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SYSTEMATIC REVIEW

The effects of Tai Chi on physical function and well-being among persons with Parkinson's Disease: A systematic review

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Review

Summary Current medical treatments for Parkinson's disease (PD) are mainly palliative, though research indicates Tai Chi exercise improves physical function and well-being. An electronic database search of PubMed, CINAHL, Web of Science, Cochrane Library, PsycINFO and Embase was conducted, to examine current scientific literature for potential benefits of Tai Chi on physical function and well-being among persons with PD. A total of 11 studies met the inclusion criteria: 7 randomized clinical trials and 4 quasi-experimental studies. PD participants (n = 548) were on average age 68 years old and 50% women. Overall, participants enrolled in Tai Chi had better balance and one or more aspect of well-being, though mixed results were reported. Further research is needed with more rigorous study designs, larger sample sizes, adequate Tai Chi exercise doses, and carefully chosen outcome measures that assess the mechanisms as well as the effects of Tai Chi, before widespread recommendations can be made.

Introduction

Parkinson's Disease (PD) is a chronic and progressively disabling neurodegenerative condition (Rodriguez-Oroz et al., 2009). By the year 2030, worldwide approximately 9 million persons over the age of 50 will be living with PD (Dorsey et al., 2007). Currently there is no cure for PD and treatment options, such as medication, physical activity or adaptive equipment are geared towards symptom management of tremors, bradykinesia, stiff muscles and postural instability (Grazina and Massano, 2013; Rodriguez-Oroz et al., 2009).

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PD is caused by a loss of neurons in the substantia nigra pars compacta. The overall effect of this neuronal loss is a dopamine deficiency in the nigrostriatal pathway (Dauer and Przedborski, 2003). Clinically, this deficiency causes bradykinesia, rigidity, and resting tremor. However, each person with PD is affected differently by the disease and can experience different symptoms (Rodriguez-Oroz et al., 2009). PD impacts physical function, including balance and gait abilities, as well as well-being (Rochester et al., 2004). PD is associated with numerous neuropsychiatric symptoms including depression and anxiety (Aarsland et al., 1999), which may have a direct effect on well-being. Well-being among those with PD is multifaceted and comprises adequate psychological, social and physical functioning (Diener et al., 2015; Luhmann et al., 2012). Due to the chronic and progressive nature of PD and lack of a cure of this debilitating disease, using complementary therapies, such as Tai Chi exercise, to improve physical function and well-being, may prove valuable (Lamotte et al., 2015). Tai Chi is thought to improve physical function by reducing dyskinesia and bradykinetic movements, leading to better postural balance and walking ability (Li et al., 2012).

Tai Chi is an ancient Chinese exercise, which is a low-cost, low-tech, low-impact moderate-intensity exercise that appeals to adults of all ages, including older adults with chronic illnesses (Li et al., 2012; Wang, 2008; Yeh et al., 2011). During Tai Chi, the slow, rhythmic movements are linked together in a continuous sequence, while body weight is shifted from leg to leg. This challenges the balance control system to maintain its center within a changing base of support (Huang and Liu, 2015). Before Tai Chi can be recommended as an adjunctive therapy for PD patients, it is important to first evaluate the current body of research evidence for potential benefits. Therefore, the purpose of this systematic review was to evaluate the effects of Tai Chi on physical function and well-being among persons with PD.

Methods

An electronic search of published research studies examining the effects of Tai Chi on physical function and well-being among persons with PD was conducted. Electronic databases included: PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Web of Science, Cochrane Library, PsycINFO and Embase (January 2000 through April 2015). The search terms included: "tai ji" or "Tai Chi" and "Parkinson Disease". Articles were limited to English language. Abstracts of all research studies were reviewed to determine if PD participants were assigned to a Tai Chi exercise intervention and if physical function or well-being outcomes were assessed. The following types of articles were rejected: abstracts, reviews, commentaries, case-reports, research methodology papers, re-analysis of data, meta-analysis, an overview, qualitative research, not-related to the topic, or if physical function or well-being were not assessed. Data abstracted from the studies meeting the inclusion criteria were: country of study origin, study design, Tai Chi style and length of the intervention, physical function and well-being variables measured, results, intervention adherence rates, attrition, and serious adverse events.

Study quality

Study quality was assessed using the Quality Index (QI) checklist developed by Downs & Black (Downs and Black, 1998). The QI checklist is widely used with established psychometric properties for determining the methodological quality of both randomized clinical trials (RCTs) and non-randomized studies (Downs and Black, 1998; Viswanathan et al., 2008). The QI checklist contains 27 items to evaluate reporting (10 items), external validity (3 items), bias (7 items), confounding (6 items), and power (1 item) of published studies. All of the items are scored either as a 1 (yes) or 0 (no or unable to determine), except for one item pertaining to the distribution of potential confounders (yes = 2, partial = 1, no = 0) and the single item on power which is scored from 0 to 5 (i.e. sample size required for clinically and statistically significant results). Possible scores range from 0 to 32 with the higher score representing a higher quality study. Two authors (KCL and RTP) independently assessed the studies using the Downs & Black QI checklist (Downs and Black, 1998). Discrepancies in scores were rechecked and consensus achieved by discussion.

Results

The search of four databases yielded 196 articles for screening for potential inclusion (see Fig. 1). After removing duplicate articles and those not-related to the topic, a total of 36 studies were reviewed in depth for eligibility. After reviewing these studies, 24 were rejected as they did not meet the inclusion criteria based on type of article. A total of 12 articles were retained, which represented 11 different studies: 7 RCTs and 4 quasi-experimental studies examining the effects of Tai Chi on physical function and well-being among persons with PD

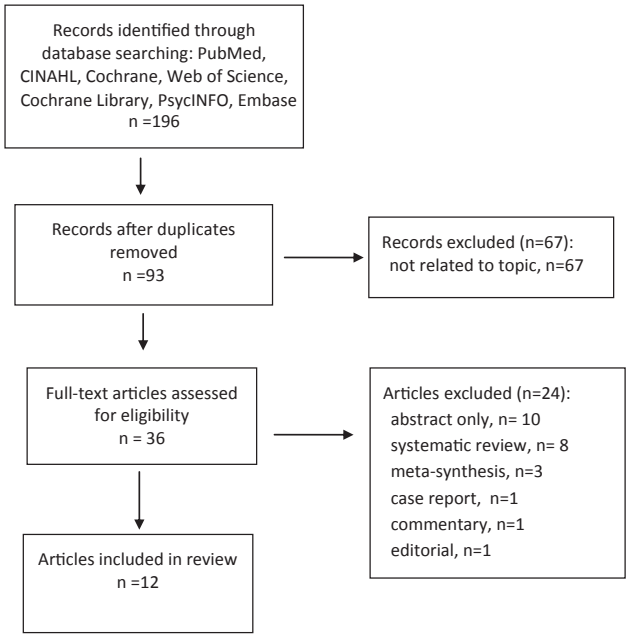

Figure 1 Study selection process.

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