# Prevalence and Significance of Unrecognized Lower Extremity Peripheral Arterial Disease in General Medicine Practice

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***OBJECTIVE:*** **To determine the prevalence of unrecognized lower extremity peripheral arterial disease (PAD) among men and women aged 55 years and older in a general internal medicine (GIM) practice and to identify characteristics and functional performance associated with unrecognized PAD.**

***DESIGN:*** **Cross-sectional.**

***SETTING:*** **Academic medical center.**

***PARTICIPANTS:*** **We identified 143 patients with known PAD from the noninvasive vascular laboratory, and 239 men and women aged 55 years and older with no prior PAD history from a GIM practice. Group 1 consisted of patients with PAD consecutively identified from the noninvasive vascular laboratory ($n$ = 143). Group 2 included GIM practice patients found to have an ankle brachial index less than 0.90, consistent with PAD ($n$ = 34). Group 3 consisted of GIM practice patients without PAD ($n$ = 205).**

***MEASUREMENTS AND MAIN RESULTS:*** **Leg functioning was assessed with the 6-minute walk, 4-meter walking velocity, and Walking Impairment Questionnaire (WIQ). Of GIM practice patients, 14% had unrecognized PAD. Only 44% of patients in Group 2 had exertional leg symptoms. Distances achieved in the 6-minute walk were 1,130, 1,362, and 1,539 feet for Groups 1, 2, and 3, respectively, adjusting for age, gender, and race ($P$ < .001). The degree of difficulty walking due to leg symptoms as reported on the WIQ was comparable between Groups 2 and 3 and significantly greater in Group 1 than Group 2. In multiple logistic regression analysis including Groups 2 and 3, current cigarette smoking was independently associated with unrecognized PAD (odds ratio [OR], 6.82; 95% confidence interval [95% CI], 1.55 to 29.93). Aspirin therapy was nearly independently associated with absence of PAD (OR, 0.37; 95% CI, 0.12 to 1.12).**

***CONCLUSION:*** **Unrecognized PAD is common among men and women aged 55 years and older in GIM practice and is associated with impaired lower extremity functioning. Ankle brachial index screening may be necessary to diagnose unrecognized PAD in a GIM practice.**

***KEY WORDS:*** **peripheral arterial disease; intermittent claudication; functional impairment; ankle brachial index; primary care.**
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The prevalence of undiagnosed peripheral arterial disease (PAD) in general medicine practices is not known. Peripheral arterial disease is likely to be unrecognized because most men and women with PAD do not have the classical symptoms of intermittent claudication.[1–3] Pulse palpation is also insensitive for detecting PAD.[4] It is important to recognize PAD because it is associated with functional impairment and a 3- to 6-fold increased risk of cardiovascular mortality.[5–9] Recognizing PAD is necessary to optimize treatment of atherosclerotic risk factors and prevent further functional decline.

To our knowledge, no previously published studies have described the relationship between unrecognized PAD and lower extremity functioning in a primary care medical practice. Patients with PAD identified from a noninvasive vascular laboratory have impaired lower extremity functioning,[8,9] but this association has not been consistently documented among community-dwelling women with PAD.[10,11] Functioning is not necessarily impaired among those with unrecognized PAD, and this may contribute to difficulty recognizing PAD in medical practice. Alternately, functioning may be impaired in the presence of unrecognized PAD, and this may provide justification for trying to identify a greater proportion of apparently asymptomatic patients with PAD.

This study's goals were to determine the prevalence of unrecognized PAD and to identify clinical characteristics associated with unrecognized PAD among men and women aged 55 years and older in a large general medicine practice.

## METHODS

The study was approved by Northwestern University Medical School's Institutional Review Board, and all participants signed an informed consent. Participants were identified from the study institution's noninvasive vascular laboratory and from its largest general internal medicine (GIM) practice. The GIM practice includes over 30 physicians.

### Definitions of Participant Groups

Unrecognized PAD was defined as an ankle brachial index (ABI) less than 0.90 in a general medicine patient with no prior history of PAD. We defined 3 participant groups for this study. Group 1 consisted of patients with PAD identified from the noninvasive vascular laboratory; Group 2 consisted of patients with unrecognized PAD identified from the GIM practice; Group 3 consisted of patients without PAD identified from the GIM practice. Inclusion of

Group 1 allowed us to determine whether characteristics of Group 2, such as leg functioning, were similar or distinct from patients with previously diagnosed PAD.

Potential participants from the GIM practice who reported a history of PAD or had PAD documented in their outpatient medical record were excluded. Any mention in the medical record of intermittent claudication, PAD, or previous lower extremity arterial procedure prior to the study visit was sufficient to exclude GIM practice patients.

## Identifying Study Participants

To identify Group 1, consecutive patients aged 55 years and older with abnormal lower extremity arterial studies documented in Northwestern Memorial Hospital's noninvasive vascular laboratory were identified using the hospital's computerized record system and offered enrollment from January 1, 1996 through the fall of 1997. Group 2 and Group 3 participants were recruited over the same time period from among randomly identified men and women aged 55 years and older with scheduled GIM practice appointments. Each month we obtained computerized lists of men and women aged 55 years and older with scheduled appointments in our GIM practice. SPSS statistical software (SPSS for Windows version 10.0, SPSS Inc., Chicago, Ill) was used to select a random subset of patients with scheduled appointments. All identified individuals received a letter notifying them of the study and were subsequently telephoned. Interested, eligible patients were scheduled for a study visit.

To make more definitive conclusions about characteristics of patients with unrecognized PAD, we aimed to maximize the number of participants in Group 2. The protocol for ABI measurement required less than 30 minutes, while the full study visit took approximately 90 minutes. After enrolling 71 participants in Group 3, we recognized that we were spending much of our time evaluating Group 3 participants in the full 90-minute visit. In order to spend more time identifying Group 2 participants, we randomly selected one third of remaining eligible Group 3 participants for the full 90-minute visit (Fig. 1). Group 3 participants who were not randomly selected were dismissed after their ABI measurement. By spending more time each day screening GIM practice patients with the ABI, we identified more Group 2 participants.

## Exclusion Criteria

We excluded men and women with a Mini-Mental Status Examination score less than 18 out of a possible 30 points ($n = 3$ for Group 1, $n = 6$ for GIM practice). We also excluded participants with severely impaired lower extremity functioning including nursing home residents ($n = 6$ for Group 1, $n = 3$ for GIM practice), wheelchair-bound patients ($n = 12$ for Group 1, $n = 6$ for GIM practice), and patients with foot or lower extremity amputations ($n = 23$ for Group 1, $n = 3$ for GIM practice). Patients with open lower extremity ulcers were excluded because blood pressure cuffs cannot be safely placed over open lower extremity ulcers for ABI measurement ($n = 4$ for Group 1, $n = 0$ for GIM practice). Non-English speaking patients were excluded because none of the research team members were fluent in languages other than English ($n = 10$ for Group 1, $n = 9$ for GIM practice). Patients with an ABI of at least 1.50 were excluded because these patients often have poorly compressible lower extremity arteries, preventing accurate assessment of lower extremity systolic pressures ($n = 1$ for Group 1, $n = 1$ for GIM practice). Patients with PAD from the noninvasive vascular laboratory found to have a normal ABI at their study visit were excluded ($n = 41$). This latter phenomenon occurred in some patients with PAD who were revascularized between the time of their lower extremity arterial evaluation and study enrollment. Calcified, noncompliant arterial walls occasionally resulted in a normal ABI in conjunction with abnormal lower extremity arterial wave forms. Finally, 33 patients from the GIM practice with a previous history of PAD were excluded.

## Functional Measures

***Six-Minute Walk.*** In the 6-minute walk, participants walk up and down a 100-foot hallway for 6 minutes and are encouraged to complete as many laps as possible using a standardized protocol.[12] The distance walked at the end of 6 minutes is recorded.[12]

***Four-Meter Walking Velocity.*** A 4-meter distance was marked out in a hallway. Participants stood with both feet together at the starting line. Participants were instructed to walk the 4-meter distance at their usual pace, as if they were walking down the street to the store. Timing began with the participant's first movement after a "go" command and stopped when the first foot had completely crossed the finish line.[11] The 4-meter walk was performed twice, and the fastest walk was used in analyses.[11,13]

***Walking Impairment Questionnaire.*** The Walking Impairment Questionnaire (WIQ) measures walking distance and speed in the community.[14] In the distance component, participants rank the degree of difficulty walking specific distances ranging from 20 feet (walking indoors around the home) to 1,500 feet (5 blocks) on a 0-to-4 Likert scale (0 = inability to walk the distance and 4 = no difficulty walking the specified distance). Each distance, expressed in feet, is multiplied by the Likert scale response selected for that distance. These products are summed and divided by the maximum possible score to obtain a percent score, ranging from 0 to 100.[14] A similar format is used to measure patient reported walking speed. Participants also rank the degree to which specific symptoms impair walking ability on a 0-to-4 Likert scale (0 = the greatest limitation due to symptoms and 4 = no limitation due to symptoms).

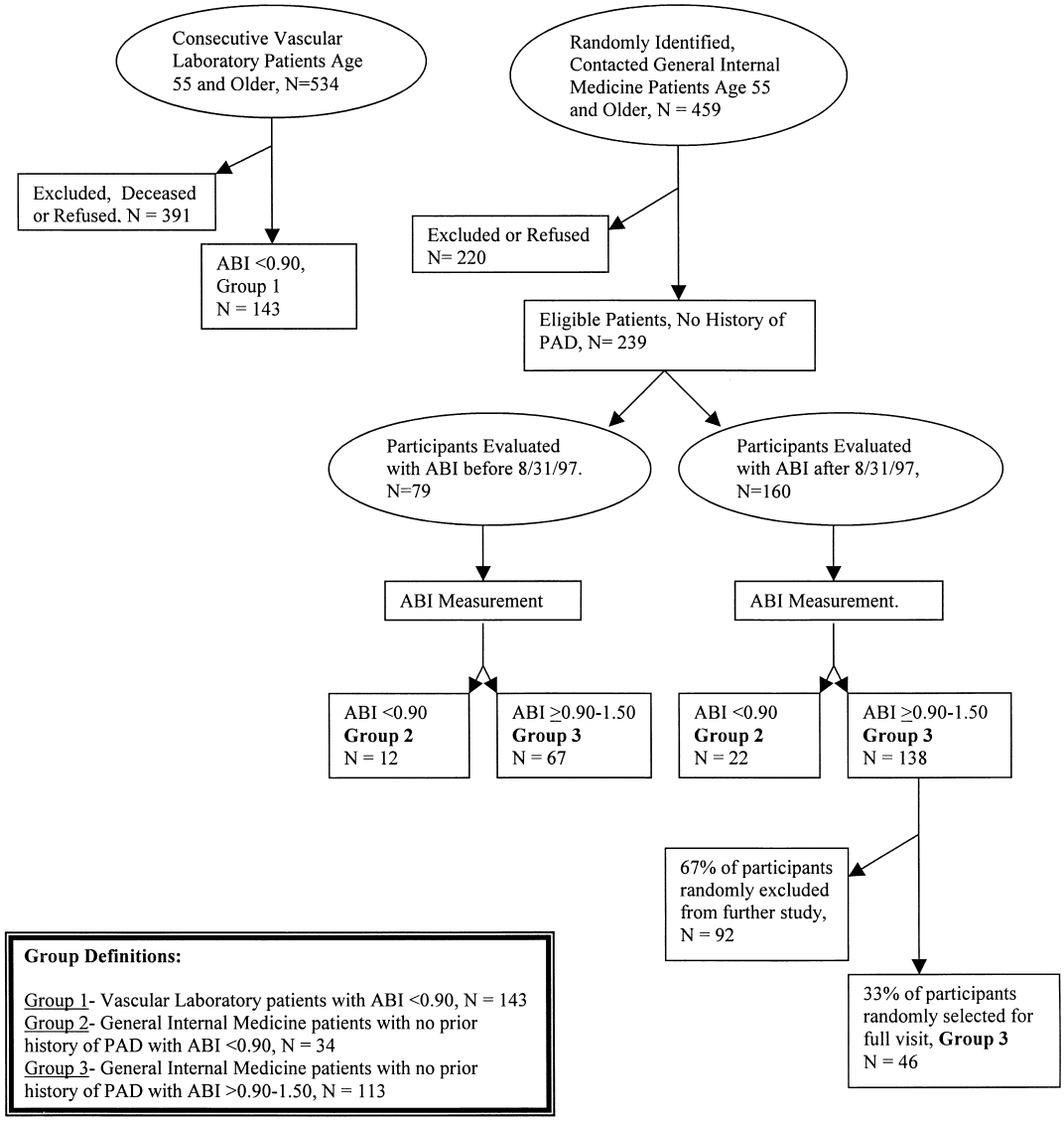


**FIGURE 1.** Participant identification and enrollment.

## Ankle Brachial Index

The ABI measurement was performed in accordance with previously accepted methods.[15] Using a handheld Doppler (Imex-Nicolet Pocket Dop-II, Golden, Colo) with a 5-MHz probe, the pressure in both dorsalis pedis, posterior tibial, and brachial arteries was recorded. The ABI was calculated for each leg artery by dividing the corresponding arterial pressure by the average of the brachial artery pressures. When the 2 brachial pressures differed by 9 mm Hg or more, the highest brachial artery pressure was used for the brachial measurement.[15] The lowest ABI measurement was used in analyses, because an ABI less than 0.90 is consistent with PAD.

## Physical Functioning

We used the Short Form-36 (SF-36) to measure functional status, following accepted, validated methods.[16] We present findings for the physical functioning component of the SF-36 because it includes measures of lower extremity functioning.

## Leg Symptoms

The presence versus absence of intermittent claudication was determined using the San Diego intermittent claudication questionnaire.[2] Classical intermittent claudication was defined as exertional calf pain, which did not begin at rest, worsened with hurrying or walking uphill, and resolved within 10 minutes of rest.[2]

## Comorbid Disease

We used definitions and methods derived from the Women's Health and Aging Study (WHAS) to ascertain comorbid diseases that affect lower extremity functioning.[17]

The WHAS algorithms combine data from patient questionnaires, medications, inpatient medical record review, and a primary care physician questionnaire. Comorbidities ascertained using the WHAS algorithms were myocardial infarction, congestive heart failure, knee and hip arthritis, diabetes mellitus, lumbar disk disease, spinal stenosis, angina, stroke, and chronic pulmonary disease. Hypertension and hypercholesterolemia were assessed with patient report, because they were not considered major determinants of the primary study's major outcome, lower extremity functioning.

### Statistical Analyses

Chi-square tests were used to compare differences in categorical variables between Groups 1, 2, and 3. To better understand the origin of statistically significant differences among all 3 groups, additional $\chi^2$ analyses were performed to determine whether differences in categorical variables between Group 1 and Group 2, and Group 2 and Group 3 were statistically significant. Analyses of variance were used to compute statistical significance for comparisons in continuous variables between Groups 1, 2, and 3, between Groups 1 and 2, and between Groups 2 and 3. Bonferroni method was used to correct for multiple comparisons for both the $\chi^2$ and analysis-of-variance tests. Analysis of covariance was used to compare mean scores for each functional assessment, adjusting for age, gender, and race, and using the Bonferroni method to correct for multiple comparisons between Groups 1 and 2, and Groups 2 and 3. Among GIM practice participants, we used multiple logistic regression analyses to identify characteristics independently associated with Group 2 status. In these regression analyses, the dependent variable was a dummy variable indicating Group 2 versus Group 3 status. Independent variables other than age, gender, and race were selected because they were associated with Group 2 status among all GIM participants at $P \leq .10$ in bivariate analyses. We performed 2 separate regression analyses. Model 1 was performed without including the 6-minute walk as an independent variable. Model 2 was performed including the 6-minute walk. We performed Model 1 because all variables are readily obtainable by clinicians (in contrast to 6-minute walk performance). Model 2 included all variables associated with Group 2 at $P \leq .10$.

## RESULTS

Of 534 potentially eligible patients identified from the noninvasive vascular laboratory, 100 were excluded. In addition, 22 patients did not participate because of limited health, 23 were deceased, 37 had transportation difficulties, 82 refused participation, 61 could not be located, 29 failed to keep scheduled study visits, and 37 could not be scheduled during the study time period, for a total of 143 participants in Group 1. Of 459 patients from the GIM practice, 61 were excluded. In addition, 10 did not participate due to limited health, 1 was deceased, 2 had transportation difficulties, 1 could not be scheduled during the enrollment period, 112 refused participation, and 33 did not show for their scheduled study visits, for a total of 239 eligible GIM practice patients. Of these, 34 (14%) patients (95% confidence interval [95% CI], 9.6% to 18.4%) had an ABI less than 0.90 and comprised Group 2. The remaining 205 GIM practice patients had normal ABI values. Of these, 113 underwent the full 90-minute study visit (Fig. 1).

Table 1 shows characteristics of participants in Groups 1, 2, and 3. The prevalence of exertional leg symptoms was highest in Group 1 and lowest in Group 3. Over half of participants in Group 2 had no exertional leg symptoms at all, and 12% had symptoms consistent with claudication. Compared with Groups 1 and 3, Group 2 had the lowest prevalence of aspirin use.

Table 2 shows results of WIQ scores representing the degree to which walking was limited by specific symptoms. Symptom scores reflecting the degree of difficulty walking due to cramps or pain in the calves, cramps or pain in the thighs, and leg weakness were all lower in Group 1, indicating greater impairment from these symptoms compared with Group 2. Group 2 did not report more difficulty walking due to leg symptoms than Group 3.

Table 3 compares objective and subjective measures of lower extremity functioning between the 3 groups, adjusting for age, gender, and race. Group 2 had significantly lower SF-36 physical functioning scores compared with Group 3. Six-minute walk performance and walking velocity were also lower in Group 2 compared with Group 3. These latter differences represented a trend toward statistical significance. Group 2 participants performed significantly better on the 6-minute walk and had a significantly better WIQ distance score than Group 1. There were no other significant differences in functioning between Groups 1 and 2.

Table 4 shows results of the 2 multiple logistic regression analyses identifying independent associations with unrecognized PAD among GIM practice patients. In Model 1, current cigarette smoking was the only characteristic independently associated with Group 2 status. Relationships between Group 2 status with exertional leg pain and absence of aspirin use trended toward significance. In Model 2, which added 6-minute walk distance to Model 1, shorter distance achieved on the 6-minute walk was independently associated with Group 2 status. Current cigarette smoking, absence of aspirin therapy, and history of high cholesterol were also independently related with Group 2 status in Model 2.

## DISCUSSION

Our findings show that 14% of men and women aged 55 years and older in a general medical practice had unrecognized PAD. Adjusting for confounders, individuals with unrecognized PAD had measurable impairment in objective assessments of leg functioning, compared with

**Table 1. Patient Characteristics**

| | Group 1 (*n* = 143) | Group 2 (*n* = 34) | Group 3 (*n* = 113) | *P* Value* |
|---|---|---|---|---|
| Age, mean ± SD, y | 71.4 ± 10.2 | 69.7 ± 7.7 | 68.5 ± 7.3 | .040 |
| Male, *n* (%) | 83 (58) | 11 (32)† | 48 (42) | .006 |
| African American, *n* (%) | 20 (14) | 15 (44)†,‡ | 26 (23) | <.001 |
| Ankle brachial index, mean ± SD | 0.56 ± 0.19 | 0.70 ± 0.24†,‡ | 1.07 ± 0.09 | <.001 |
| Exertional leg symptoms, *n* (%) | 103 (72) | 15 (44)†,‡ | 18 (16) | <.001 |
| Intermittent claudication, *n* (%) | 50 (35) | 4 (12) | 1 (1) | <.001 |
| Ever smoked cigarettes, *n* (%) | 118 (83) | 23 (68) | 63 (56) | <.001 |
| Currently smokes cigarettes, *n* (%) | 33 (23) | 5 (19) | 6 (6) | .002 |
| High cholesterol, *n* (%) | 83 (58) | 15 (56) | 43 (43) | .065 |
| Hypertension, *n* (%) | 90 (63) | 25 (74) | 60 (53) | .069 |
| Myocardial infarction, *n* (%) | 35 (24) | 4 (12) | 14 (12) | .026 |
| Angina, *n* (%) | 41 (29) | 9 (26) | 20 (18) | .119 |
| Stroke, *n* (%) | 23 (16) | 3 (9) | 11 (10) | .244 |
| Congestive heart failure, *n* (%) | 28 (20) | 5 (15) | 14 (12) | .291 |
| Diabetes mellitus, *n* (%) | 41 (29) | 8 (24) | 17 (15) | .035 |
| Pulmonary disease, *n* (%) | 22 (15) | 11 (32) | 22 (19) | .075 |
| Disk disease, *n* (%) | 42 (29) | 6 (18) | 25 (22) | .232 |
| Knee or hip arthritis, *n* (%) | 32 (22) | 10 (29) | 30 (27) | .600 |
| Aspirin use, *n* (%) | 75 (52) | 7 (21)† | 41 (36) | <.001 |
| Cholesterol-lowering medication, *n* (%)§ | 45 (54) | 9 (60) | 23 (54) | .904 |
| Regular exercise, *n* (%) | 46 (32) | 9 (35) | 39 (39) | .511 |

*Group 1 indicates men and women with peripheral arterial disease (PAD) identified from the noninvasive vascular laboratory; Group 2, patients with unrecognized PAD in a general internal medicine practice; Group 3, patients without PAD identified from a general medicine practice.*

* *For comparison between all 3 groups.*

† *Difference between Group 1 and Group 2 is statistically significant using the Bonferroni method (P < .025).*

‡ *Difference between Group 2 and Group 3 is statistically significant using the Bonferroni method (P < .025).*

§ *Cholesterol-lowering medication was assessed only for participants with a history of high cholesterol.*

GIM practice patients without PAD. Patients with unrecognized PAD were 3 times more likely to report exertional leg symptoms, but no more likely to report difficulty walking due to calf pain, thigh pain, or leg weakness than GIM practice patients without PAD. Furthermore, more than half of patients in Group 2 had no exertional leg symptoms. Our findings suggest that unrecognized PAD may be difficult to diagnose without measuring the ABI.

Diagnosing PAD is important because of the associated functional impairment, observed even in patients with unrecognized PAD as reported here. Among community-dwelling men and women, functional impairment is associated with future mobility loss and nursing home placement.[13,18] Implementing supervised exercise programs increases pain-free and maximal walking distance among men and women with intermittent claudication.[19] Recognizing PAD is also important to ensure that atherosclerotic risk factors are intensively treated. In our cohort, just 21% of patients in Group 2 were taking aspirin, and only 60% of those with high cholesterol were taking a cholesterol-lowering medication.

**Table 2. The Walking Impairment Questionnaire**

| | Group 1 (*n* = 143)† | Group 2 (*n* = 34)† | Group 3 (*n* = 113)† | *P* Value |
|---|---|---|---|---|
| Cramps/pain in calves | 2.0 | 3.1‡ | 3.3 | <.001 |
| Cramps/pain in thighs | 2.7 | 3.5‡ | 3.4 | <.001 |
| Pain, stiffness, or aching in joints (ankles, knees, or hips) | 2.3 | 2.5 | 2.9 | .001 |
| Weakness in 1 or both legs | 2.2 | 3.4‡ | 3.2 | <.001 |
| Pain or discomfort in chest | 3.2 | 3.1 | 3.5 | .043 |
| Shortness of breath | 2.8 | 2.9 | 3.4 | <.001 |
| Heart palpitations | 3.2 | 3.3 | 3.4 | .470 |

* *Age-, gender-, and race-adjusted scores for associations between symptoms and walking difficulty according to group status among men and women aged 55 and older. Participants ranked the degree to which each symptom made it difficult for them to walk on a 0-to-4 Likert scale (0 = very limited and 4 = no limitation).*

† *Group 1 indicates men and women with previously diagnosed peripheral arterial disease (PAD) identified from the noninvasive vascular laboratory; Group 2, unrecognized PAD, defined as a screening ankle brachial index <0.90 in general internal medicine practice patients with no prior history of PAD; Group 3, men and women without PAD identified from a general medicine practice.*

‡ *Difference between Group 1 and Group 2 is statistically significant using Bonferroni adjustment (P < .025).*

**Table 3. Age-, Gender-, and Race-Adjusted Measures of Lower Extremity Functioning**

| Measures of Functioning | Group 1 (*n* = 143) | Group 2 (*n* = 34) | Group 3 (*n* = 113) | *P* Value |
|---|---|---|---|---|
| Objective | | | | |
| Six-minute walk distance, ft. | 1129.9 | 1361.7*,† | 1538.9 | <.001 |
| Four-meter walking velocity, m/sec | 0.954 | 0.999‡ | 1.124 | <.001 |
| Subjective | | | | |
| SF-36 physical functioning score‖ | 50.9 | 57.6§ | 72.1 | <.001 |
| Walking Impairment Questionnaire distance score‖ | 38.9 | 68.4* | 78.5 | <.001 |
| Walking Impairment Questionnaire speed score‖ | 37.8 | 49.0 | 62.3 | <.001 |

*SF-36 indicates Short Form-36; Group 1, men and women with previously diagnosed peripheral arterial disease (PAD) identified from the noninvasive vascular laboratory; Group 2, unrecognized PAD, defined as men and women with a screening ankle brachial index <0.90 in general internal medicine patients with no prior history of PAD; Group 3, men and women without PAD identified from a general medicine practice.*

* *Statistically significant comparisons (P < .025) between Group 1 and Group 2 using Bonferroni adjustment.*

§ *Statistically significant comparisons (P < .025) between Group 2 and Group 3 using Bonferroni adjustment.*

† *P = .048.*

‡ *P = .038.*

‖ *Range, 0 to 100. 100 = best.*

Unrecognized PAD was independently associated with poorer performance on the 6-minute walk in multiple logistic regression analysis, compared with GIM patients without PAD. Performance on the 6-minute walk correlates highly with objectively measured physical activity levels among patients with PAD.[20] The poorer performance of patients in Group 2 on the 6-minute walk compared with Group 3 may be indicative of lower overall activity levels among participants in Group 2. In contrast, patients with unrecognized PAD achieved a greater distance on the 6-minute walk than patients with PAD previously diagnosed in the noninvasive vascular laboratory. The difference in walking impairment between Group 1 and Group 2 may have been underestimated, however, if patients with greater disability from the noninvasive vascular laboratory were more likely to refuse study participation.

There are several possible reasons for the high proportion of unrecognized PAD in our GIM practice. First, because patients with PAD have a substantial burden of comorbid disease, clinicians may have insufficient time or resources to inquire about PAD-related symptoms. Second, history and physical examination are insensitive for diagnosing PAD.[1,2,4] Finally, patients with unrecognized PAD had higher ABI values, fewer leg symptoms, and better functioning than patients with recognized PAD identified from the noninvasive vascular laboratory, making the distinction between Groups 2 and 3 more subtle than that between Groups 1 and 3. One reason for the relative paucity of leg symptoms among patients in Group 2 may be that patients with unrecognized PAD do not walk sufficiently to experience leg symptoms. Alternatively, patients in Group 2 may ignore walking-related leg symptoms because of other competing symptoms, such as shortness of breath.

Because of the large proportion of participants in Group 2 without exertional leg symptoms, our data support screening men and women aged 55 years and older in GIM practices for PAD with the ABI. The ABI is 95% sensitive and 99% specific for PAD.[21] Although cigarette smoking was independently associated with Group 2 status in

**Table 4. Multiple Logistic Regression Analyses Relating Clinical Characteristics to Unrecognized Peripheral Arterial Disease (PAD) (*n* = 147)***

| | Model 1 | | Model 2 | |
|---|---|---|---|---|
| Independent Variables | OR | 95% CI | OR | 95% CI |
| African American | 1.45 | 0.46 to 4.58 | 1.56 | 0.34 to 5.74 |
| Age | 1.06 | 0.98 to 1.14 | 1.05 | 0.38 to 1.16 |
| Male | 1.12 | 0.39 to 3.23 | 2.86 | 0.72 to 11.36 |
| Currently smokes cigarettes | 6.82 | 1.55 to 29.93 | 12.03 | 1.80 to 80.59 |
| Exertional leg pain | 2.93 | 0.95 to 9.04 | 0.76 | 0.18 to 3.16 |
| Hypertension | 2.29 | 0.76 to 6.90 | 3.81 | 0.81 to 17.88 |
| High cholesterol | 2.27 | 0.84 to 6.15 | 6.58 | 1.39 to 31.12 |
| Aspirin therapy | 0.37 | 0.12 to 1.12 | 0.18 | 0.04 to 0.83 |
| Six-minute walk distance per 100 ft | — | — | 0.77 | 0.61 to 0.95 |

* *Unrecognized PAD was defined based upon a screening ankle brachial index less than 0.90 in general internal medicine patients with no prior history of PAD. Independent variables other than age, gender, and race were selected based upon associations with unrecognized PAD of P $\leq$ .10 in bivariate analyses. However, Model 1 does not include 6-minute walk because it is not easily measured by clinicians. OR indicates odds ratio; CI, confidence interval.*

logistic regression analyses, most patients in Group 2 did not smoke. Selective ABI screening of men and women aged 55 years and older based on number of cardiovascular risk factors would not have been efficient.

The prevalence of women and African Americans was substantially higher in Group 2 compared with Group 1, suggesting that clinicians may be significantly less likely to diagnose PAD among women and African Americans compared with men and whites, respectively. The reason for this phenomenon is unclear. Further study is needed to explain these findings.

The association between less aspirin use and unrecognized PAD is of interest. In the Physician's Health Study, aspirin therapy, compared with placebo, was associated with a lower incidence of intermittent claudication or lower extremity revascularization among male physicians,[2] suggesting a possible causal association between lower rates of aspirin use and PAD. However, the lower prevalence of aspirin therapy might alternatively reflect less healthy behavior in Group 2 compared with Group 3.

In conclusion, unrecognized PAD is common among men and women aged 55 years and older in primary care medical practices and is associated with measurably impaired lower extremity functioning. Further study is needed to identify mechanisms to increase ABI screening and recognition of PAD in general medicine practices. Further study is also needed to develop interventions to improve functioning and atherosclerotic risk factor treatment rates in patients with unrecognized PAD.

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