

Characteristics of Resistance Training Programs Targeting Improvements in Health Outcomes in Postmenopausal Women: A Scoping Review



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INTRODUCTION

- Menopause is the permanent cessation of menstruation resulting from losing ovarian follicular activity¹. After going into menopause, women transition into the **postmenopausal period**, which is defined as the period **after 12 months of spontaneous amenorrhea**².
- Resistance training** can be defined as an effective mode to **increase muscle mass** by maximizing the magnitude of the effect in muscle hypertrophy/strength through the variation in exercise intensity, frequency, training volume, and overload³.
- Resistance exercise has been shown to improve postmenopausal syndrome⁴, vasomotor symptoms⁵, metabolic syndrome⁶, muscle mass³, strength gains³, and overall health⁷ in postmenopausal women.
 - It can also improve health complications associated with chronic health conditions such as osteoporosis⁸, obesity⁸, and diabetes⁸.
- Intervention studies usually do not report how the intervention was developed. It would be valuable to report how the intervention was established to guide future resistance training intervention development.

OBJECTIVE

The study investigated the typical characteristics of resistance training programs targeting health-related outcomes in postmenopausal women and to implement resistance training to communities in an evidence-based manner.

STUDY DESIGN

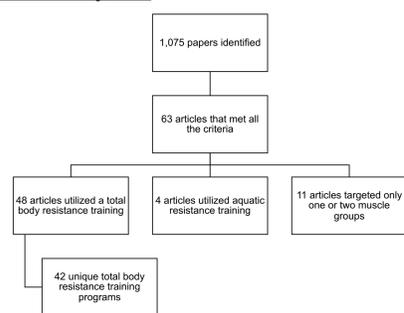
Search Method

Three databases were searched: **PubMed, Embase and CINAHL.**

Selection Criteria

Inclusion Criteria	Exclusion Criteria
<ul style="list-style-type: none"> Published in English Published in 2002 or after Randomized controlled trials Participants are exclusively postmenopausal women. Intervention is only resistance training. Study reports at least the duration of the intervention, frequency, and included exercises. Reporting the impact of resistance training intervention on a health-related outcome 	<ul style="list-style-type: none"> Additional interventions Systematic Reviews, Scoping Reviews, Meta-Analysis, Case studies, Case series, Protocol papers, Editorials, Letters to the editor, Dissertations, Conference abstracts, Grey literature Qualitative research Studies focusing only on women who did not enter menopause naturally.

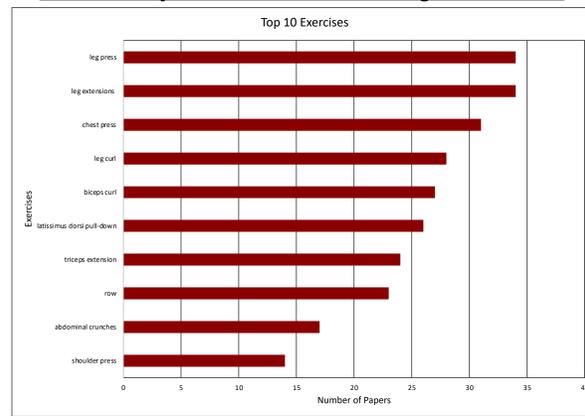
Data Collection and Analysis:



Title and abstract screening, full text screening, and data extraction was performed using the **Covidence systematic review software** (Veritas Health Innovation, Melbourne, Australia). The data extracted from the studies were exported to **Excel**. Data were summarized using **counts, medians, and minimums/maximms.**

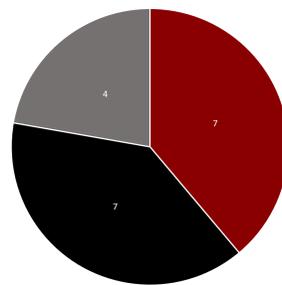
RESULTS

Total Body Resistance Training Exercises



There was a total of 34 exercises. The most common exercise was leg press (n=34) and leg extensions (n= 34). The median number of exercises included in the total body resistance training programs was 9 with a minimum of 4 and a maximum of 14. Thirty-five programs utilized gym equipment while 4 utilized resistance bands.

Number of Sets and Repetitions

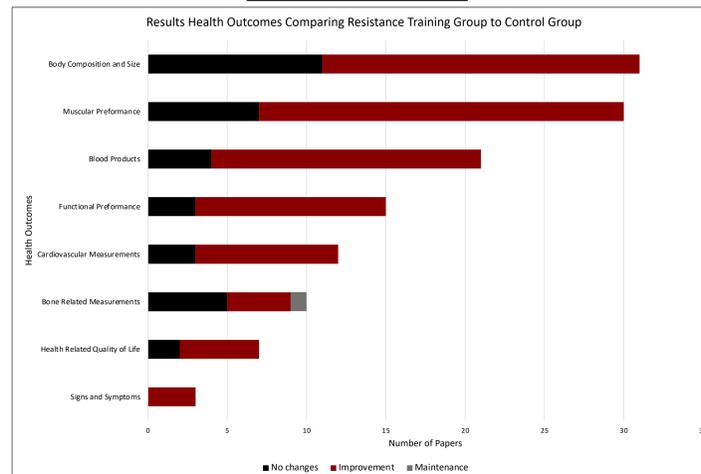


*A protocol of 3 x 8+ repetitions is when participants performed 2 x 8 repetitions and during the third set, they performed as many repetitions as possible. Most reported intensity was 80% 1-repetition maximum (n=8). The second most common intensity was 8-repetition maximum (n=6).

Intervention Duration and Frequency

The median intervention duration for all the studies using a unique protocol was 12 weeks (n=23) with a minimum 6 weeks and maximum of 104 weeks. The median weekly training frequency was 3 days/week (n=49) with a minimum of once a week and a maximum of 5 days/week.

Health Outcomes



A total of 325 unique health-related outcomes were identified. The health-related outcomes were categorized into 8 comprehensive categories. Most reported health-related outcomes were in the body size and composition (n=31) or the muscular performance (n=30) category. Studies typically reported several health-related outcomes and therefore the total number exceeds the number of papers included in this review.

DISCUSSION

- The most common approach to resistance training among postmenopausal women was a **total body resistance training program comprising of lower extremity, upper extremity and trunk muscle resistance exercises**. The median number of exercise per training session was **9**. Most studies used **3 sets of 10 repetitions or 3 sets of 8 repetitions**. These results align with the recommendations set by the **American College of Sports Medicine (ACSM)**^{9,10}.
- The median intervention duration was **12-week resistance training program**. This result aligns with another study that demonstrates that a **12-week exercise program improved body mass, muscular strength, endurance, flexibility, and balance from pre-testing to post-testing**¹¹.
- The most common frequency of the training program to be **3 times a week**. This exercise frequency is generally recommended for maximal strength improvement, and it is the optimal frequency for each body part¹². A **48-h rest period** between concurrent training sessions is generally recommended because that interval is sufficient for recovery of power and repeatability of muscular endurance workouts^{13,14}.
- The most reported health-related outcomes were either in the **body size and composition or muscular performance category**. This is not surprising, considering that at least height and body mass are typically measured to describe participant characteristics in randomized controlled trials, and it is easy to perform an analysis in changes in body mass. Similarly, some measure of muscular performance is typically part of a study protocol in a resistance training intervention study.

Limitations:

- There was a high variation in the characteristics of the observed training programs. The studies used a wide heterogeneity in the number and characteristics of subjects.

Conclusions:

- The literature regarding resistance training on postmenopausal women suggests that a **total body training intervention with roughly 9 exercises with 3 sets of 8 or 10 repetitions, 3 sessions a week for 12 weeks is beneficial to a wide variety of health outcomes**. These results can guide future development of resistance training programs to assist postmenopausal women in improving their health and well-being.

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