



## Effects of 16-weeks of Pilates on health perception and sleep quality among elderly women



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### ABSTRACT

The objective of this study was to determine the effect of 16 weeks of mat-based Pilates training on health perception and sleep quality among elderly women. A randomized and controlled trial was conducted in Caxias do Sul, Brazil, in 2015, in which 61 healthy older women were divided into two groups: experimental group (EG;  $n = 31$ , average of 64.25 years old, SD 0.14) and control group (CG;  $n = 30$ , average of 63.75 years old, SD 0.08). The EG participants performed mat-based Pilates exercises twice a week in 60-min sessions, whereas the CG did not train. All participants completed Brazilian-adapted and validated versions of the Pittsburgh Sleep Quality Index (PSQI-BR) and General Health Questionnaire (GHQ-12) at baseline and after 16 weeks. Significant time  $\times$  group interaction effects were found for the GHQ-12 total score ( $p < 0.001$ ,  $\eta^2 = 0.19$ ), and the depression ( $p = 0.002$ ,  $\eta^2 = 0.15$ ) and social dysfunction subscales ( $p = 0.001$ ,  $\eta^2 = 0.18$ ), as well as the PSQI-BR total score ( $p = 0.017$ ,  $\eta^2 = 0.09$ ), and the sleep latency ( $p = 0.023$ ,  $\eta^2 = 0.09$ ) and use of sleeping medication subscales ( $p = 0.019$ ,  $\eta^2 = 0.09$ ), indicating better improvements (reductions) in these outcome variables for the Pilates EG when compared to the CG. All significant effects were classified as moderate to high. These results indicate that 16 weeks of mat-based Pilates training significantly improves the perceived health status and some sleep quality indices among elderly women. However, more studies are needed to assess the effectiveness of equipment-based Pilates exercises among this population.

### 1. Introduction

According to the World Health Organization (2016), in almost every country, the proportion of people aged over 60 years is growing faster than in any other age group, because of both longer life expectancy and declining fertility rates. This ageing population can be seen as a success for public health policies, and as socioeconomic challenges for society, as it needs to adapt and maximize older people's health, as well as their social participation and sense of security. With this increase in the elderly population, especially women, there is a need to investigate interventions designed to promote their quality of life and health.

Of all the different physical activity and exercise programs made available to the elderly at gyms, cohabitation centers, clubs, free schools, community centers and sports associations, the Pilates methodology has been most widely popularized.

Pilates believed that his method, called "Contrology", would

activate brain cells to stimulate the mind and affect the body. As McNeill (2011, p. 103) stated, "there are many differences in the way that Pilates is taught. It is often divided into two types of Pilates: Pilates on the mat and Pilates equipment in which the work is based on the use of Pilates machines". He invented his apparatus as an aid to learning movement patterns; mastering the mat program was the method's goal, and the outcome was transference to more functional and integrative movements.

According to Di Lorenzo (2011, p. 355), there are 12 original pieces of Pilates equipment: the reformer, cadillac, wunda chair, electric or high chair, magic circle, ladder barrel, small barrel, baby chair, mat, spine corrector, toe corrector and breath-a-ciser. Another important feature of Pilates was highlighted by Aparício and Pérez (2005), regarding the emphasis of this method on the strengthening of the powerhouse, which includes the circumference of the lower torso, which is responsible for supporting and strengthening the rest of the body.

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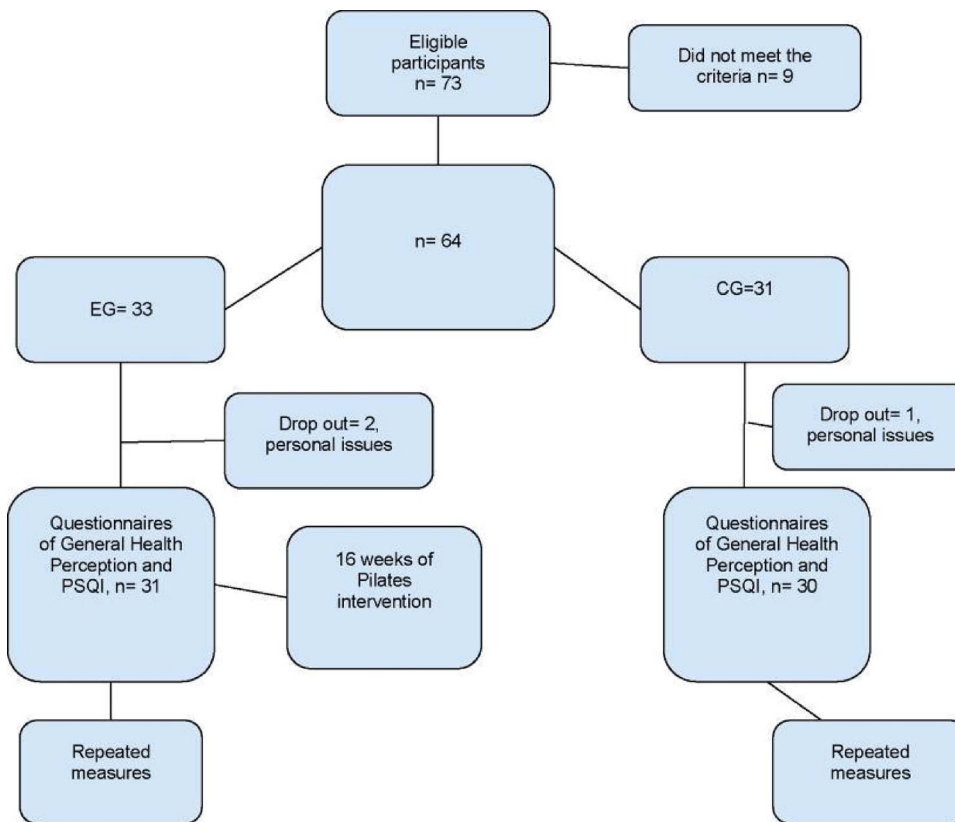


Fig. 1. Flowchart of participants during the trial.

Working with the whole body, with correct alignment and appropriate posture, it helps to develop the body stability necessary for a long and healthy life.

In a systematic review by [Cancela, de Oliveira, and Rodríguez-Fuentes \(2014\)](#), the authors concluded that there is strong evidence supporting that the Pilates program improves the static and dynamic balance in older adults, while there is moderate evidence of the effects on flexibility of the lower limbs.

In a study by [Oliveira, Fagundes, and Gorges \(2015\)](#) on the effects of Pilates for older people, the authors concluded that while Pilates could be a useful tool in rehabilitation and prevention programs, more high-quality studies are necessary to establish the full extent of the effects associated with the use of this method in the elderly population. The studies included in this systematic review showed limited evidence of improvements in muscle strength, flexibility, reduction of falls, autonomy and quality of life in men and women. Additionally, there was limited evidence about adherence to a Pilates program and inconclusive results about the effects on cardio- metabolic parameters.

Meanwhile, a study by [Bullo et al. \(2015\)](#) concluded that Pilates should be taken into account as a way to improve quality of life in the elderly, due to the imparted benefits of prevention of falls, physical fitness, and mood States. In this context, physicians might include the Pilates programs in exercise prescriptions for the elderly.

When we think of the importance of sleep in terms of obtaining the desired effects of regular practice of Pilates, the sleep quality becomes relevant in the healthcare process. For example, the results found in a meta-analysis by [Yang, Ho, Chen, and Chien \(2012\)](#) indicate that participation in exercise training has a moderately beneficial effect on sleep quality and decreases both sleep latency and use of sleep medication. These findings suggest that physical exercise therapy could be an alternative or complementary approach to existing therapies for sleep problems, especially since exercise is cheap, widely available and generally safe.

Added to this, the perception that the individual has over their own

health serves as a self-care tool, especially for older people in daily life activities. However, many older people perceive ageing negatively, describing it in terms of poor or declining health and functioning. According to [Warmoth, Tarrant, Abraham, and Lang \(2016\)](#), these perceptions may be related to health and functioning across seven domains: memory and cognitive performance, physical and physiological performance, medical conditions and outcomes, disability, seeking care, self-rated health and quality of life and death.

So far, no studies have been found that investigate the perception of health and quality of sleep in older female practitioners of Pilates. Only studies that assessed other populations in terms of these variables were found. Therefore, this study aims to narrow this gap by investigating the effects of regular Pilates practice in elderly women and its influence on their quality of sleep and health perception. The hypothesis of this randomized controlled trial was that elderly women who engaged in a 16-weeks Pilates program would report increases in their health perception and sleep quality indices after this training period, whereas control participants would not show changes in these outcomes during the same time.

## 2. Methods

### 2.1. Design and setting

This randomized controlled trial ([Lakatos & Marconi, 2001](#)) was submitted to the Research Ethics Committee of the Federal University of Rio Grande do Sul, Brazil. Sixty-one female volunteers enrolled in the UCS Senior Project, in the city of Caxias do Sul, Brazil.

### 2.2. Participants

The participants were randomized by a draw into an experimental group (EG;  $n = 31$ , average of 64.25 years old, SD 0.14) and control group (CG;  $n = 30$ , average of 63.75 years old, SD 0.08), (Fig. 1).

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