www.sciencedirect.com/journal/journal-of-vascular-nursing

Patient perceptions of peripheral artery disease: A cross-sectional study of hospitalized adults

Sebastien Eyholzer, RN, MSN, Béatrice Perrenoud, PhD, RN, and Andrew A. Dwyer, PhD, FNP-BC

Patients with peripheral artery disease (PAD) have increased risk for complications of cardiovascular disease. Smoking cessation, physical activity, and adherence to treatment are critical for limiting the progression of this chronic disease and improving health-related quality of life in patients with PAD.The aim of the study was to explore patient perceptions of PAD and views on medication, tobacco use, and physical activity. This descriptive, cross-sectional study included patients with PAD admitted to a vascular surgery unit at a tertiary academic medical center (October 2017 to January 2018). Sociodemographic data and medical information were collected during hospitalization. Patients completed the Brief Illness Perception Questionnaire, Beliefs about Medicines Questionnaire, and Cigarette Dependence Scale. Additional questions examined physical activity. In total, 32 patients participated in the study. About half (16/30) were active smokers, whereas the remainder had smoked in the past. Only half of patients (16/32) considered smoking as contributing to PAD. Most patients (18/30) perceived PAD as a chronic problem, yet 8/30 (27%) considered PAD a rather acute illness. Patients reported significant cognitive and emotional consequences of PAD (mean 6.2 ± 1.8 and 8.3 ± 2.9, maximum score 10, respectively). They rated relatively low perceived personal control (mean 4.8 ± 2.8, maximum score 10) and weak beliefs about the necessity of medication (mean 12.5 ± 3.3, maximum score 25). Most patients (21/32) perceived physical activity as a protective factor for PAD. Patients perceive PAD as having significant impact on their life and report low levels of personal control in managing PAD. Understanding patient health beliefs may inform more tailored therapeutic education and health promoting interventions to limit disease progression. (J Vasc Nurs 2019;37:188-193)

INTRODUCTION

Peripheral artery disease (PAD) affects more than 200 million people worldwide.[1] PAD is defined by a partial or complete occlusion of an artery in the upper or lower extremity due to atherosclerosis.[2] A large Swedish study estimates that approximately 18% of adults 60–90 years old have PAD.[3] A recent systematic review points to increasing prevalence (23.5%) from 2000 to 2010.[1] Risk factors for PAD are similar to other cardiovascular diseases.[4,5] The most important risk factors are diabetes mellitus, tobacco use, hypertension, and hypercholesterolemia.[1,4] Studies show smokers have twice the risk of developing PAD compared with nonsmokers.[1] Treatment recommendations focus on lifestyle modification including regular physical activity and smoking cessation combined with pharmacotherapy (eg, aspirin, antihypertensives, cholesterol lowering agents).[6]

Importantly, PAD is largely underdiagnosed[3,7–9] and is associated with increased cardiovascular risk.[10,11] Patients with PAD have twice the risk of dying from cardiovascular causes.[10] Recent studies indicate low levels of PAD awareness among patients and the general population.[7,12–14] Increased awareness could enable earlier, more effective management and adherence to secondary prevention strategies.[5,6,15] To date, a few qualitative studies have been conducted in patients with PAD, yet there is a paucity of data exploring patients' perceptions using validated quantitative instruments. This study aims to examine patient perceptions of PAD in a cohort of Swiss patients hospitalized in a vascular surgery unit. Second, we explore perceptions related to smoking, medication, and physical activity.

MATERIALS AND METHODS

This cross-sectional, descriptive study included hospitalized adult patients (18+ years) diagnosed with PAD. Patients with cognitive impairment, unstable clinical status, or receiving end-of-life care were excluded. Data were collected from October 2017 to January 2018 in a single vascular surgery unit at a tertiary academic medical

From the University of Lausanne (UNIL), Institute of Higher Education and Research in Healthcare, Lausanne, Switzerland; University Hospital of Lausanne (CHUV), Lausanne, Switzerland; Boston College William F. Connell School of Nursing, Chestnut Hill, Massachusetts.

Corresponding author: Sebastien Eyholzer, RN, MSN, University of Lausanne (UNIL), Institute of Higher Education and Research in Healthcare, HES-SO Valais-Wallis, Chemin de l'Agasse 5, 1950 Sion, Switzerland (E-mail: sebastien.eyholzer@outlook.com).

The authors have no funding or conflicts of interest to disclose.

1062-0303/$36.00

https://doi.org/10.1016/j.jvn.2019.04.001

center (University Hospital of Lausanne). Approximately 16–24 patients with PAD are admitted to the vascular surgery unit each month. When necessary, an investigator helped participants complete questionnaires by reading items aloud and recording responses. The study was reviewed and approved by the local human research ethics committee (Commission cantonale [Vaud] d'éthique de la recherche sur l'être humain). All subjects provided written informed consent before the initiation of study procedures.

The Health Promotion Model (HPM) was used as a guiding theoretical framework for investigating patient perceptions of PAD and mitigating factors.[16] Sociodemographic and clinical data were extracted from medical records. Instruments were selected for the study based on coherence with the HPM and reported psychometric validity. Illness perceptions were measured using the 9-item Brief Illness Perception Questionnaire (B-IPQ).[17] It examines cognitive and emotional representations of illness using Likert-type questions (0–10) on specific domains: consequences (ie, how much the illness affects one's life), timeline (ie, acute vs chronic), personal control (ie, ability to control/recover), treatment control (ie, medication to cure or control symptoms), identity (ie, how much one experiences symptoms), concerns, understanding, and emotional representations (ie, emotional impact of illness). The last item is open-ended and requires patients to identify 3 perceived causative factors. The validated French version demonstrates acceptable internal consistency ($\alpha = 0.8$).[18]

The Beliefs about Medication Questionnaire (BMQ) is a 28-item, Likert-type instrument used to examine general and specific beliefs regarding medication.[19] The general questions explore the beliefs about overuse and harmful effects of medicines. The specific component assesses perceived necessity and concerns about medication(s). Higher scores depict stronger beliefs. A necessity-concern differential score can be calculated as the difference between the 2 respective subscales. Positive values indicate perceived treatment need exceeds concerns. The BMQ has been validated in different patient populations,[20,21] and the validated French version exhibits acceptable internal consistency ($\alpha = 0.64$ to 0.85).[22]

Tobacco use was explored using the Cigarette Dependence Scale (CDS-12).[23] This 12-item instrument uses Likert-type ratings (1–5) with higher scores indicating greater tobacco use/dependency (ie, mild, moderate, or strong dependence). The CDS-12 was developed in French and validated by Etter et al, with good internal consistency ($\alpha = 0.87$–0.91) and test-retest correlation (0.84).[23,24]

Perceptions relating to physical activity were evaluated using 5-point Likert-type questions from the Health Promoting Lifestyle Profile II[25]—"I do daily physical exercise such as walking, using stairs instead of elevators" and "Walking improves the course of the disease." Higher scores indicate stronger agreement.

Data were analyzed using descriptive statistics (eg, mean, standard deviation, percentages). Illness timeline (B-IPQ) scores were dichotomized as acute (score = 0–4) or chronic illness (score = 6–10).

RESULTS

Forty-eight participants were approached for participation. Thirty-two patients were enrolled, 14/48 (29%) refused participation, and 2/48 (4%) were excluded because of health problems. Of the 32 participants, 3 questionnaires were not fully completed. Roughly one-third (12/32) requested assistance in completing the questionnaires. Patient demographic and clinical data are presented in Table 1. Patients ranged in age from 45–89 years. Nearly all (28/32, 93%) were either current or former smokers. Nearly one-third (10/32) were hospitalized for the first time in vascular surgery. Chart review indicated lower extremity pain was near-universally reported by patients (26/32, 90%).

Patient B-IPQ scores indicate high cognitive and emotional consequences of PAD (Table 2). Most participants (18/30, 60%) perceived PAD as chronic. Patients reported low perceived personal control over PAD (4.8 ± 2.8, maximum score 10). Tobacco consumption was the most frequently cited cause of PAD (16/31, 51.6%), followed by stress (8/31, 25.8%), heredity

TABLE 1

SAMPLE CHARACTERISTICS (N = 32)

Variables	*n (%)*
Men	20 (62.5)
Age, (mean ± SD)	67.8 ± 10.5
Tobacco consumption	
Current smoker	16 (53.3)
Former smoker	12 (40.0)
Non smoker	2 (6.7)
Number of hospitalizations in vascular surgery	
First hospitalization	10 (31.3)
2-3 hospitalizations	14 (43.8)
4-6 hospitalizations	8 (25)
Surgical intervention	
Endovascular treatment	14 (45.2)
Angioplasty	9 (29)
Angioplasty and endovascular treatment	6 (19.4)
Other	2 (6.5)
Fontaine classification stages	
Stage IIb	15 (46.9)
Stage III	7 (21.9)
Stage IV	6 (18.8)
Unspecified	4 (12.5)
Symptoms	
Lower extremity pain	26 (89.7)
Intermittent claudication	9 (28.1)
Comorbidities	
Type 2 diabetes	12 (37.5)
Cardiovascular comorbidities	30 (93.8)
Hypertension	22 (68.8)
Cerebrovascular disease	9 (28.1)
Ischemic heart disease	5 (15.6)
Arrhythmias	5 (15.6)

TABLE 2

PATIENT ILLNESS PERCEPTIONS (BRIEF ILLNESS PERCEPTION QUESTIONNAIRE)

Subscales (0-10)	*n*	*Maximum score*	*Mean ± SD*
Perceived consequences	32	10	6.8 ± 2.8
Timeline	30	10	6.9 ± 2.9
Rather acute (%)	26.7		
Rather chronic (%)	60.0		
Personal control	32	10	4.8 ± 2.8
Treatment control	31	10	7.8 ± 2.0
Identity (impact of symptoms)	32	10	6.2 ± 2.9
Concern	32	10	8.3 ± 1.8
Coherence/illness understanding	32	10	8.1 ± 2.2
Emotional representations	32	10	6.6 ± 2.4

(5/31, 16.1%), and aging (4/31, 12.9%). Four participants (4/31, 12.9%) did not identify a cause of their illness. Only 2 patients (2/31, 6.5%) reported vascular problems. Notably, half of current/former smokers identified tobacco use as potential cause of PAD (15/28, 53.6%). A quarter of the participants with diabetes identified diabetes as potential cause (3/12, 25%).

The general BMQ results revealed moderate concerns about medications being harmful (12 ± 2.9, maximum score 20) and medication overutilization (13 ± 2.8, maximum score 20). Patients expressed relatively weak beliefs regarding necessity of medication (12.5 ± 3.3, maximum score 25). The necessity concern differential score was −1.7 ± 2.7 (Table 3), indicating that patient concerns outweigh their beliefs regarding medication necessity. The CDS-12 results revealed that half of active smokers had high-level tobacco dependence. On average, patients smoked 19 ± 8.5 cigarettes per day. Nearly three-quarters of the participants (21/29, 72.4%) perceived walking as beneficial for ameliorating PAD symptoms. Most patients (23/28, 82.1%) reported regular, daily exercise, given their physical limitations.

TABLE 3

RESULTS OF BELIEFS ABOUT MEDICINES QUESTIONNAIRE AND CIGARETTE DEPENDENCE SCALE-12

BMQ	*n*	*Maximum score*	*Mean ± SD*
Beliefs about the necessity of medication (score range: 5-25)	30	21	12.5 ± 3.3
Concerns about the potential adverse consequences of medication (5-25)	30	20	14.2 ± 3.0
Beliefs about harmful medicines (4-20)	29	18	12 ± 2.9
Beliefs about overuse of medicines by doctors (4-20)	29	18	13 ± 2.8
Necessity-concerns differential score	30		−1.7 ± 2.7
CDS-12			
Total score (score range: 12-60)	15	54	43.2 ± 8.8
Cigarettes per day	16	40	19.1 ± 8.5
Intensity of dependence, *n* (%)			
Moderate dependence			1 (6.7)
Medium dependence			6 (40.0)
Strong dependence			8 (53.3)

DISCUSSION

Herein, we report patient perceptions of PAD among a cohort of inpatients in a tertiary medical center. Results suggest most patients perceive PAD as a chronic illness with limited personal control that has significant impact on daily life. Interestingly, we identified contrasting results. Patients consider that they have a clear understanding of PAD. However, almost half (48%) of participants (and 44% of smokers) did not identify smoking as a potential cause of PAD suggesting a disconnection in understanding etiology.

We observed that patient concerns about medications (BMQ) outweighed the perceived necessity. Medication adherence was not formally assessed, yet low perceived medication necessity is consistent with poor adherence.[26] Indeed, smoking cessation combined with cardioprotective medication can decrease morbidity and mortality related to PAD.[27] Patient beliefs regarding the necessity of treatment was lower than patients with coronary artery disease (mean 12.5 $\pm$ 3.3 vs 20.8 $\pm$ 2.3, maximum score 25).[28] This is relevant because these patient populations share similar cardiovascular risks and pharmacotherapy (ie, antihypertensives, cholesterol lowering agents, antidiabetic medications). Thus, our results underscore that many patients with PAD lack awareness of the importance of pharmacotherapy for managing PAD.[27]

Prior work suggests that a poor understanding of the relationship between PAD and lower limb pain may hinder patients' daily physical activity.[29–31] In the present study, nearly three-quarters of patients perceived physical activity (eg, walking) as beneficial for controlling symptoms. Patients expressed strong concerns about PAD with 13/32 patients rating concern at the scale maximum. These quantitative findings are consistent with observations from small qualitative studies that identified similar themes.[30,32,33] Beyond physical limitations, our data point to significant cognitive and emotional effects on patients in line with a prior report of diminished health-related quality of life (WHO QOL-100) in patients with PAD.[34]

A quarter of participants (8/30) perceived PAD as being rather acute—similar to previous qualitative studies.[31,35] Research indicates that perceived chronicity of PAD only becomes apparent as patients progressively experience recurrent symptoms (eg, intermittent claudication).[32] Moreover, it appears that patients are only motivated to adopt healthy lifestyle changes once they recognize the chronic nature of PAD.[32] Patient perceptions are important because negative illness perceptions are associated with increased health care use independent of objective measures of disease severity. Furthermore, interventions that change illness perceptions have been shown to increase function and decrease disability.[36]

Perceived personal control was low in our study as 14/32 (44%) of patients rated control in the lower half of the scale. Perceived personal control is correlated with self-efficacy[17]—an important predictor of behavior.[16] The HPM stipulates low perceived self-efficacy limits adoption of health behaviors such as smoking cessation, medication adherence, and daily physical activity—all of which are important for limiting PAD morbidity and mortality.[6,16] Thus, HPM may be a useful framework to guide interventions as it focuses on self-efficacy and considers both promoters and barriers to healthy behaviors.[16]

Our study adds to our understanding of PAD by quantifying patient illness perceptions. The age and sex distribution of patients in the present study were similar to prior studies,[37–40] yet our patients reported higher rates of symptomatic PAD. This observation may result from the setting (ie, hospitalized patients) and may represent an ascertainment bias—as hospitalized patients may have more severe PAD.[3,12] We did not collect information on socioeconomic status in the present study. This point is relevant as socioeconomic status may influence health literacy, illness perceptions, and perceived lifestyle limitations as well as adherence to treatment. Thus, findings may not be fully representative of all patients. Limited sample size and single-site recruitment may limit transferability of our findings. In addition, the fact that we assisted some patients in completing questionnaires introduces a potential social desirability bias in our findings. Larger studies will be required to fully clarify the observed patient perceptions. More work is needed to develop and test specific interventions in patients with PAD.

CONCLUSION

In summary, PAD is underdiagnosed, and the prevalence is growing.[1,3,7–9] Increased awareness of PAD among patients could improve health-promoting behaviors such as smoking cessation, regular physical activity, and adherence to pharmacotherapy, thereby improving treatment effectiveness.[5,6,15,27] The data presented herein highlight gaps in patient understanding of risk factors and causes of PAD. Patients had strong negative illness perceptions of PAD. They perceived PAD as having significant consequences on their life, and patients felt they had relatively little control over the disease. Most patients correctly identified that physical activity was important for managing PAD. Overall, patients did not perceive medication as a necessity—potentially compromising adherence. Effective therapeutic education and tailored interventions aimed at changing illness perceptions, and building self-efficacy may be important for promoting healthy behaviors and improving outcomes for PAD.

ACKNOWLEDGMENTS

The authors thank Drs. Horne and Weinman for use of the BMQ, Dr Broadbent for the B-IPQ, and Dr Etter for the CDS-12. The authors wish to acknowledge the nursing staff of the CHUV vascular service for their collaboration. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

REFERENCES

1. Fowkes FGR, Rudan D, Rudan I, et al. Comparison of global estimates of prevalence and risk factors for peripheral artery disease in 2000 and 2010: a systematic review and analysis. Lancet 2013;382(9901):1329-40.

2. Hiatt WR, Goldstone J, Smith SC, et al. Atherosclerotic peripheral vascular disease symposium II. Circulation 2008; 118(25):2826-9.
3. Sigvant B, Wiberg-Hedman K, Bergqvist D, et al. A population-based study of peripheral arterial disease prevalence with special focus on critical limb ischemia and sex differences. J Vasc Surg 2007;45(6):1185-91.
4. Criqui MH, Aboyans V. Epidemiology of peripheral artery disease. Circ Res 2015;116(9):1509-26.
5. Feringa HHH. A prognostic risk index for long-term mortality in patients with peripheral arterial disease. Arch Intern Med 2007;167(22):2482.
6. The European Stroke Organisation (ESO)Tendera M, Aboyans V, Bartelink M-L, et al. ESC Guidelines on the diagnosis and treatment of peripheral artery diseases: document covering atherosclerotic disease of extracranial carotid and vertebral, mesenteric, renal, upper and lower extremity arteries: the task force on the diagnosis and treatment of peripheral artery diseases of the European Society of Cardiology (ESC). Eur Heart J 2011;32(22):2851-906.
7. Hirsch AT. Peripheral arterial disease detection, awareness, and treatment in primary care. JAMA 2001;286(11):1317.
8. Stoffers HE, Rinkens PE, Kester AD, et al. The prevalence of asymptomatic and unrecognized peripheral arterial occlusive disease. Int J Epidemiol 1996;25(2):282-90.
9. Argyriou C, Saleptsis V, Koutsias S, et al. Peripheral arterial disease is prevalent but underdiagnosed and undertreated in the primary care setting in central Greece. Angiology 2013;64(2):119-24.
10. Heald CL, Fowkes FGR, Murray GD, et al. Risk of mortality and cardiovascular disease associated with the ankle-brachial index: systematic review. Atherosclerosis 2006;189(1):61-9.
11. Hooi J, Kester AD, Stoffers HEJ, et al. Asymptomatic peripheral arterial occlusive disease predicted cardiovascular morbidity and mortality in a 7-year follow-up study. J Clin Epidemiol 2004;57(3):294-300.
12. Hirsch AT, Murphy TP, Lovell MB, et al. Gaps in public knowledge of peripheral arterial disease: the first national PAD public awareness survey. Circulation 2007;116(18):2086-94.
13. Willigendael EM, Teijink JAW, Bartelink M-L, et al. Peripheral arterial disease: public and patient awareness in the Netherlands. Eur J Vasc Endovasc Surg 2004;27(6):622-8.
14. Mukherjee D, Cho L. Peripheral arterial disease: considerations in risks, diagnosis, and treatment. J Natl Med Assoc 2009;101(10):999-1008.
15. Chang VYP, Handa KK, Fernandes M, et al. Improving cardiovascular prevention through patient awareness. Rev Assoc Med Bras 2012;58(5):550-6.
16. Pender NJ, Murdaugh CL, Parsons MA. Health promotion in nursing practice. 6th ed. Upper Saddle River, NJ: Pearson; 2011:349.
17. Broadbent E, Petrie KJ, Main J, et al. The brief illness perception questionnaire. J Psychosom Res 2006;60(6):631-7.
18. Timmermans I, Versteeg H, Meine M, et al. Illness perceptions in patients with heart failure and an implantable cardioverter defibrillator: dimensional structure, validity, and correlates of the brief illness perception questionnaire in Dutch, French and German patients. J Psychosom Res 2017;97:1-8.
19. Horne R, Weinman J, Hankins M. The beliefs about medicines questionnaire: the development and evaluation of a new method for assessing the cognitive representation of medication. Psychol Health 1999;14(1):1-24.
20. Horne R, Parham R, Driscoll R, et al. Patients' attitudes to medicines and adherence to maintenance treatment in inflammatory bowel disease. Inflamm Bowel Dis 2009; 15(6):837-44.
21. Horne R, Weinman J. Patients' beliefs about prescribed medicines and their role in adherence to treatment in chronic physical illness. J Psychosom Res 1999;47(6): 555-67.
22. Fall E, Gauchet A, Izaute M, et al. Validation of the French version of the beliefs about medicines questionnaire (BMQ) among diabetes and HIV patients. Eur Rev Appl Psychol 2014;64(6):335-43.
23. Etter J-F, Le Houezec J, Perneger TV. A self-administered questionnaire to measure dependence on cigarettes: the cigarette dependence scale. Neuropsychopharmacology 2003; 28(2):359-70.
24. Etter J-F, Le Houezec J, Huguelet P, et al. Testing the cigarette dependence scale in 4 samples of daily smokers: psychiatric clinics, smoking cessation clinics, a smoking cessation website and in the general population. Addict Behav 2009;34(5):446-50.
25. Walker SN, Sechrist KR, Pender NJ. The health-promoting lifestyle profile: development and psychometric characteristics. Nurs Res 1987;36(2):76-81.
26. Foot H, La Caze A, Gujral G, et al. The necessity–concerns framework predicts adherence to medication in multiple illness conditions: a meta-analysis. Patient Educ Couns 2016;99(5):706-17.
27. Armstrong EJ, Chen DC, Westin GG, et al. Adherence to guideline-recommended therapy is associated with decreased major adverse cardiovascular events and major adverse limb events among patients with peripheral arterial disease. J Am Heart Assoc 2014;3(2):e000697.
28. Dias A, Pereira C, Monteiro MJ, et al. Patients' beliefs about medicines and adherence to medication in ischemic heart disease. Aten Primaria 2014;46:101-6.
29. Sharath SE, Kougias P, Barshes NR. The influence of pain-related beliefs on physical activity and health attitudes in patients with claudication: a pilot study. Vasc Med 2017;22(5): 378-84.
30. Gorely T, Crank H, Humphreys L, et al. "Standing still in the street": experiences, knowledge and beliefs of patients with intermittent claudication—A qualitative study. J Vasc Nurs 2015;33(1):4-9.
31. Cunningham MA, Swanson V, Pappas E, et al. Illness beliefs and walking behavior after revascularization for intermittent claudication: a qualitative study. J Cardiopulm Rehabil Prev 2014;34(3):195-201.
32. Wann-Hansson C, Rahm Hallberg I, Klevsgård R, et al. The long-term experience of living with peripheral arterial disease and the recovery following revascularisation: a qualitative study. Int J Nurs Stud 2008;45(4):552-61.

33. Pedrosa DFA, Moura Siqueira HB de O, Falconi Gomez RR, et al. Evaluation of the perception of chronic ischemic pain in humans with peripheral arterial disease. J Vasc Nurs 2014;32(3):82-7.
34. Tóthová V, Bártlová S, Dolák F, et al. Quality of life in patients with chronic diseases. Neuro Endocrinol Lett 2014; 35(Suppl 1):11-8.
35. Lokin JLC, Hengeveld PJ, Conijn AP, et al. Disease understanding in patients with intermittent claudication: a qualitative study. J Vasc Nurs 2015;33(3):112-8.
36. Petrie KJ, Weinman J. Why illness perceptions matter. Clin Med (Lond) 2006;6(6):536-9.
37. Owens M, Mohan H, Moloney MA, et al. Patient knowledge of peripheral vascular disease in an outpatient setting: an Achilles heel? Ir Med J 2013;106(4):116-8.
38. Corriere MA, Avise JA, Peterson LA, et al. Exploring patient involvement in decision making for vascular procedures. J Vasc Surg 2015;62(4):1032-10392.
39. Lopes-Costa E, Amato-Vealey E. Identifying beliefs about smoking in patients with peripheral vascular disease. J Vasc Nurs 2016;34(4):137-43.
40. Coughlin PA, Gulati V, Mavor AI, et al. Risk factor awareness in patients with peripheral arterial disease. J Cardiovasc Surg (Torino) 2007;48(6):735-40.