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REVIEW ARTICLE (META-ANALYSES)

Dance for People With Parkinson Disease: What Is the Evidence Telling Us?

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Abstract

Objectives: (1) To appraise and synthesize the literature on dance interventions for individuals with Parkinson disease (PD); (2) to provide information regarding the frequency, intensity, duration, and type of dance used in these programs; and (3) to inform the development of future studies evaluating dance interventions in this population.

Data Sources: Eight databases (MEDLINE, Cumulative Index to Nursing and Allied Health Literature [CINAHL], the Allied and Complementary Medicine Database [AMED], SPORTDiscus, PubMed, PubMed Central, Sage, and ScienceDirect) were electronically searched in April 2014. The references lists from the included articles were also searched.

Study Selection: Studies retrieved during the literature search were reviewed by 2 reviewers independently. Suitable articles were identified by applying inclusion criteria.

Data Extraction: Data regarding participants and the frequency, intensity, duration, and type of dance form used were extracted. The effect that each dance program had on defined outcomes and the feasibility of each program were also reviewed.

Data Synthesis: Thirteen articles were identified. The quality of studies varied, and methodological limitations were evident in some. The evidence evaluated suggests that two 1-hour dance classes per week over 10 to 13 weeks may have beneficial effects on endurance, motor impairment, and balance.

Conclusions: Dance may be helpful for some people with PD. This article provides preliminary information to aid clinicians when implementing dance programs for people with PD. Higher-quality multicenter studies are needed to determine the effect of other dance genres and the optimal therapy volume and intensity.

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Parkinson disease (PD) is a progressive neurodegenerative[1] disease estimated to affect 6 million people worldwide.[2] People with PD can present with movement disorders,[3] postural instability, reduced mobility, and an increased risk of falls.[4] The severity of PD can be classified according to the original or modified Hoeln and Yahr[1] staging scales, with lower stages on these scales representing milder disease states. At stages 1 and 2, physical symptoms are predominantly unilateral; however, as the stage of disease progresses, physical symptoms become bilateral.[1] Dance has been advocated as one form of exercise for people with PD,[5] especially for those who are newly diagnosed or who have mild to moderate disease severity. Dance interventions for people with PD can sometimes have a positive effect on balance and mobility[6,7] and may help improve quality of life by reducing symptoms of depression.[8,9] Research has also found that dance is superior to exercise for improving balance and functional mobility[10] in some people with PD. Dance may improve motor performance[11] and facilitate long-term compliance with physical activity because it incorporates exercise, socialization, and caregiver participation, which helps to motivate people with PD to engage in physical activity.[12]

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Earhart[5] provided a valuable review consolidating evidence on several aspects of dance in people with PD. However, since 2009, a number of studies have been published in this area, and research protocols have differed in terms of the frequency, intensity, duration, and type of dance interventions used. In addition, the methodological quality of studies that investigated dance interventions for people with PD has not been evaluated. The lack of evidence-based dance prescription renders it difficult to translate research into clinical practice. The primary objectives of this article were to (1) critically appraise the peer-reviewed literature that has investigated the benefit of dance for people with idiopathic PD and (2) provide information regarding the frequency, intensity, time/duration, and type (FITT principle) of dance[13] for people with PD.

The FITT principle provides a framework for reviewing the effectiveness of physical activity programs and enables specific guidelines to be established regarding the optimum characteristics of exercise priograms.[13] The secondary objective of this article was to identify limitations in current peer-reviewed research to ensure that the design, methodological quality, and reporting of future unpublished studies adds to the body of existing literature and addresses gaps in the research.

Methods

Inclusion criteria

Only those articles that met all the inclusion criteria listed in appendix 1 were included in this review.

Literature search

An electronic literature search of 8 databases was conducted in April 2014 (Allied and Complementary Medicine Database [AMED], MEDLINE, Cumulative Index to Nursing and Allied Health Literature [CINAHL] Plus, SPORTDiscus, Sage, ScienceDirect, PubMed, and PubMed Central). The search terms used were "Parkinson's disease" AND "dance." The suitability of articles was determined in a staged process by 2 reviewers (J.S. and A.M.C.). First, titles and abstracts were read and articles that were obviously unrelated to this review were excluded. Then, the remaining articles were read in full and those not meeting all inclusion criteria were excluded. Reference lists from suitable articles were also searched. Any disagreements between reviewers were resolved through discussion. A detailed description of the search process is provided in figure 1.

Data extraction

Articles meeting all the inclusion criteria were reviewed to extract relevant details of the intervention (mode of delivery, frequency, intensity, duration, and type of dance implemented) and the outcomes used to assess the effect of the intervention. In addition, data regarding the age and stage of disease of participants involved in the studies, number of dropouts, attendance rates, and the safety of the dance interventions (monitoring and reporting of adverse events) were extracted.

List of abbreviations:

FITT	**frequency, intensity, time/duration and type**
MDS- UPDRS-3	**Movement Disorder Society-Unified Parkinson's Disease Rating Scale-Subsection 3**
PD	**Parkinson disease**
RCT	**randomized controlled trial**
UPDRS-3	**Unified Parkinson's Disease Rating Scale-Subsection 3**

Outcomes of interest

The outcomes reviewed in this study were chosen so that the benefit of dance for people with PD was assessed at the 3 levels of the International Classification of Functioning, Disability and Health. These levels are body structure and function, activity, and participation.[14] The primary outcomes of interest were balance function measured on the Berg Balance Scale,[15,16] motor impairment measured using the Unified Parkinson's Disease Rating Scale-Subsection 3 (UPDRS-3),[16,17] and functional mobility measured using the Timed Up and Go Test.[16] Secondary outcomes of interest were endurance assessed using the 6-minute walk test,[18,19] quality of life assessed on the Parkinson's Disease Questionnaire-39,[20,21] and activity and participation as measured on the Physical Activity Scale for the Elderly.[14,22] If studies used more than 1 measurement tool to assess the same outcome (primary or secondary), information regarding only the measurement tool listed was reviewed.[23] If studies reported an outcome (primary or secondary) using different measurement tools than those listed,[23] the first measurement tool listed in the article was included in the review. Feasibility was measured using the dropout and attendance rates. Safety was assessed by reviewing adverse effects reported.[24]

Quality assessment

The *Cochrane Handbook for Systematic Reviews of Interventions*[25] was used to define the study design. Level of evidence was graded according to the Agency for Health Care Policy Research recommendations previously described by Ritchlin et al.[26] Two separate quality assessment tools were used to appraise the included articles because of the diversity of study designs.[27] This was done to ensure that key methodology issues associated with each type of design were considered during the appraisal process.[28] The PEDro Scale was used to measure the quality of randomized controlled trials (RCTs) and quasi-RCTs. This scale is valid and reliable and evaluates a clinical trial's statistical methods and internal and external validity.[29-31] The quality of cohort studies was assessed using the Newcastle-Ottawa Quality Assessment Scale for Cohort Studies. This is a reliable scale and recommended by the Cochrane Non-Randomised Studies Methods Group.[32]

Data analysis

Where possible, forest plots were used to illustrate data from RCTs/quasi-RCT for the primary outcomes of interest (balance, motor impairment, and functional mobility). Forest plots were produced by comparing between-group differences for dance and control/other intervention groups using Comprehensive Meta-analysis Software.[a] For accurate and appropriate cross-study comparability, only the data collected using 1 measurement tool was included in each forest plot analysis. The most frequently used measurement tool for each primary outcome of interest was chosen because this would give the largest representation on the effects of dance. Only an exploratory meta-analysis could be performed for each forest plot because of the variability in intervention protocols and participant characteristics. For this reason,