



## Feature Article

## Characterization of the peripheral artery disease symptom experience



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## ABSTRACT

Claudication is the most commonly recognized peripheral artery disease (PAD) symptom, but not the most prevalent. Only 7.5%–33% of patients report claudication as being part of their symptom experience. However, there is little evidence supporting atypical symptom reporting. The study purpose was to describe the full spectrum of symptoms experienced by older and younger individuals with PAD. Semi-structured interviews were conducted with a purposive sample of 38 community-dwelling adults aged 49–83 years; transcripts were analyzed using content analysis. Six themes emerged: symptom descriptors (claudication and atypical), maintaining equilibrium, temporal fluctuations, the role of exercise, perceived impact on quality of life, and disease presence and treatment. Results suggest heavy reliance on claudication can result in mis- or under-diagnosis of PAD. Further research is needed to validate the correspondence of atypical symptoms with ischemic changes during exercise to broaden currently accepted symptom locations and descriptors associated with PAD.

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## Introduction

Claudication is the symptom most commonly associated with peripheral artery disease (PAD) and is described as an aching, cramping, painful or tired feeling in the calves. However, research has shown that the presentation and progression of PAD-related symptoms can vary by individual and may be influenced by gender, age, and ethnicity.<sup>1</sup> Some individuals remain asymptomatic despite disease progression, while others consistently experience discomfort upon exertion that subsides when physical activity ceases. Further, atypical symptom reporting among individuals with PAD may be more common than classic claudication.<sup>2–4</sup>

## PAD symptom reporting

Differences in symptom reporting can partially be attributed to the methods used to obtain the symptom experiences of individuals with PAD. Individuals with PAD experience discomfort during exercise primarily due to the presence of ischemia in the calf, thigh, or buttocks.<sup>5,6</sup> Subsequently, these exercise-induced ischemic symptoms limit an individual's ability to exercise and affect oxygen consumption during exercise testing.<sup>7,8</sup> Verbal report of PAD symptoms (e.g., location, severity, and descriptors of

sensation) can be used to subjectively assess the PAD symptom experience. Currently, the most common way to assess PAD-related symptoms in clinical practice is through claudication questionnaires. However, multiple questionnaires exist and categorization of symptoms vary, with most questionnaires excluding atypical symptoms.<sup>1</sup> For example, due to the restricted symptom location and descriptor options on PAD questionnaires, an ache in the calf could be reported (classic claudication), but a burn in the quadriceps could not (atypical symptom).

The variety of PAD questionnaires and the restriction of symptom categories further complicates the ability to present a clear picture of the array of symptoms experienced by individuals afflicted with the disease. One potential solution to obtaining a more comprehensive understanding of PAD symptom experiences is to conduct a semi-structured interview that would allow an individual to describe the symptoms they experience in their own words, using the locations and descriptors of their choice, as opposed to restricting them to the pre-determined responses on current PAD questionnaires. Responses from a diverse group of individuals with PAD may provide a deeper understanding of the influence of gender, age, and ethnicity on the PAD symptom experience.

## Purpose

The purpose of this study was to describe the symptom experience of individuals diagnosed with PAD (e.g., attitudes, beliefs,

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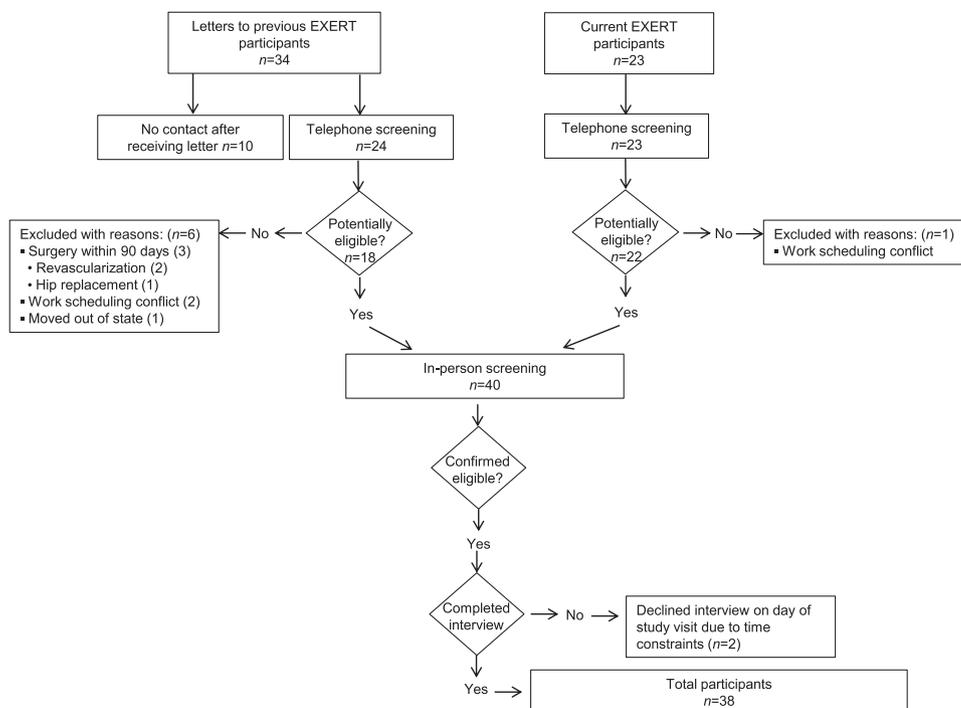


Fig. 1. Flow diagram illustrating the details of study recruitment.

and perceptions). Participants were asked to report their symptom experience during a semi-structured interview, and subsequently by completing a PAD symptom questionnaire. The primary research question was “How do individuals with PAD describe the PAD symptom experience?”

## Methods

Semi-structured, face-to-face, descriptive interviews and a PAD symptom questionnaire were used to measure symptom experiences among people with PAD during a one-time visit to a University of Minnesota clinic site. The completion of both the interview and the questionnaire took approximately 35 min per participant.

## Sample

Adults were eligible to participate in the study if they were: (a)  $\geq 21$  years of age, (b) diagnosed with PAD (ankle-brachial index (ABI)  $\leq 0.90$  or a post-exercise drop in ABI confirming PAD), (c) reporting exercise-limiting claudication or ischemia-related symptoms, (d) cleared for exercise via exercise or pharmacological stress test within one year of study enrollment, and (e) able to read, write, and speak the English language.

## Sample size

Sample size guidelines for qualitative research were used to provide an estimate of an appropriate sample size for this study.<sup>9</sup> A purposive sample of 38 participants completed a semi-structured interview; it was anticipated that data saturation would be achieved with this number.

## Participant recruitment

This study was approved by the University of Minnesota Institutional Review Board. Potential study participants were recruited

from the **EX**ercise Training to Reduce Claudication: Arm **ER**gometry versus **T**readmill Walking (EXERT) study. This study was funded by the National Heart, Lung, and Blood Institute (NHLB) (R01 HL 090854-03, PI: Dr. Diane Treat-Jacobson). The study examined the efficacy of two forms of supervised exercise compared to the usual care provided by a physician for the treatment of PAD. Specifically, the EXERT study compared aerobic arm exercise and treadmill walking, to determine which, if any, form of supervised exercise reduced the symptoms of claudication and improved the walking ability in patients with PAD. Study procedures included a screening visit, baseline testing (cardiac exercise stress test, confirmatory ABI, etc.), supervised exercise training three times per week or a weekly control visit, and follow-up testing at six week increments, until 24 weeks of study participation had been completed. All current and previous EXERT study participants were contacted for potential participation in this study. After determining eligibility of EXERT study participants, 38 out of 40 individuals agreed to participate in this ancillary study. Fig. 1 provides the specific details of study recruitment and enrollment.

## Measures

A standard demographic form was given to participants to obtain the following information: age, gender, marital status, race, ethnicity, education, and employment status. Next, a semi-structured interview was conducted using an interview guide (Table 1) to obtain a detailed account of the PAD symptom experience in a participant's own words. Each question on the interview guide was designed to be clear, open-ended, sensitive, neutral, and targeted toward the participants' PAD symptom experience. Questions focused on the PAD symptoms experienced at rest and with exercise. Participants were encouraged to provide the location, sensation, timing, and estimated duration of each symptom reported. Participants were also asked about “other pain or discomfort” during exercise or rest in an effort to understand symptoms that may not be related to PAD. All participant

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