Disease management interventions for improving self-management in lower-limb peripheral arterial disease (Protocol)

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Disease management interventions for improving self-management in lower-limb peripheral arterial disease

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ABSTRACT

This is the protocol for a review and there is no abstract. The objectives are as follows:

The objective of this review is to systematically review, synthesise and quantify the effects of non-pharmacological and non-surgical chronic disease management interventions targeting self-management for people with lower-limb PAD.
**BACKGROUND**

**Description of the condition**

Peripheral arterial disease (PAD) is a chronic atherosclerotic cardiovascular disease impacting on quality of life and leading to adverse outcomes. The principal symptom of PAD is lower-limb pain or discomfort (known as intermittent claudication), which is typically brought on by walking and relieved by rest (Sutherland 2009). As PAD progresses, intermittent claudication may increase in severity and critical limb ischaemia may develop, which results in constant lower-limb pain at rest, leg ulceration, sepsis, and possibly gangrene and the need for amputation (Sutherland 2009). Several studies have indicated that the prevalence of PAD increases with age. A large study undertaken in San Diego, US identified a prevalence of 2.5% in people aged 60 years, 8.3% in those aged 60 to 69 years, and 18.8% in the study participants aged 70 years or older (Criqui 1985). Of 28,980 Scottish men and women screened using the ankle-brachial index (ABI), 10.9% of participants had an ABI which categorised them as ‘at risk’ (with an ABI < 0.9 indicating PAD and increased cardiovascular risk) (Price 2008). Another Scottish study identified that 4.6% of 2720 participants aged 55 to 74 years had intermittent claudication (lower-limb pain or discomfort brought on by walking and relieved by rest) and 8% had significant impairment of blood flow but were asymptomatic (Fowkes 1991).

Exercise, in particular regular walking, is a fundamental component of lower-limb PAD management (Hirsch 2005; Norgren 2007). Its effectiveness is proven by other Cochrane Reviews (Bendermacher 2006; Watson 2008). The latter showed that with exercise, including walking, skipping and running, the pain-free walking distance mean difference was 82.19 metres (95% confidence interval (CI) 71.73 to 92.65) and the maximum walking distance mean difference was 113.20 metres (95% CI 94.96 to 131.43) (Watson 2008). The benefits of exercise in PAD may be facilitated by the reversal of several pathological events that are common in PAD (for example arterial obstruction, endothelial dysfunction, altered skeletal muscle phenotype and inflammation) (Hamburg 2011). There are several important benefits of exercise for people with PAD. These include improved functional ability, cardiovascular fitness, physical mobility and psychological well being (Guidon 2010; Hamburg 2011). However, adhering to regular exercise can be problematic for people with PAD as the onset of intermittent claudication can act as a deterrent to exercise participation. A recent meta-analysis comparing endovascular treatment of intermittent claudication to supervised exercise reports that outcomes measured by treadmill walking were no different to the outcomes of endovascular treatment (Ahimastos 2011). The authors of the study concluded that “mechanisms that promote greater access to, uptake and sustainability of SVE (supervised exercise programs) would appear to be an important requirement to advance management of intermittent claudication given the favourable results” (Ahimastos 2011). Not only are access and uptake of such interventions important, but adherence is fundamental to the success of interventions such as exercise programs.

Smoking is a substantial risk factor for the development (odds ratio 5.09, 95% CI 2.97 to 8.72) (Leng 1995) and progression of lower-limb PAD and has significant implications for morbidity and mortality (Hirsch 2005; Norgren 2007). Quitting smoking is challenging and specialised support improves the success of attempts to quit (Fiore 2008). Like many other chronic diseases, people with PAD often experience poor health-related quality of life (Dumville 2004). There is evidence of socioeconomic disparity in the prevalence (Kroger 2009) and outcomes (Ferguson 2010) for people with PAD. Stigma and social marginalisation can be experienced by smokers (Stuber 2008).

Considering the psychological burden (Smolderen 2009), poor quality of life (Dumville 2004), risk of acute events (Criqui 2008) leading to increased morbidity and mortality, and management strategies requiring behavioural change and long-term adherence, chronic disease management interventions that aim to improve self-management may improve outcomes for people with PAD. Performance measures for management of PAD underscore the importance of risk assessment, patient education (in particular on the importance of exercise and smoking cessation), self-management (especially adherence to exercise and smoking cessation) and monitoring of disease status (Olin 2010). Based on this guideline, non-pharmacological, non-surgical disease management interventions for PAD should incorporate risk assessment, patient education, self-management strategies and monitoring of disease status.

**Description of the intervention**

Surgical and pharmacological interventions can provide symptom relief and reduce the risk of adverse outcomes for people with lower-limb PAD. However, benefits to quality of life and other outcomes can also be gained through non-surgical and non-pharmacological strategies, in particular, smoking cessation and exercise. However, adhering to exercise programmes and quitting smoking can be very challenging and interventions which promote and support the change of health behaviours and adherence to prescribed treatments may assist people with PAD to improve their own health. Health professionals typically refer to this concept as self-management. There is currently a lack of consensus on the definition of self-management (Gardetto 2011) and self-care is also often used as an interchangeable term. In this review, we will use the term self-management for consistency. Self-management is a core component of disease management interventions (Lovell 2011), which are organised programmes or services often led by a nurse or allied health professional. They aim to increase self-efficacy (a person’s belief that they can achieve a given task) and knowledge about the disease, treatment and outcomes (health literacy) so that the person is better informed and capable of engaging in activities which protect or promote their own health.
defines self-management approaches as help-
Types of participants

Adults (aged ≥ 16 years) of either sex, any age or ethnic group with a diagnosis of lower-limb PAD, ideally defined by the ankle-brachial index (ABI) measurement (ABI < 0.9) or diagnostic equivalent. We will include studies which do not report an ABI or diagnostic equivalent to confirm diagnosis of PAD but state that participants were patients with PAD or had intermittent claudication. Study participants may be from hospital or community cohorts. We will exclude studies dealing with general cardiac or vascular disorders rather than specifically with PAD unless the intervention is tailored to individual patient needs (that is addresses the needs specific to people with PAD and involves the key characteristics of self-management) and data are available for participants with PAD separate from participants with other cardiac or vascular disorders.

Types of interventions

We will include chronic disease management interventions designed to engage people with lower-limb PAD in activities that protect and promote their own health (for example smoking cessation, diet, exercise). These interventions must have a component that supports people in understanding, monitoring and managing symptoms of lower-limb PAD and the impact of lower-limb PAD has on their life (intermittent claudication), as well as maintaining lifestyle modifications that are recommended to people with PAD and adherence to prescribed therapies.

Interventions which involve exercise or everyday physical activity, or both, will be considered for inclusion. However, in addition to prescribing or facilitating an exercise regime, the intervention must be multifaceted and include additional components such as support in understanding, monitoring and managing symptoms of lower-limb PAD and the impact lower-limb PAD has on their life (intermittent claudication), as well as maintaining lifestyle modifications that are recommended to people with PAD and adherence to prescribed therapies. Interventions with no self-management component will be excluded. These interventions will include an active component of support or interaction with the patient as opposed to the mere provision of recommendations about therapies to patients. Education interventions should include some form of assessment of understanding and follow-up. These interventions could take the form of, but are not limited to, interactive education, telemonitoring, self-monitoring, a peer-support group, coaching and motivational interviewing (Lai 2010). Modifiable risk factors such as smoking and adherence to exercise can be addressed with behaviour change strategies that consider the individuals’ beliefs, values and motivation to change. We will not exclude studies based on the personnel delivering the intervention and our review may include programmes delivered by lay personnel (Foster 2007).

We will compare these interventions with usual care, defined as no specialist chronic disease management intervention aimed at improving self-management. For example, usual care could involve a patient receiving instructions from a clinician to stop smoking and commence an exercise programme, but the patient is not enrolled in a programme which addresses self-management specifically and there is no ongoing follow-up of the patient to encourage or support self-management. Interventions will not be performed as part of a trial of surgical or pharmacological interventions and at the same time. The only difference between the intervention and control arms in terms of care received should be the chronic disease management intervention to support self-management.

Types of outcome measures

We will not exclude studies based on the outcomes reported. We will examine immediate outcomes (up to six weeks from the commencement of the intervention), intermediate (up to and including one year from the commencement of the intervention), and longer-term outcomes (measured more than one year after the intervention).

Primary outcomes

We will examine the following as our primary outcomes.

- Functional status will be examined in separate meta-analyses according to the individual measures of distance, such as:
  - absolute claudication distance;
  - initial claudication distance;
  - the six-minute walk test.
- Functional status will also be examined according to the individual questionnaires, such as:
  - Summary Lower Extremity Performance Score (Vogt 1994);
  - Walking Impairment Questionnaire (Regenstein 1990);
  - Baltimore Activity Scale (Gardner 2006).
- Health-related quality of life measured using PAD-specific validated questionnaires, such as the Intermittent Claudication Questionnaire (Chong 2002), the Claudication Scale (CLAU-S) (Spengel 1997); or generic health-related quality of life measures such as the Medical Outcomes Short-Form (SF) 36 (Ware 1992) and its related instruments or the EuroQol. (EQ-5D) (The EuroQol Group 1990).

Secondary outcomes

We will examine the following as our secondary outcomes:

- all-cause mortality;
- revascularisation or amputation;
- acute events (stroke or myocardial infarction);
- self-efficacy for exercise (using validated measures such as Bandura’s Self-Efficacy for Exercise Scale (Bandura 1994));
- modifiable risk factors (smoking, obesity, blood pressure, lipids);
• adherence to prescribed therapies (exercise, medications, diet);
• patient acceptance and satisfaction with the intervention;
• adverse events.
Adverse events are not a commonly reported outcome in non-pharmacological, non-surgical chronic disease management studies, however improved adherence to pharmacological interventions may lead to increases in adverse event rates and hence these will be examined, if reported.

Search methods for identification of studies
We will not apply date limits to database searches. We will search all databases from commencement of the database up to the search date. Language restrictions will not apply to any of the searches.

Electronic searches
The Cochrane Peripheral Vascular Diseases Group Trials Search Co-ordinator (TSC) will search the Specialised Register and the Cochrane Central Register of Controlled Trials (CENTRAL), part of The Cochrane Library (www.thecochranelibrary.com). See Appendix 1 for details of the search strategy which will be used to search CENTRAL. The Specialised Register is maintained by the TSC and is constructed from weekly electronic searches of MEDLINE, EMBASE, CINAHL, AMED, and through handsearching relevant journals. The full list of the databases, journals and conference proceedings which have been searched, as well as the search strategies used, are described in the Specialised Register section of The Cochrane Library (www.thecochranelibrary.com).
In addition, the authors will search the following databases using search strategies based on the CENTRAL search strategy.
• PsycINFO.
• Web of Science.
• ProQuest Dissertations & Theses Database.
• ANU Digital Theses Collection.
• Index to Theses.

Searching other resources
We will review bibliographies of retrieved studies to identify other relevant studies. We will use citation tracking to identify other publications related to the included studies or other relevant references.
In addition, we will search our personal literature collections for relevant studies.
We will handsearch conference abstracts to identify relevant abstracts of randomised controlled trials of self-management interventions for people with PAD. Due to resource constraints, we will handsearch abstracts for the following conferences for the past five to 10 years if we are able to obtain copies of abstract books or access to online resources:
• American Heart Association Annual Scientific Sessions;
• Society for Vascular Surgery Annual Meetings;
• Society for Vascular Nursing Annual Conventions;
• European Society for Vascular Surgery Annual Meetings.

Data collection and analysis
Two review authors will review all identified abstracts and results from database searches for relevance to the review topic. If the reference appears relevant, we will obtain a full copy of the reference for detailed review to determine the inclusion in the review or exclusion of the study.

Selection of studies
Two review authors will independently review the results of each search according to the exclusion and inclusion criteria. A third review author will adjudicate in the instance of disagreement between the first two review authors.

Data extraction and management
Two review authors will extract data from the included studies in a blinded manner and a third review author will check all extracted data for accuracy and consistency. We will use a customised electronic data extraction form to record all extracted data.

Assessment of risk of bias in included studies
Two review authors will independently assess risk of bias (methodological quality). A third review author will adjudicate in the instance of disagreement between the first two review authors. We will assess the risk of bias in the following domains using the Cochrane Collaboration tool (Higgins 2011):
• sequence generation;
• allocation concealment;
• blinding;
• incomplete outcome data;
• selective outcome reporting;
• other sources of bias.
We will rate the assessment of risk of bias as ‘unclear risk of bias’, ‘low risk of bias’ and ‘high risk of bias’ according to the Cochrane Collaboration tool (Higgins 2011) for assessing risk of bias; examples from the text will be provided to support this classification.

Measures of treatment effect
We will analyse outcomes which are continuous variables using difference in means and the 95% confidence intervals (CI) for studies using the same outcome measurement scale. In the instance of
studies reporting the same outcome (for example quality of life or measures of functional status) but using different measurements, we will use the standardised mean difference and 95% confidence interval to report these data. We will report risk ratios (RR) for outcomes which are dichotomous variables (that is all-cause mortality, revascularisation or amputation, and acute events).

**Unit of analysis issues**

If the included trials report outcomes at more than one time point, we will report the primary outcome data. That is, the main time point used in the analysis in the primary publication of the study.

**Dealing with missing data**

We will contact study authors via e-mail in the instance of missing or unclear data in order to maximise data synthesis. Where possible, we will perform all analyses using intention-to-treat analysis, that is, we will analyse all participants and their outcomes in the groups to which they were allocated regardless of whether they received the intervention or whether or not they were assessed for the outcome. In the event of dropouts, we will adjust the denominator for the number of participants followed up for each outcome if these data are available.

**Assessment of heterogeneity**

We will assess statistical heterogeneity for the outcomes meta-analysed using the I² statistic, which describes the percentage of variability in effect estimates due to heterogeneity (Deeks 2011).

**Assessment of reporting biases**

Funnel plots allow review authors to make a visual assessment of whether small-study effects may be present in a meta-analysis (Sterne 2011). Small-study effects, when the intervention effect variability in effect estimates due to heterogeneity (Deeks 2011). We will assess statistical heterogeneity for the outcomes meta-analysed using the I² statistic, which describes the percentage of variability in effect estimates due to heterogeneity (Deeks 2011). We will assess statistical heterogeneity for the outcomes meta-analysed using the I² statistic, which describes the percentage of variability in effect estimates due to heterogeneity (Deeks 2011).

**Data synthesis**

We will quantitatively meta-analyse primary outcomes and some secondary outcomes (all-cause mortality, revascularisation, amputation, stroke or myocardial infarction, smoking status) depending on the availability of suitable data from high-quality studies. Considering the likely heterogeneity in participant populations, intervention characteristics, length of follow-up and outcome measurement, we will perform a random-effects meta-analysis. We will tabulate and describe other outcomes such as adherence, self-efficacy for exercise, modifiable risk factors (obesity, blood pressure, lipids) and patient acceptance and satisfaction with the intervention. We will include the following outcomes in the summary of findings table: functional status, health-related quality of life, all-cause mortality, revascularisation, amputation and smoking status.

**Subgroup analysis and investigation of heterogeneity**

If the number of included studies permits, we will perform subgroup analyses and investigations of heterogeneity for each outcome meta-analysed by considering each particular type of intervention. For example, some studies may use a face-to-face in a group or one-on-one format, other studies may include an Internet, e-mail, telephone-based or SMS delivered intervention. We will also consider the elements of interventions, that is clinician delivered, theoretically derived, and the intensity of the intervention, if the number of included studies permits. If the number of studies permits, we will also perform subgroup analyses to examine the clinical characteristics of the study participants, such as history of revascularisation.

**Sensitivity analysis**

We will perform sensitivity analyses if issues with methodological quality of the included studies are identified. Additionally, we will perform a sensitivity analysis to assess the influence of publication type (full peer-reviewed publication versus abstract or thesis) on reported outcomes. We will perform further sensitivity analyses to assess the effect of dropouts on outcomes, that is, in the event of dropouts we will not adjust the denominator for the number of participants followed up for each outcome and the denominator will be the total number of participants randomised to each arm irrespective of whether or not they were followed up for the outcome. If a sensitivity analysis indicates the results are influenced by particular methodological or publication factors, we will discuss the findings of the review within this context.

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Dr Michelle DiGiacomo is a Post-Doctoral Research Fellow supported by University of Technology, Sydney, Curtin University and the NHMRC (NHMRC Grant ID 533 547).
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Bendermacher 2006

Chong 2002

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Criqui 1985

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Fiore 2008

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Norgren 2007

Olin 2010

Price 2008

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Smolderen KG, Hoeks SE, Pedersen SS, van Domburg RT, de Liefde II, Poldermans D. Lower-leg symptoms in peripheral arterial disease are associated with anxiety, depression, and anhedonia. Vascular Medicine 2009;14:297–304.

Spengel 1997

Sterne 2011

Stuber 2008

Sutherland 2009

The EuroQol Group 1990

Tsai 2005

Vogt 1994

Ware 1992

Watson 2008

* Indicates the major publication for the study

A P P E N D I C E S

Appendix 1. CENTRAL search strategy
#1 MeSH descriptor Arteriosclerosis, this term only
#2 MeSH descriptor Arteriolosclerosis, this term only
#3 MeSH descriptor Arteriosclerosis Obliterans, this term only
#4 MeSH descriptor Atherosclerosis, this term only
#5 MeSH descriptor Arterial Occlusive Diseases, this term only
#6 MeSH descriptor Intermittent Claudication, this term only
#7 MeSH descriptor Ischemia, this term only
#8 MeSH descriptor Peripheral Vascular Diseases explode all trees
#9 (arter* or vascular or vein* or veno* or peripheral*) near (occlus* or reocclus* or re-occlus* or steno* or obstruct* or lesio* or block* or harden* or stiffen*)
#10 (peripheral near3 dis*)
#11 claudic* or IC
#12 (isch* or CLI)
#13 (leg or limb) near4 (obstruct* or occlus* or steno*)
#14 dysvascular*
#15 (#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13 OR #14)
#16 MeSH descriptor Self Care explode all trees
#17 self near3 (care or help or manag* or directed or monitor* or efficacy or admin*)
#18 symptom near3 (care or help or manag* or directed or monitor* or efficacy or admin*)
#19 MeSH descriptor Patient Education as Topic, this term only
#20 (patient near3 (education or promot*))
#21 (patient near3 (information or care or manag*))
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HISTORY


CONTRIBUTIONS OF AUTHORS

Sally C Inglis: responsible for conception and design of this review. Responsible for writing the protocol. Reviewed and revised the protocol for intellectual content.

Huiyun Du: reviewed and revised the protocol for intellectual content.

Phillip J Newton: reviewed and revised the protocol for intellectual content.

Michelle DiGiacomo: reviewed and revised the protocol for intellectual content.

Abdullah Omari: reviewed the protocol for intellectual content.

Patricia M Davidson: reviewed and revised the protocol for intellectual content.

DECLARATIONS OF INTEREST

None known

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