

The Effectiveness of Exercise Program for aerobic Fitness in Adults with Systemic Lupus Erythematosus: A Systematic Review and Meta-Analysis



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Objectives:

- Learners will understand the effectiveness of exercise program for aerobic fitness in adults with SLE.
- Learners will understand steps of conducting systemic review.
- This study did not receive any funding from any public, for-profit, or non-for-profit organization.
- The authors declare that there is no conflict of interest in conducting this study.

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Outline



- Introduction
- Research question
- Purpose of the study
- Methodology
- Results
- Discussion
- Conclusion and suggestions
- References

Introduction (1/2)



- ❑ Systemic Lupus Erythematosus (SLE) is a chronic immune system disorder that affects various organ systems.
- ❑ Hyperactive B cells, resulting from T-cell and antigen stimulation, increase the production of these anti-bodies against antigens.
- ❑ Autoantibodies and immune complexes formation and deposition lead to multiple organs damage.
- ❑ SLE patients may suffer from a variety of distress symptoms (i.e., fatigue, pain, depression, and sleep disturbance)

Introduction (2/2)



- ❑ SLE patients perform sedentary life style and have lower aerobic fitness, exercise capacity, muscle strength and pulmonary function than healthy people.
- ❑ High correlation between physical inactive and fatigue was reported.
- ❑ Gualano et al. (2010) proposed **a vicious cycle** that lack of physical exercise lead to physical inactivity and variety of symptoms aggravation. Accumulative symptoms (i.e. fatigue and muscle weakness) may drive patients to live in a physical inactive life style.
- ❑ Physical exercise could be a treatment that break the vicious cycle.

Research Question



□ Can exercise increase SLE patients' physical fitness and decrease SLE patients' fatigue?

□ PICO

P	I	C	O
Adult SLE patients	Exercise program	Usual care	1. Physical fitness 2. fatigue

Purpose of the study



- To examine the effectiveness of exercise program on physical fitness and fatigue in adult SLE patients.

Methodology



□ Systematic review and meta-analysis

- Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) recommended guidelines
- Search strategy
 - ✓ Databases: Cochrane Library, PubMed, PsycINFO (ovid), MEDLINE, CINAHL Plus with Full Text (EBSCO)
 - ✓ In order to reduce publication bias, we also searched the System for Information on Grey Literature in Europe (SIGLE) database.

Methodology



- Keywords and terms used
- ✓ Participant: lupus or systemic lupus erythematosus
- ✓ Interventions: exercise, physical exercise, physical activity
- ✓ Types of studies: experimental study, randomized control trial, or quasi-experimental study
- ✓ Outcome measures: no key words used to avoid missing any potentially relevant studies during the search process

Methodology



- Inclusion criteria
 - ✓ participants were adult participants aged over 18 years;
 - ✓ participants were diagnosed with SLE;
 - ✓ intervention was an exercise program;
 - ✓ comparisons were usual care or no treatment;
 - ✓ outcome measures were cardiovascular fitness or psychological distress symptoms;
 - ✓ types of studies were primary research reports of randomized control trial, or quasi-experimental studies.

Methodology



- Exclusion criteria
 - ✓ animal studies;
 - ✓ not published in English

Methodology



□ Assessment of methodological quality

➤ Jadad scale

(Jadad et al., 1996; Olivo et al., 2008)

- ✓ randomization (0-2)
- ✓ double blinding (0-2)
- ✓ dropouts (0-1)

-the score ≥ 3 consider as a high quality trial

(Jadad et al., 1996)

Methodology



□ Data synthesis

- ✓ Cochrane Collaboration's Review Manager Software (RevMan 5.2)
- ✓ We used the degree of inconsistency (I^2) to examine the heterogeneity between studies.
- ✓ If $I^2 > 50\%$ ($p < 0.1$) indicate notable heterogeneity, which need random effects model

(Borenstein, Hedges, Higgins, & Rothstein, 2009).

158 articles identified from database searching

0 additional articles identified from other sources

36 duplicates were removed using Endnote software

122 articles screened

103 articles were excluded

19 full-text articles assessed for eligibility

10 full-text articles excluded.
1 article sample cannot distinguish SLE patient from other rheumatic disease
4 articles conducted short term exercise testing only
1 article was physical exercise survey
4 articles were not original research

9 articles included in this systemic review

4 RCTs included in this meta-analysis

Results



- 9 experimental studies are included in systemic review
- 4 studies are included in meta-analysis
- Characteristics of the included studies
 - Country: Brazil, USA, UK, Norway
 - Study design: 6 RCTs, 2 one group pretest- posttest designs, 1 quasi-experimental design
 - Sample size: 6-93; 337 individuals in total
 - Mean age of sample: 30-50

Results



- Characteristics of intervention

- Frequency

- 2 times/wk- 1 study
- 3 times/wk- 10 studies

- Intensity

- Fairly light to moderate- 1 study
- Moderate- 2 studies
- Moderate to vigorous- 3 studies
- Not mentioning- 3 studies

Results



- Mode
 - Walking- 4 studies
 - Stationary bicycling- 1 study
 - Aerobic exercise- 4 studies

- Duration
 - <30 min – 1 study
 - 30-60 min – 7 studies
 - > 60 min – 1 study

Results



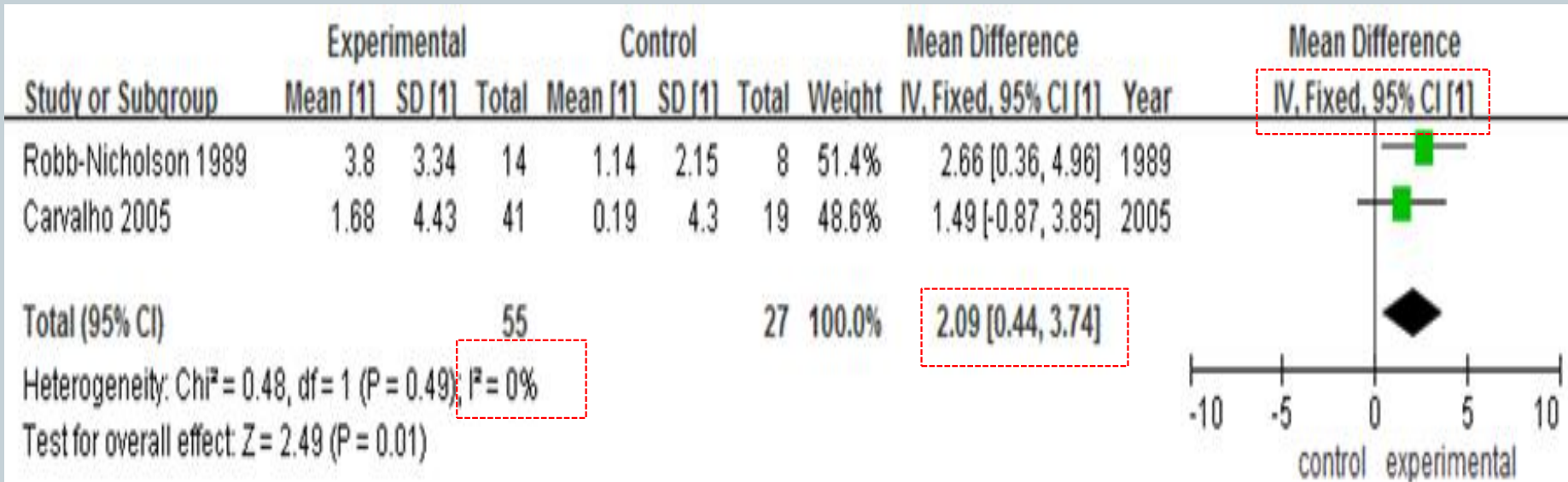
- Study period
 - 8 weeks – 2 studies
 - 10 weeks- 1 study
 - 12 weeks- 5 studies
 - 16 weeks- 1 study

- Supervised exercise or home-based exercise
 - Supervised exercise program- 4 studies
 - Home-based exercise- 4 studies
 - Mixed- 1 study

Results

Meta-analysis

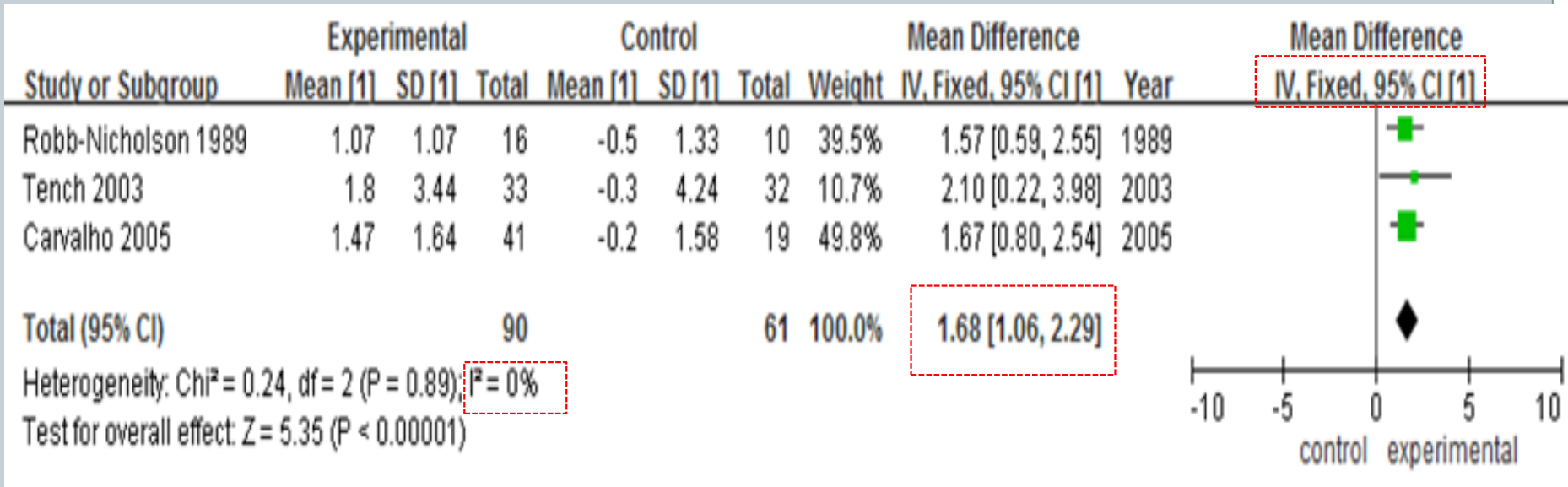
Physical fitness- VO_2 max (ml/kg/min)



Results



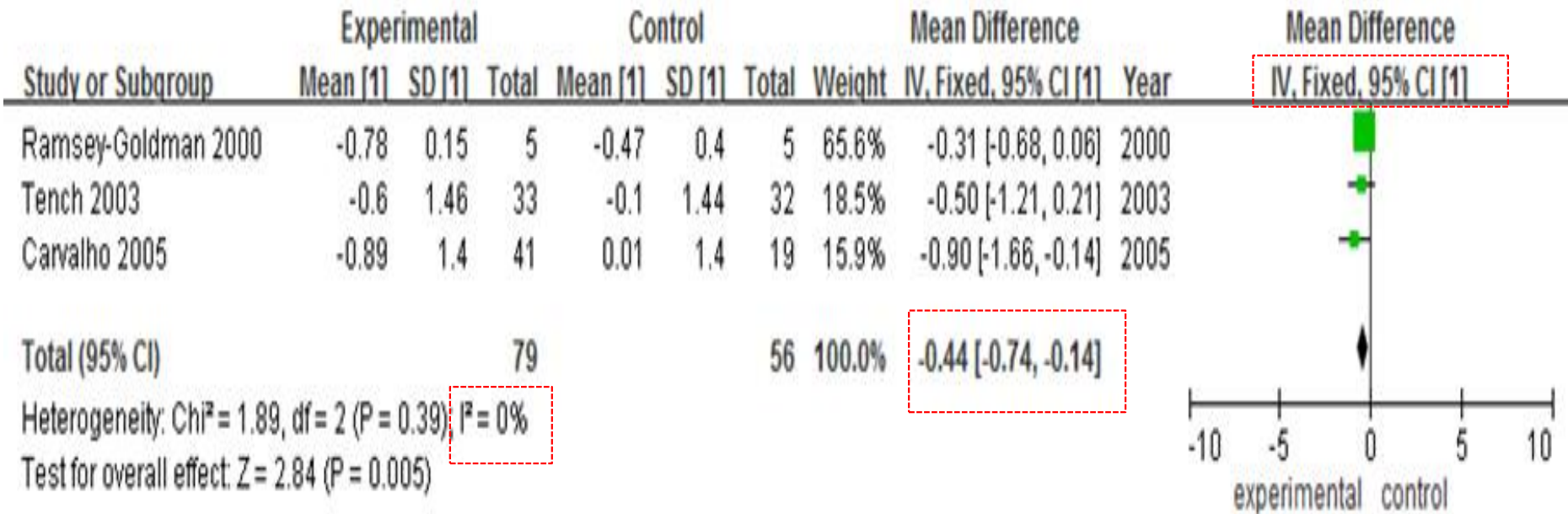
- Physical fitness-exercise tolerance (min)



Results



- Fatigue- Fatigue Severity Scale (FSS) (0-7)



Discussion



□ Effect on physical fitness

Exercise is effective in improving $VO_{2\text{ max}}$ and walking endurance in adults SLE patients.

□ Effect on fatigue

Exercise is effective in decreasing fatigue.

Statistic significance does not imply clinical importance.

□ Exercise is medicine

Exercise is a treatment that could interrupt physical inactivity caused vicious cycle.

Limitations



- Publication bias
- Methodology quality
- Small sample size
- Small number of eligible studies
- Different physical variables/ unit

Conclusion and Suggestions



- Regular exercise with moderate intensity perform at least 8 weeks can improve adult SLE patients physical fitness and decrease fatigue severity.
- Exercise recommendation for adult SLE patients
Regular exerciser :
 - ✓ 150 min of moderate intensity aerobic activity/wk
 - ✓ 75 min of vigorous intensity aerobic activity/wk+ muscles-strengthening activities on 2 or more days/wk
(major muscle group-legs, hips, back, abdomen, chest, shoulder, arms)

Suggestions



- Exercise recommendation for adult SLE patients

Sedentary lifestyle:

- ✓ Begin with 20min a day, 3 days a week, moderate intensity, gradual progression to 150 min a week.
- ✓ Light to moderate exercise for deconditioned individuals is acceptable.

Caution:

- ✓ Patients have severe joint pain and osteoporosis should avoid doing high impact exercise.

Suggestions



- Patient centered exercise prescription is recommended.
- Exercise education or exercise counseling should be a part of clinical care.
- Health care providers should encourage SLE patients do exercise regularly.



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