Effects of Yoga on Older Adults Residing in Assisted Living Facilities

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Introduction

The percentage of older adults (those age 65 and older) in the United States is growing, and 1/3 of them fall every year. Although falls are multifactorial, decreased physical functioning, particularly lower-leg strength has been identified as a key risk. Few studies have been conducted with residents of assisted living facilities. A within-subjects repeated measures experimental design was used to examine the effectiveness of yoga for improving lower leg strength, balance, and overall quality of life for adults aged 60 and older by utilizing a 30-minute yoga-type intervention three times per week for 6 weeks. Pre-assessment included testing the participants' isometric knee strength along with performance of the Short Physical Performance Battery (SPPB) and completion of the Older People's Quality of Life-brief Questionnaire. Differences from pre- to post-intervention testing were examined using paired samples t-tests.

Methods

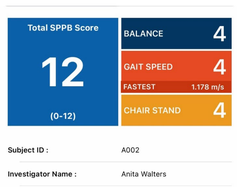
Participants were recruited from three assisted living facilities in mid-west Kansas. The study was marketed as a strength and balance exercise program through fliers, word-of-mouth, and a presentation at each facility. Thirty-nine residents signed informed consent forms and completed demographic information, the Older People's Quality of Life-Brief (OPQOL-brief) and the Godin-Shephard Leisure-Time Physical Activity Questionnaire (GSLTPAQ); however, only 12 met the inclusion criteria after the initial physical assessments. The strength test and SPPB were assessed the first week and repeated the second week with the 12 qualifying participants to develop test-retest reliability. All physical assessments were completed by a licensed Doctor of Physical Therapy with seven years of clinical experience and formal training of the assessment tools utilized in this study.

Components of the SPPB were used to assess global lower limb function and capacity (mobility, balance, and muscle strength). In addition, isolated quadriceps-strength of the lower-extremities was measured using a hand-held dynamometer (HHD) and a standard gait belt. Ahmadiahangar et al. (2018) reported that the occurrence of falls was negatively associated with quadriceps muscle strength; and Wearing et al. (2019) concluded that quadriceps strength had a positive relationship with the performance of basic Activities of Daily Living (ADLs) in the nursing home residents that participated in their study. The SPPB has shown test-retest reliability of 0.87 and demonstrated construct and convergent validity (Gomez et al. 2013). The SPPB mimics functions of daily activities and measures gait speed, static balance, and lower-extremity strength and power via the measurement of time to get in and out of a chair.

Research Design

- Quasi Experimental Design
- Independent Variable
  - Yoga-Standing Postures
- Dependent Variables
  - Strength
  - Balance
  - Quality of Life

Data Collection Tools



Analysis/Results

A paired samples t-test was performed to evaluate whether there was a difference between each component of the SPPB and from pre-intervention to post-intervention as well as in quadriceps muscle strength as measured by the hand-held dynamometer. Using an alpha level of .05, the results are included below:

- 41 residents completed informed consents
- 13 met the inclusion criteria
- 12 sedentary-mildly active individuals completed the study
- 9 women and 3 men
- Aged 61-93 M=83, Median = 87.5 Modal age = 92
- SPPB Results
  - Insignificant increase in Total SPPB score (9.16 – 9.75;p = .066)
  - Insignificant decrease in balance score (3.42 - 3.00; p = .135)
  - Significant increase in gait score (3.00 - 3.42; p = .009)
  - Insignificant increase in chair sit-to-stand (2.91 – 3.00; p = .088)
- A strong positive linear relationship between attendance and Total SPPB (r = .735)
- BSHHD results were deemed unreliable
  - Working memory (cognition)
  - Lack of orientation (training) session
  - Lack of controlled environment (living facility)

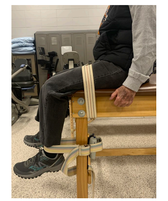
Intervention

The intervention was designed as a beginner class with a focus on standing and balance postures along with relaxation techniques. Each participant had a chair in front of them for support and one behind for them to sit down if needed. Thirty-minute sessions were conducted every Monday, Wednesday, and Friday for six consecutive weeks at each of the three assisted living facilities. The format of the class is shown in Table 2.

Format of class for yoga intervention

Warm up Poses	10 min	Mountain (3 min.), Moonflowers (2 min.), Sunflowers (2 min.), Cow/Cat (3 min.)
Balance/Power Poses	12 min	Balancing Mountain (4 min.), Warrior 1 (4 min), Warrior II (4min.), Knee to Chest (2 min.), Tree (1 min.), Side Squats (2 min)
Stretches	8 min	Quadriceps stretch, Calf stretch, Seated fold/Hamstring, Neck/shoulder stretch (2 min. each)

Discussion



The reliability and validity of this assessment method, known as a belt-stabilized hand-held dynamometer (BSHHD), has been recognized as a portable and convenient method for objectively measuring isometric knee extension muscle strength as compared to isokinetic dynamometry (Bohannon et al., 2011; Katoh et al., 2011; Hirano et al., 2020). However, the current study indicates the need to validate this measure with the older adult population.

This study indicated the potential benefits of a simple standing strength and balance activity for improvement in lower leg strength, with the potential of reducing fall risk over time. It is our belief that with continued exercise intervention strength would continue to improve, yielding more significant results in other areas of the SPPB. Further study with a larger sample size and control group is necessary to support this hypothesis.

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