

Effects of yoga practice on muscular endurance in young women



Juliana Costa Shiraiishi*, Lídia Mara Aguiar Bezerra

University of Brasília, Faculty of Physical Education, Campus Universitário Darcy Ribeiro, 70910-900, Brasília, Distrito Federal, Brazil

ARTICLE INFO

Article history:

Received 24 August 2015

Received in revised form

19 October 2015

Accepted 3 December 2015

Keywords:

Yoga

Physical endurance

Women

Muscle strength

ABSTRACT

The aim of this study was to verify the effects of a systematized yoga practice on muscular endurance in young women. Twenty six women (24 ± 3.5 years old) participated in six weeks of yoga classes, and twenty one women (25 ± 5.1 years old) participated as the control group. The yoga intervention was composed of eighteen sessions, three times per week, at 1 h per session. The muscular endurance of upper limbs (push-up) and abdominal (sit-up) was assessed through the protocol suggested by Gettman (1989) [1] and Golding, Myers and Sinning (1989) [2] to the maximum repetitions performed in 1 min. To verify the significant differences intra groups and between groups a SPANOVA was performed, and the level of significance was $p \leq 0.05$. The findings suggest that yoga provides improvement in upper limb and in abdominal muscular endurance.

© 2015 Elsevier Ltd. All rights reserved.

1. Introduction

According to the Yoga encoder, Patañjali (II a.C.), *asana* is any posture that remains steady and comfortable. To Mahanjan and Babbar (2003) [3] *asanas* are isometric exercises which involve a coordinated action of synergists and antagonists muscles, requiring firmness, flexibility and precision in body movement. Thus, the *pranayamas* (breathing exercises) request a coordinated action from abdominals and intercostal muscles; furthermore, apnea can be done after an inhale or exhale breathing.

Some studies showed improvements in well-being, anxiety, stress and mood after a yoga intervention [4–7]. Other studies reported better physical performance in flexibility, resistance and retardation of fatigue in those who have practiced yoga for six months or more [8–10]. Yet, Raju et al. (1994) [11] demonstrated an increase in oxygen consumption due to an efficient oxygen delivery to tissues without an increase in blood lactate levels. With *pranayama*, it was possible to observe a reduction in blood pressure (systolic and diastolic), resting cardiac rate, and lipid profile [12–15].

Additionally, the regular practice of yoga (*asanas*) could improve flexibility and strength in spinal muscles; a decrease of impairments in individuals with rheumatism [10,16]; an increase in

aerobic muscle power due to the conversion of type II fibers into Type I fibers; a positive effect on balance and gait parameters [17]; and better velocity and agility [18,19].

In the case of muscle endurance, the study by Bhutkar et al. (2011) [20] concluded that a progressive increase of cycles (6–24 cycles) in *surya namaskara*, a sequence of dynamic movements, six days a week for 24 weeks, increased muscle endurance in young men and women (undergraduate students); however there was no control group to broaden methodological support. Jackhotia et al. (2015) [21] also demonstrated a major increase in muscle endurance in the upper limbs of obese women (20–40 years old) when compared to circuit training, treadmill and the control group; they also proposed regularly practicing only *surya namaskara* for eight weeks, yet did not mention the time for each of the postures or cycles of *surya namaskara*, nor how breathing control was conducted. Another study of male and female Chinese adults who attended a yoga program for 12 weeks found that the yoga group achieved significant improvements in curl-up and push-up tests compared to the controls [22].

The yoga postures not only require strength in the abdominal wall, but strength in the upper-limbs because the execution of the movements automatically utilize trunk muscles to maintain an assertive trunk posture. Some studies support that some upper-limb movements like abduction provide contra lateral abdominal muscle activity [23].

Nevertheless, the studies cited above served as stimuli to propose a systematized program of yoga practice. These types of exercises do not demand quick movements or require impact; on the

* Corresponding author. SQS 310 F 305, Brasília, Distrito Federal, 70363-060, Brazil.

E-mail addresses: jshiraiishi@gmail.com (J.C. Shiraiishi), Lidia.bezerra@gmail.com (L.M.A. Bezerra).

other hand, the question remains; could a systematized yoga practice influence local muscle endurance?

2. Methods

2.1. Trial design

This was a quasi-experimental study conducted on young women. Randomization was at the participant level, allocated to the practice of yoga or to the maintenance of a daily routine, using a computer program. All experimental protocols and procedures were approved by a Committee board at the University and all subjects signed a statement of informed consent acknowledging that they are fully aware of the purposes and procedures of the project.

2.2. Subjects

Sixty healthy women between ages of 20–29 years old were recruited through convenience sampling method. The participants were screened and randomized into YG ($n = 30$) and CG ($n = 30$). Major exclusion criteria included: pregnancy or postpartum (less than 6 months); the use of any medications; the practice of yoga or other regular physical activity, and an attendance of less than 75% of total sessions or an absence from the post test (Fig. 1).

2.3. Intervention

The body mass index (BMI) was calculated from height and weight measurements by using the formula: $BMI = \text{Body weight (kg)} / \text{Height}^2 (\text{m}^2)$. Body mass was measured at a 0.1 kg precision using a digital scale (FILIZOLA) with the volunteer wearing light clothes and no shoes. Height was measured at a precision of 0.1 cm using a stadiometer set in the digital scale.

The supervised yoga program lasted 6 weeks and was held three times per week at 60 min per session. Each session was divided into 3 parts: preparatory, main and final [24]. Each phase is described below (Table 1).

Preparatory phase (*pranayamas*): Five minutes with continuous nasal respiratory exercises. During respiratory exercises, the participants were sitting and carried out the following exercises: i) *Adhama Pranayama* (deep breaths with or without air retention); ii) *Nadi Sodhana* (alternated breathing through the nostrils); iii) *Bhastrika* (quick and forceful inhaling and exhaling, producing a noise as loud as the sound of a sickle). Concomitantly with these respiratory exercises, abdominal muscle contraction techniques were also performed: iv) *Uddiyana Bandha* (contraction of the abdominal region breathing normally or after a forced expiration) and v) *Jalandhara Bandha* (contraction of the larynx muscles after an inspiration).

Main phase: 45 min to perform “sun salutation” (*surya namas-kara*), and 15 positions (*asanas*). The positions were: tree position (*vrikasana*), triangle position (*trikonasana*) royal ballerina (*natar-ajasana*), half-moon (*ardha chandrasana*), hands on feet (*padahas-tasana*), wheel position (*chakrasana*), vertebral column torsion (*ardha Matsyendrasana*), incan position (*pashimotanasana*), snake position (*bhujangasana*), turtle position (*kurmasana*), bridge pose (*setu bandha sarvangasana*), cat position (*katuspadasana*), grass-hopper position (*salabhasana*), head on the knees (*janusirsharsana*), arch position (*dhanurasana*), sail (*sarvangasana*), the sickle (*vipar-itakarani*), crow pose (*kakasana*), crane pose (*bakasana*) [24].

Final phase: 5 min of natural continuous nasal breathing seated in a meditation that the participant choose; lotus position (*pad-masana*), adepts position (*siddhasana*), easy position (*sukhasana*) or ankle lock position (*swastikasana*) and 5 min of normal breathing while lying on the floor (*savasana*).

Muscle endurance was assessed through pushup and sit-up tests according to Gettman (1989) [1] and Golding, Myers and Sinning (1989) [2]. The primary goal of the test is to measure the maximum number of push up and sit up in 1 min.

2.4. Statistical analysis

Statistical analyses were performed using the Statistical Package of Social Science (SPSS) for windows version 12.0 (Chicago, IL), and the results were expressed as mean and standard deviations. Upon

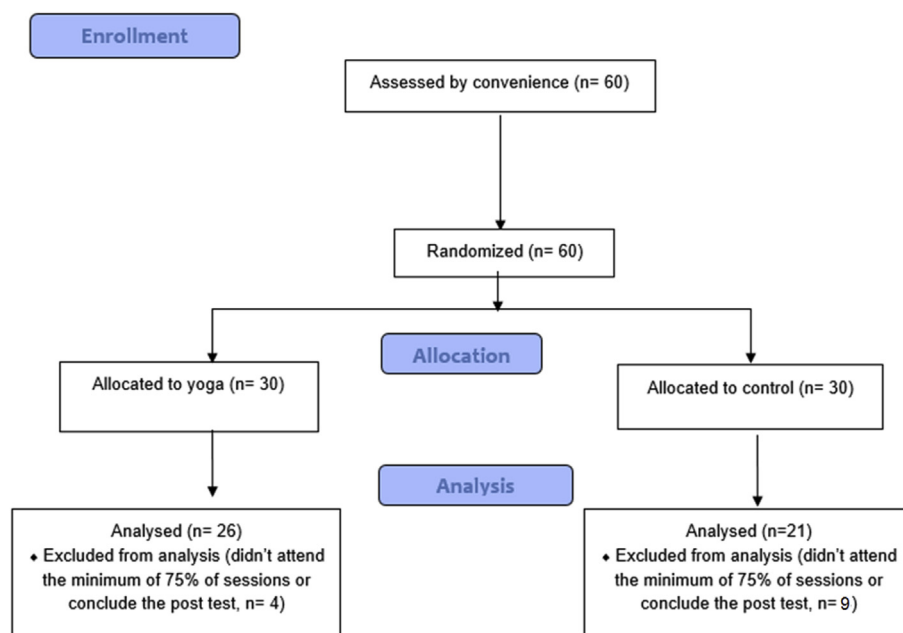


Fig. 1. Flow chart outlining participation in this study.

Download English Version:

<https://daneshyari.com/en/article/2628444>

Download Persian Version:

<https://daneshyari.com/article/2628444>

[Daneshyari.com](https://daneshyari.com)