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Patient-reported outcome measures in patients with peripheral artery disease: Protocol for a systematic review

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Abstract

Background

Peripheral arterial disease (PAD) results in reduced health-related quality of life and significant functional impairment. Patient-reported outcome measures (PROMs) are important when considering the impact of treatments and management strategies in patients with PAD. A variety of studies have reported the use of different PROMs in patients with PAD. However, PROMs should provide valid and reliable findings to help in healthcare decision-making. The aim of this proposed systematic review is to comprehensively evaluate the psychometric properties of PROMs developed and/ or validated in patients with PAD.

Methods

Computerised searches will be conducted in major electronic databases and PROM-specific databases. Searches will be supplemented by checking reference lists of identified relevant studies. Studies reporting and/or comparing the measurement properties of PROMs in English-speaking patients with a diagnosis of PAD will be considered for inclusion. Study selection, data extraction and quality assessment will be performed independently by at least 2 reviewers. Methodological quality of included studies will be assessed using the COSMIN checklist while criteria based on published recommendations will be used to appraise reported psychometric properties. Findings will be presented as narrative and tabular summaries.

Discussion

This systematic review will provide an overview of available psychometric properties of PROMs to help identify a suitable measure for capturing health-related quality of life and functional or health status in patients with PAD.

Background

Peripheral artery disease (PAD) of the lower extremities is caused by atherosclerosis in the arteries of the legs and results in reduction in blood circulation to affected tissues and muscles.[1;2;3] Available literature suggests that clinical diagnosis and classification of PAD is often based on varying criteria. A few of these include the International Society for Cardiovascular Surgery (ISCVS) recommended standards[4-6], the Edinburgh Claudication Questionnaire[7] and several cut-offs of ankle brachial pressure indices at rest or following exercise[7-10]. Consequently, the prevalence of PAD typically differs depending on criteria used for the identification of patients. In general, it is estimated that a third of individuals aged 70 years and over are affected by PAD[2].

While most patients tend to be asymptomatic for many months or years, symptomatic patients experience significant functional limitations and reduced health related quality of life (HRQoL)[11-15]. Symptoms and signs of PAD are closely related to the severity of impaired blood supply in the affected vasculature. Pain in the calf muscles triggered by walking and relieved by resting is one of the commonest and earliest symptoms of PAD. This clinical presentation is known as intermittent claudication. Other manifestations of PAD include pain in the legs at rest, ulceration and gangrene which may subsequently result in amputation. Management strategies for patients with PAD aim to improve symptoms, delay progression, prevent tissue loss and modify risk factors[1;16]

Patient-reported outcome measures (PROMs) are considered to be useful when assessing the health of patients as well as the performance of healthcare systems. The National Health Service (NHS) in England introduced the PROMs programme in April 2009. The programme encourages all patients undergoing varicose vein surgery, groin surgery and hip or knee replacement to provide PROMs data before and after treatment. PROMs may be obtained through self-administered or interviewer-administered questionnaires. Presently, PROMs are not collected from patients with PAD[4]. Appropriate outcome measures are needed for capturing the impact of treatments of patients and also for informing decisions about treatments. To provide information useful for health-care decision-making, a suitable PROM must be valid, reliable, responsive and acceptable to the patient and attending healthcare providers. The aim of this review is to identify, critically appraise and synthesise evidence relating to the psychometric performance of PROMs in patients with PAD.

Review questions to be answered by this systematic review are as follows:

- Which PROMS have been validated (i.e. assessed using psychometric criteria) in patients with PAD?
- To what extent do the reported psychometric properties of identified PROMs meet recommended criteria?
- What is the methodological quality of the relevant studies?
- What is the quality of reporting of relevant studies?

Methods

The protocol was developed and agreed following extensive consultation within a multi-disciplinary research team comprising methodological and clinical experts.

Literature searching

Computerised literature searching of major bibliographic databases using a two-staged approach will be undertaken in the following databases from their dates of inception: MEDLINE and MEDLINE in Process; EMBASE; Cochrane Library; CINAHL; PsycINFO; Web of Science.

Stage 1 searching will aim to identify studies reporting PROMs in patients with PAD. Three sets of terms, including Medical Subject Heading (MESH) terms and free text terms, relating to (1) PAD; (2) known generic PROMs and (3) known condition-specific PROMs will be included in the search strategy. Stage 2 searching will be undertaken to identify studies reporting the development and/or validation of identified PROMs. The search strategy will consist of terms for (1) the population of interest (as used in Stage 1 searching) and (2) known generic and condition-specific PROMs (as used in Stage 1 searching together with additional terms identified from sifting records of the first search) and (3) a methodological search filter for locating studies reporting measurement properties.

The search strategy will be developed by an experienced information specialist in consultation with methodological and topic experts and will be adapted for searching within different databases, when necessary. Searches will be undertaken by an information specialist. All retrieved records will be imported and managed within a reference management database.

Supplementary searches will include searching the PROQOLID and PROMS Bibliography (Oxford University) databases; checking reference lists of relevant studies and reviews; and searching grey literature using the Google Scholar search engine.

Study eligibility

Study eligibility will be based on agreed criteria as summarised in Table 1.

Table 1: Criteria for considering eligibility of studies

	INCLUSION CRITERIA	EXCLUSION CRITERIA
Population	A defined population of English-speaking participants with a diagnosis of peripheral arterial disease of the lower limbs, also described as peripheral vascular disease; peripheral obliterative arteriopathy; peripheral arterial occlusive disease OR Patients with rest pain; claudication; vascular spasms; ischaemic ulceration; amputation; necrosis or gangrene of the limb due to PAD	Undefined population of PAD patients OR Patients with rest pain; claudication; vascular spasms; ischaemic ulceration; amputation; necrosis or gangrene of the limb due to any cause other than PAD
Interventions	No intervention or any intervention indicated for PAD	
Outcomes	PROMs[1] covering any of the following: generic or preference-based measures e.g. EQ-5D, SF-6D, SF-36; directly elicited preference-based measures e.g. time-trade-off (TTO), standard gamble (SG) utility values; condition-specific outcome measures; functional outcome measures English version of PROMs	Outcome measures of patient satisfaction or experience of treatment or outcome measures obtained from proxies, carers or health providers Non-English versions of PROMs
Study type	Published validation studies, other than linguistic validation of English versions of relevant PROMs Publication in English	Unpublished studies Studies of linguistic validation of PROMs Review articles, letters, commentaries, abstracts Non-English publications

[1] See list of relevant PROMS in Appendix 1

Types of participants

A study will be eligible for inclusion if it reports on a well-defined English-speaking population (age, > 18 years) with an objective clinical diagnosis of PAD. Studies in countries where English is not the official language will be excluded, unless the study reports PROMs obtained from an English speaking study sub-group. Studies evaluating patients with self-reported PAD will also be excluded. Studies with PROM data for a heterogeneous study population including patients with PAD will be excluded if the sub-group of patients with PAD is less than 50% or if there is no PROM data for the relevant study population of patients with PAD.

Types of interventions

It was anticipated that the study design of relevant studies will be wide-ranging. Studies will be considered for inclusion whether or not patients received any intervention for PAD.

Types of outcome measures

Primary outcomes

- Reported PROMs will include generic or condition-specific instruments capturing health-related quality of life, health status and functional well-being
- Reported psychometric properties of identified PROMs will include:
  (1) Validity (that is, the degree to which the instrument measures what it is supposed to measure);
  (2) Reliability (that is, the degree to which measures are reproducible and consistent over time in patients with a stable condition);
  (3) Responsiveness (that is, the degree to which the instrument detects meaningful change over time) and
  (4) Acceptability (that is, the degree to which the instrument is acceptable to the patient).

Secondary outcomes

- Reported domains of relevant PROMS

Types of studies

Primary studies published in English reporting the validation of relevant PROMs in the population of interest will be eligible for inclusion. Validation implies the assessment of one or more psychometric or measurement properties of a PROM. Studies reporting on non-English translations of relevant PROM instruments or PROMs elicited from non-English speakers will be excluded. This is an

acceptable approach to overcome the uncertainty due to language validation and cross-cultural adaptation of PROMs[17].

Publication types that will be excluded include conference abstracts, editorials, commentaries and letters.

Study selection

Study selection will be undertaken independently by at least two reviewers using pre-specified criteria as presented in Table 1. Disagreements will be resolved by discussion and referred to a third reviewer, when needed.

Data extraction

Data will be extracted using a piloted standardised electronic form by one reviewer to construct evidence tables. Abstracted data will include the study's aim(s), characteristics of study population including diagnostic criteria, identified PROMS as well as their contents/domains, reported psychometric properties, timing and method(s) of administration. Discrepancies will be checked by a second reviewer and discussed between researchers. Where consensus cannot be achieved, a third reviewer will be consulted.

Methodological quality assessment

For each identified PROM, methodological quality of included studies and reported psychometric properties will be evaluated by one researcher. Ambiguities will be resolved by discussion with a second researcher. It is anticipated that a wide range of study designs will be eligible for inclusion; therefore quality assessment will focus on the following:

- Assessment of methodological quality of included studies based on criteria recommended in the COnsensus-based Standards for the selection of health status Measurement INstruments (COSMIN) checklist[19] will be undertaken. Scoring will be limited to reported psychometric properties in each study, based on a 4-point rating scale (excellent, good, fair or poor). Subsequently, a "worst score counts method"[18] will be used to provide an overall domain score.

- Assessment of psychometric properties of validated PROMs based on published standardised criteria from a number of sources will be used to examine the psychometric performance of validated PROMS. Appraisal criteria to be considered are presented in Table 2.

Table 2: Criteria for assessing the psychometric properties of PROMs

DOMAIN	DESCRIPTIVE CRITERIA
Test re-test reliability	The intra-class correlation/ weighted kappa score should be ≥0.70 for group comparisons and ≥ 0.90 if scores are going to be used for decisions about an individual based on their score[19]. The mean difference (paired t-test or Wilcoxon signed-rank test) between time point 1 (T_1) and time point 2 (T_2) and the 95% CI should also be reported.
Internal consistency	A Cronbach's alpha score of ≥0.70 is considered good and it should not exceed ≥0.92 for group comparisons as this is taken to indicate that items in the scale could be redundant. Item total correlations should be ≥0.20[20].
Content validity	This is assessed qualitatively during the development of an instrument. To achieve good content validity, there must be evidence that the instrument has been developed by consulting patients, experts as well as undertaking a literature review. Patients should be involved in the development stage and item generation. The opinion of patient representatives should be sought on the constructed scale[19-21].
Construct validity	A correlation co-efficient of ≥0.60 is taken as strong evidence of construct validity. Authors should make specific directional hypotheses and estimate the strength of correlation before testing[19;20;22].
Criterion validity	A good argument should be made as to why an instrument is a gold standard and correlation with the gold standard should be ≥ 0.70[22] .
Responsiveness	There are a number of methods to measure this including t-tests, effect size, standardised response means or responsiveness statistics Guyatts' responsiveness index. There should be statistically significant changes in score of an expected magnitude[23].
Floor-ceiling effects	A floor or celling effect is considered if 15% of respondents are achieving the lowest or the highest score on the instrument[22].
Acceptability	Acceptability was measured by the completeness of the data supplied. 80% or more of the data should be complete[21].

Domain mapping and data synthesis

Due to the expected heterogeneity of eligible studies, a meta-analysis is unlikely or may be inappropriate to undertake. Findings of this review will be presented in narrative and tabular summaries to provide an overview of characteristics of included studies as well as the contents, scoring and psychometric performance of identified PROMs. The methods for summarising

information on the psychometric criteria including methodological quality will be informed by the Oxford system and the COSMIN checklist[23;24] In general, the combined rating scales will be as follows:

[0] for not reported (no evaluation completed),

[-] for evidence not in favour,

[+/-] for conflicting evidence and

[+] for evidence in favour

Analysis of subgroups or subsets

None planned

Dissemination plans

The findings of the review will be published as a report to the funders; in peer-reviewed journals and as conference proceedings.

Discussion

This protocol of a planned systematic review of PROMs validated in patients with PAD clearly outlines methods for identifying, appraising and collating available evidence. The findings of the review will inform re-configuration of vascular services in the United Kingdom. In April 2009, the National Health Service (NHS) encouraged that PROM data should be obtained from patients undergoing knee replacement, hip replacement, groin hernia and varicose vein surgery[25]. Currently, there is no routine collection of PROMs from patients with PAD.

Strengths and limitations of the review

Potential strengths of the planned review include the comprehensive and iterative literature searching to identify studies as well as the involvement of a multi-disciplinary team of clinical and methodological experts. To ensure robustness of the review, study selection, data extraction and quality assessment will be undertaken independently by at least two reviewers. Additionally, the scope of the review is broader compared to an earlier systematic review which focussed on patients with intermittent claudication.

A decision to include studies examining English version of PROMs administered to predominantly English-speakers could be considered as a weakness of the review. On the other hand, this approach is appropriate for identifying and proposing a single PROM for use in the United Kingdom (UK). This is

of significant importance considering conflicting or unclear evidence with regard to linguistic validation and cross-cultural validation of some existing PROMS[17].

Relevance of the review

The utility of validation studies of psychometric properties of PROMs substantial rely on clear and detailed reporting of primary studies. By examining the methods and timing of PROM administration as well as methodological quality of identified PROMs, the planned review will overcome one of the hurdles in assess the generalisability of findings from validation studies[20].

In general, it is anticipated that the findings of this review will be supplemented by qualitative evidence to inform the recommendation and subsequent selection of a single PROM which is appropriate for assessing the impact of treatment in patients with PAD within the NHS.

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Appendix 1

List of patient-reported outcome measures considered as potentially relevant in patients with peripheral arterial disease

1. Activities-specific Balance Confidence (ABC) Scale
2. AMC linear disability score (ALDS)
3. Amputee Body Image Scale (ABIS)
4. Assessment of Quality of Life (AQoL-4D or AQoL-8D) questionnaire
5. Australian Vascular Quality of Life Index (AUSVIQUOL)
6. Baltimore Activity Scale for Intermittent Claudication (BASIC)
7. Beck Anxiety Inventory
8. Beck Depression Inventory
9. Berg Balance Scale
10. Centre for Disease Control and Prevention Health-Related Quality of Life 4 question set
11. Charing Cross Claudication Questionnaire (CCCQ)
12. Claudication Scale (CLAU-S) questionnaire
13. Community-based walking ability
14. Comprehensive High Level Activity Mobility Predictor (CHAMP)
15. Cumulative Illness Rating Scale (CIRS)
16. Discomfort-Engagement in everyday activities involving revealing the body (Discomfort-EEARB) scale
17. Disease-specific Questionnaire for Quality of Life in Patients with Peripheral Arterial Occlusive Disease in the Stage of Critical Ischemia (FLeQKI)
18. Engagement in everyday activities involving revealing the body (EEARB) scale
19. EQ-5D; EQ-5D 5L
20. Estimating Ambulation Capacity by History-Questionnaire (EACH-Q)
21. Frenchay Activities Index
22. Functional Independence Measure (FIM)
23. Functional Limitations Profile
24. Geriatric Depression Scale (GDS)
25. Global Mood Scale
26. Health Utilities Index-Mark III (HUI-III)
27. Hospital Anxiety and Depression Scale (HADS)
28. Houghton scale
29. Intermittent Claudication Questionnaire (ICQ)
30. King's College Hospital's Vascular Quality of Life Questionnaire (Vas-QoL)
31. London School of Hygiene IC Questionnaire
32. McGill Pain Questionnaire
33. McMaster Health Index Questionnaire (MHIQ)
34. Mental component scale (MCS)
35. Modified WHO-Edinburgh Claudication Questionnaire
36. MOS-SS questionnaire for social support
37. Nottingham Health Profile (NHP)
38. Nottingham Health Profile index of Depression (NHPD)
39. Orthotics and Prosthetics Users' Survey (OPUS)

40. PAD Quality of life questionnaire (PADQOL)
41. Pain Interference Scale of the Brief Pain Inventory
42. PAOD Physical Activity Recall
43. Patient Generated Index
44. Patient Health Questionnaire
45. PAVK-86
46. Peripheral Artery Questionnaire (PAQ)
47. Positive Attitude Toward Physical Activities/Exertion Questionnaire
48. Profile of Mood States (POMS)
49. Prosthetic Evaluation Questionnaire (PEQ)
50. Prosthetics Evaluation Questionnaire (PEQ)
51. Quality of Well Being scale
52. Rand-36 DLV
53. Rand-36 Physical Functioning subscale
54. Roland-Morris Disability Questionnaire.
55. Rose questionnaire
56. Rosser index/Scale
57. San Diego Claudication Questionnaire
58. Satisfaction with Prosthesis Questionnaire (SAT-PRO)
59. Self-reported Life Satisfaction (LS) score
60. SF-8; SF-6; SF-12; SF-20; SF-36
61. Short-Form Health Survey questionnaire adapted for the veteran population (SF-36V)
62. Sickness Impact Profile - Intermittent Claudication (SIP(IC))
63. Sickness Impact Profile (SIP)
64. Standard gamble
65. Time-trade off (TTO)
66. Vascular Quality of life (VascuQol)
67. Verbal rating scale
68. Walking impairment questionnaire
69. WHO Intermittent claudication questionnaire
70. WHOQOL-100
71. World Health Organization Quality of Life-BREF (WHOQOL-BREF)
72. Zung-SDS (depression symptoms)
73. 15D Health-related QoL instrument
74. 6-item Brief Social Support Questionnaire

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