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ORIGINAL ARTICLE

Effects of Pilates Exercises on Health-Related Quality of Life in Individuals With Juvenile Idiopathic Arthritis

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Abstract

Objective: To determine the effects of Pilates exercises on health-related quality of life (HRQOL) in individuals with juvenile idiopathic arthritis (JIA).

Design: Randomized, prospective, single-blind trial.

Setting: Outpatient clinic of pediatric rheumatology and the rehabilitation department.

Participants: Children (N=50) with JIA according to the International League of Associations for Rheumatology criteria.

Interventions: Participants were randomly assigned into 2 groups. In group I (n=25), the participants were given a conventional exercise program for 6 months. Patients in group II (n=25) participated in a Pilates exercise program for 6 months.

Main Outcome Measures: The primary outcome measure was HRQOL, as measured by the Pediatric Quality of Life Inventory version 4.0 (PedsQL 4.0). The secondary outcome measures provided an estimate of the clinical relevance of the primary outcome results and included joint pain intensity (according to a 10-cm visual analog scale), disability (according to the Childhood Health Assessment Questionnaire), joint status (using the Pediatric Escola Paulista de Medicina Range of Motion Scale), and the total PedsQL 4.0 score.

Results: All participants completed the study. The scores of the PedsQL 4.0 differed significantly between groups, indicating that Pilates exercises increased these scores when compared with the conventional exercise program. Group II participants showed significant improvements in the 10-cm visual analog scale-joint pain, Childhood Health Assessment Questionnaire, and Pediatric Escola Paulista de Medicina Range of Motion Scale.

Conclusions: The use of Pilates exercises had a positive physical and psychosocial impact on HRQOL in individuals with JIA. Future multicenter studies with a follow-up beyond the period of treatment using more objective parameters will be useful to support the results of the present study. Archives of Physical Medicine and Rehabilitation 2013;94:2093-102

Juvenile idiopathic arthritis (JIA) is a chronic disease of unknown etiology with an age of onset of >16 years.[1] JIA is characterized by persistent arthritis (with a minimum duration of 6wk) and, in some cases, extra-articular manifestations.[1] The disease has an estimated incidence of 16 to 150 per 100,000 children worldwide.[2] The disease makes physical activity difficult for patients and negatively impacts patients' health-related quality of life (HRQOL), as perceived by the patients and their caregivers.[3,4]

Exercise programs can be effective at increasing JIA patients' physical activity and abilities and reducing pain.[5-10] Based on

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previous studies in adult populations,[11-15] it was hypothesized that a Pilates exercise program would result in a greater improvement in HRQOL for patients with JIA than a conventional exercise program. Thus, the goal of this study was to assess the effects of a Pilates exercise program on HRQOL in individuals with JIA.

Methods

Participants

The participants recruited for this randomized controlled trial were 8- to 18-year-old patients, who were diagnosed with oligoarticular, polyarticular, and systemic subtypes of JIA, according to the International League of Associations for Rheumatology criteria,[16] from the outpatient clinic of pediatric rheumatology at the Hospital de Clinicas da Universidade Federal de Uberlândia in Brazil. The patients and their caregivers were informed of all aspects of the study, and their written consent was obtained. The human ethics committee of the Uberlândia Federal University approved the study.

The sample size and power calculations were performed using SPSS statistical software version 18.[a] The calculations were based on detecting a difference of 4.4 points for the child self-report and a difference of 4.5 points for the parent proxy report in the Pediatric Quality of Life Inventory version 4.0 (PedsQL 4.0) total scale score,[17] using a 2-tailed test and assuming an SD of 7 points and an alpha level equal to .05. This generated a sample size of 25 participants per group.

During the 6 months prior to inclusion in the study (the pre-baseline period), the participants did not follow any standardized exercise program, but they did receive local and/or systemic arthritis-related therapy consisting of nonsteroidal anti-inflammatory drugs, disease-modifying antirheumatic drugs, immunosuppressive medication, and/or steroids. No restrictions were placed on their medication use, and every effort was made to keep the patients' health stable throughout the study. The importance of using medication to control JIA was explained to the caregivers to alleviate any parental reluctance to use drug therapy.[18] Patients were excluded from the study if they had significant cardiac, pulmonary, or metabolic comorbidity or had an active disease that required therapy modification during the study.

Arthritis was defined by an increased joint volume and/or the presence of 2 of the following manifestations: pain, limited range of movement, or increased temperature. JIA was considered to be active when arthritis and/or extra-articular manifestations were present, as observed in the systemic form of JIA.[19]

List of abbreviations:

CHAQ	**Childhood Health Assessment Questionnaire**
CI	**confidence interval**
HRQOL	**health-related quality of life**
JIA	**juvenile idiopathic arthritis**
MCID	**minimal clinically important difference**
PedsQL 4.0	**Pediatric Quality of Life Inventory version 4.0**
pEPM-ROM	**Pediatric Escola Paulista de Medicina Range of Motion Scale**
RR	**relative risk**
VAS	**visual analog scale**

Randomization and patient groups

Randomization was performed 2 days after the patient recruitment period by 2 hospital staff members who were blinded to all information pertaining to the patients' participation in the study. One staff member generated 50 random numbers in a Microsoft Excel spreadsheet.[b] The second staff member associated each random number with a patient from a second list containing the names of the patients listed in the order of recruitment. The randomization lists were transferred to 2 sealed, opaque envelopes, which were then given to the research team. The patients were divided into 2 groups. Group I consisted of the participants associated with the first 25 random numbers, and group II consisted of the other 25 participants. For 6 months, group I patients participated in a conventional exercise program, and group II patients performed the Pilates exercises.

The 2 physicians who assisted the patients were blinded to the study. The study personnel responsible for administering fitness testing, data collection, statistical analysis, and manuscript preparation were blinded to the patient allocation.

All participants were instructed not to reveal information to other potential participants in the study. Patients who missed therapy 3 consecutive times during the intervention period were excluded from the study.

Interventions

Each intervention was performed under the supervision of a physical therapist trained to provide the same degree of motivation for each of them. The intervention sessions were 50 minutes in duration and occurred twice per week. Forty-eight intervention sessions were planned for each patient. The treatment interventions were standardized to enhance the internal validity of the design and to allow for the ease of replication in future clinical trials, in accordance with the 2010 update of the Consolidated Standards of Reporting Trials statement.[20]

Appendices 1 and 2 describe the exercises performed by each group. Supplemental videos 1 and 2 (available online only at http://www.archives-pmr.org/) demonstrate a Pilates session and a conventional exercise program, respectively. Both groups performed their exercises in the morning and afternoon in different locations.

Pilates

A group of general exercises was chosen for the baseline period of this study, and a paper copy of the exercises was available to patients (see appendix 1). The exercises followed the Canadian STOTT-PILATES methodology and included floor exercises[21] and exercises with the Reformer,[22] Stability Chair,[23] Cadillac,[24] and Ladder Barrel.[25]

These exercises were adapted to the physical and cognitive specifications required for the age groups (8−12y and 13−18y) (fig 1) and the limitations imposed by JIA. The exercises were introduced in order of increasing difficulty and were performed with 5 repetitions of each exercise for the first 3 classes, 8 repetitions for the next 3 classes, and 10 repetitions in subsequent classes.