The effect of walking intervention on blood pressure control: a systematic review
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CRD summary
This review concluded there was evidence showing beneficial effects of walking on lowering either systolic or diastolic blood pressure or both. The authors' conclusions reflected the evidence presented but, given the poor quality of the included trials (many of which had small sample sizes) and lack of reporting of the control groups, the reliability of these conclusions is uncertain.

Authors' objectives
To review the evidence for the effectiveness of walking interventions on blood pressure control.

Searching
MEDLINE, CINAHL, EMBASE, SPORTDiscus, Science Direct, SocINDEX, PsycINFO, ERIC, the Cochrane Library, Web of Science and CRD databases were searched. Chinese papers were sought from the National Central Library and the Chinese Electronic Periodical Services databases. Search terms were reported. Cross-referencing of original and review articles was undertaken.

Study selection
Randomised controlled trials (RCT) of walking interventions compared with a non-exercise control group for adults (aged 16 years and older) were eligible for inclusion. Studies that included a combination of walking and other activities were excluded. The primary outcome was change in blood pressure.

The interventions included in the review varied in intensity, duration and/or frequency. Most of the included trials had moderate to high levels of exercise intensity. Intervention periods ranged from four days to 26 weeks, with a frequency ranging from four sessions in total to daily sessions; although most trials reported a frequency of five days a week. The duration of the intervention ranged from 10 minutes per session to more than one hour (often with progressive increases). No specific details of non-exercise control conditions were reported.

The age of participants ranged from 16 to 88 years; most were female. Most of the trials only included participants who were sedentary. Some trials reported restrictions on cigarette or alcohol use, or both. Baseline blood pressure measurements were generally lower than the level of hypertension, although nearly half the trials aimed to recruit hypertensive participants. Antihypertensive medication usage varied widely between trials. Trials were conducted in the USA, UK, Australia, Finland, Canada, Japan, Taiwan and New Zealand.

One reviewer selected studies for inclusion. Undecided cases were checked by a second reviewer and verified by a third reviewer.

Assessment of study quality
Trial quality was assessed using the Jadad scale evaluating randomisation, blinding and withdrawals and drop-outs (total maximum score of 5 points).

The assessment was carried out independently by two reviewers; disagreements were resolved by discussion with a third reviewer.

Data extraction
Data were extracted and used to calculate the net change in systolic and diastolic pressure after adjustment for changes in the control group. Authors were contacted for missing data where necessary.

Data were independently extracted by two reviewers; disagreements were resolved by discussion with a third reviewer.
Methods of synthesis
Data were combined in a narrative synthesis.

Results of the review
Twenty seven RCTs (n=1,842 patients, range 18 to 216) were included in the review. Only 12 studies had more than 50 participants. Seven RCTs scored 3 points, fifteen RCTs scored two and five RCTs scored 1 point. Only seven RCTs reported their randomisation process in detail. Drop-out rates ranged from 3 to 42%.

Nine out of 27 RCTs (n=633 patients) reported a statistically significant beneficial effect on either systolic blood pressure (four RCTs) or diastolic blood pressure (two RCTs) or both (three RCTs) for a walking programme compared with a control group. Overall mean differences in systolic blood pressure ranged from -5.2 to -11.00mmHg and in diastolic blood pressure ranged from -3.8 to 7.7mmHg from baseline to end point of follow-up.

Trials interventions that had a beneficial effect on blood pressure tended to have larger sample sizes (nine RCTs), higher baseline blood pressure level (six RCTs) and employed moderate to high-intensity walking (nine RCTs) compared with RCTs that did not show beneficial effects.

Authors' conclusions
This review found there was evidence for the beneficial effects of walking on the lowering either systolic or diastolic blood pressure or both. Trials interventions that showed a beneficial effect on blood pressure tended to have large sample sizes, higher baseline blood pressure level and employed moderate to high-intensity walking programmes compared with those trials that did not show a beneficial effect.

CRD commentary
The review question was clear with appropriate inclusion criteria. Several relevant sources were searched with no restriction on language, publication status or date. However, the authors did not report the end-date of the search (the included trials were published up to 2007). Appropriate methods to reduce reviewer error and bias were undertaken for the assessment of quality and data extraction, but it appeared that only one reviewer selected studies for inclusion, so some relevant studies could have been missed.

Trial quality was assessed using an appropriate tool and details of the assessment were reported. A narrative synthesis was appropriate given the differences between trial interventions and participants. Lack of reporting of details of the control groups made interpretation of the findings difficult. Most of the participants in the included trials were women, so it was uncertain if the results were generalisable to men. Only twelve of the included trials had more than 50 participants.

The authors’ conclusions reflected the evidence presented but, given the poor quality of the included trials (many of which had small sample sizes), the reliability of these conclusions is uncertain.

Implications of the review for practice and research
Practice: The authors stated that when health professionals advise walking as a means of reducing blood pressure, moderate to high intensity walking (65% to 85% of maximum heart rate or greater than 61% of volume of oxygen uptake) should be recommended in addition to other characteristics of physical activity (such as frequency and duration).

Research: The authors stated that further rigorous research was needed to assess the effect of walking interventions on blood pressure, which should ideally include both male and female, normotensive and hypertensive participants.

Funding
Tzu-Chi College of Technology, Taiwan.

Bibliographic details

PubMedID
20863494

DOI
10.1016/j.ijnurstu.2010.08.008

Original Paper URL
http://dx.doi.org/10.1016/j.ijnurstu.2010.08.008

Indexing Status
Subject indexing assigned by NLM

MeSH
Blood Pressure /physiology; Humans; Hypertension /therapy; Randomized Controlled Trials as Topic; Walking

AccessionNumber
12011000358

Date bibliographic record published
25/05/2011

Date abstract record published
09/11/2011

Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.