

The Effects of Exercise on Sleep Quality in Adults Aged 50+

A systematic review

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Background

- ✓ Good quality sleep is essential for optimal health, & virtually all body systems, including cognitive, neurological, immune, skeletal & muscular, are affected by poor or inadequate sleep (Kline, 2014).
- ✓ Poor sleep quality is one of the most common problems in older adults (Santos, 2012), being reported by over 50% of the population (Neikrug, 2010).
- ✓ Sleep disturbances & complaints of poor sleep increase with age & have associated negative health consequences (Yang, 2012).
- ✓ Pharmaceuticals are the primary therapy (Glass, 2005);
 - An estimated 6 to 10% of adults took a hypnotic drug for poor sleep in 2010 (Kripke, 2012);
 - Medications are associated with increased risk & increased financial costs.
- ✓ Exercise has the potential to improve sleep, exercise having been reported reduce insomnia, anxiety, sleep latency & medication use (Buman, 2010); however, reviews exploring the impact on sleep quality in this population are limited & narrow in scope.

Purpose

To perform a systematic review of the literature to investigate ***the effects of regular exercise on sleep disruption*** in a population 50 years of age, or over, including any dose-response relationships between exercise & sleep patterns.

Relevance

- ✓ Exercise could *provide a viable alternative to sedative hypnotics* to alleviate complaints of sleep disturbances in 50+adults.
- ✓ We examined the effects of diverse modes & volumes of exercise on individuals with sleep disruptions to *determine evidence-based exercise prescriptions to optimize health outcomes*.

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Methods

- ✓ Searched PubMed, Cochrane, CINAHL & EMBASE databases (Jan 1990-Jan 2017)
- ✓ Keywords: sleep*, sleep wake disorders, insomnia*, sleep initiation and maintenance disorder, sleep disorder, sleep deprivation, sleep stages, resistance training, exercise, muscle exercise, motor activity, exercise*, physical activit*, kinesiotherap*, Pittsburgh Sleep Quality Index (PSQI), Fatigue Severity Scale (FSS), Epworth Sleepiness Scale (ESS), PSG.
- ✓ Articles were reviewed by four independent authors, with discrepancies resolved by a 5th independent author
- ✓ Inclusion Criteria:
 - Studies with reports of participants' baseline PA &/or exercise level
 - Sleep disruptions (insomnia, restless leg syndrome, sleep apnea, etc.) not caused by secondary issues (i.e., depression)
 - No complex secondary metabolic conditions (i.e., diabetes, hypertension, obesity, etc.)
 - Intervention:
 - Exercise training program (aerobic &/or resistance exercise)
 - Studies examining effects of regular exercise on sleep
 - Studies stating specific parameters of exercise program
 - NOTE: If physical activity was used to describe specifically prescribed parameters for exercise it was included
 - Outcome measures:
 - Self-reported sleep quality (e.g., PSQI, ESS, FSS)
 - Objective sleep quality (e.g., PSG)
 - Other tools considered valid, reliable and frequently cited in sleep studies
- ✓ Exclusion Criteria:
 - Examining atypical sleep regiments (e.g., shift-workers, experimentally-induced insomnia)
 - Non-English articles
 - Participants with medical & psychiatric conditions other than sleep disruptions/disorders (e.g., depression, mania, alcohol/substance abuse) &/or progressive neuromuscular disorders, ABI, stroke, chronic disease, chronic progressive disease, cancer/tumors
 - Interventions including complex forms of exercise, mind-body exercise (e.g., Tai-Chi, Yoga, Pilates) &/or anaerobic exercise programs

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Methods

✓ Publications meeting inclusion/exclusion criteria underwent:

1. Data Extraction:

- Article Citation
- Type of Study
- Research Question/Purpose
- Characteristics of Population
 - » Population size (n)
 - » number of males/females
 - » Age (mean and/or range)
 - » Power Analysis (Y/N)
- Exercise intervention parameters / dosage
- Outcome Measures employed (i.e. exercise / sleep / other)
- Summary of findings
- Author's Conclusions
- Author Stated Limitation/Weakness of Study Our findings of limitations/weaknessess of study

2. Quality Assessment using the PEDro scale and the Oxford Levels of Evidence.

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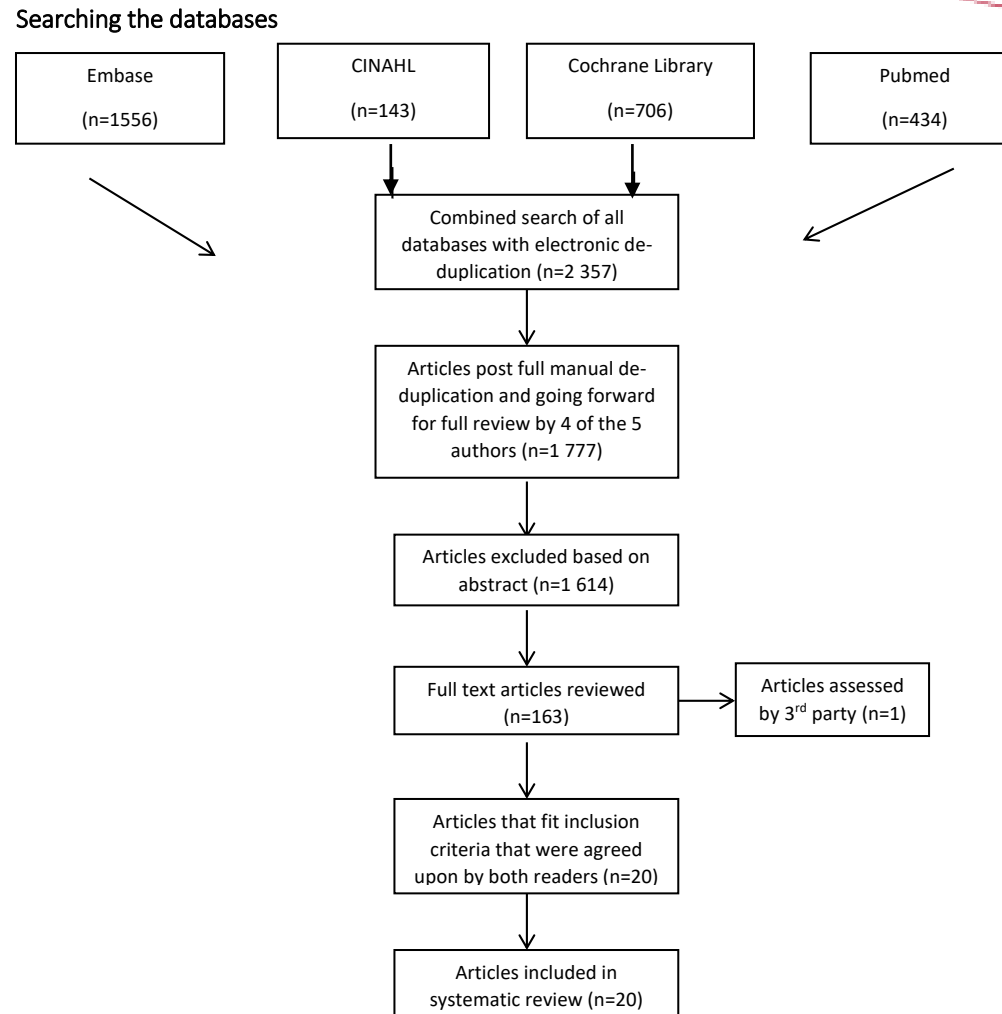


Figure 1: search strategy

Results

- ✓ 1,777 papers were identified from an initial search,
- ✓ 20 of which met inclusion/exclusion criteria.
- ✓ 17 studies (85%) were found to have a positive effect of exercise.
- ✓ Studies in which aerobic exercise was the primary mode of intervention all demonstrated a significant improvement in some or all components of the PSG, PSQI or ESS outcomes (e.g. increased total sleep time, prolonged REM sleep latency, decreased REM sleep and increased slow wave sleep).
- ✓ 2 papers provided some evidence that resistance training alone may improve sleep.
- ✓ 1 study reported a statistically significant dose-response relationship of aerobic exercise;
- ✓ The majority saw trends towards greater improvements in self-reported & measured sleep outcomes with greater volume or intensity of exercise.
- ✓ Specific parameters cannot be recommended due to the heterogeneity of interventions.
- ✓ Quality:
 - The median PEDro score of the combined trials was 4, with scores ranging from 2 to 8.
 - Based on the OCBEM Levels of Evidence: 1 systematic review was attributed the highest score of 1a, 10 studies were rated 1b, & 9 trials obtained a rating of 2b.

Conclusions

Current evidence demonstrates a positive effect of moderate- to high-intensity exercise on sleep quality for those aged 50+ who experience sleep disruptions.