turning, and changing speeds, other dance styles may also be beneficial for addressing impairments in mood, cognition, participation, and quality of life. Interventions ranged from six weeks to two years, from 30 min to 90 min per session, and from one to five days per week.

Older adult studies used various dance styles, including salsa [26], Caribbean traditional [27], Turkish folkloristic [28], aerobic [29], ballroom [30], square [31], contemporary [32], creative [33], and video game-based [34] dance, as well as modified dance for seniors [35]. Interventions in older adults were between 8 weeks and eighteen months, 30–75 min per session, and one to seven days per week.

Certain dance programs may be optimal for addressing specific non-motor impairments in older adults and PD, and further investigations directly comparing different types of dance in both populations are warranted. The ideal dance intervention parameters for individual class duration, training frequency, and length of overall program are unknown for both populations, and direct comparisons of interventions of different intensities and durations will be necessary to develop recommendations.

3.2. Evaluation parameters/study design

In PD, participants maintained normal medication schedules during the intervention. In some studies, evaluations were conducted with participants on their normal anti-Parkinson medications [16,17,21,22], while others evaluated participants off medication (≥12 h withdrawal from anti-Parkinson medication) [18–20]. Medication status during evaluations was not explicitly stated for three studies [23–25]. This limits the generalizability of findings across studies and is particularly relevant for cognitive measures because dopamine differentially affects aspects of cognition [36].

Comparison groups differed widely across studies. In PD, general exercise classes [25], self-directed exercise [21], Tai Chi [16], another dance style [16], physiotherapy [22], neurodevelopment treatment and functional electrical stimulation [23], health education [17], no intervention [18–20,25], or healthy older adults in the dance intervention [24] were used as controls. Only one study in