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Identifying Gaps in Disease Knowledge among Patients with Peripheral Artery Disease

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Background

- Peripheral artery disease (PAD) is a severe form of atherosclerosis in the lower extremities that affects 230 million people globally which leads to claudication, rest pain, foot ulcers, and gangrene[1,2]
- PAD patients have a 3-5x increased relative risk for stroke, MI, and all cause mortality compared to non-PAD population[3]
- In a study of 2,500 Americans 50y+ in the general public, only 25% expressed familiarity with PAD, compared to 67% familiarity with coronary artery disease (CAD), stroke, and heart failure, along with only 14% familiarity with the associated limb loss as consequence in severe forms of PAD[4]
- A 2003 study of patient with and without PAD established the PAD cohort was less aware of the associated risk of stroke, MI, and death compared to the non-PAD cohort[5]

Purpose

We hypothesize that despite the high global prevalence and morbidity and mortality associated with peripheral artery disease, patients with PAD have inadequate knowledge of PAD.

Methods

- Observational study of patients with PAD recruited from vascular surgery outpatient clinic at NMH from 2 PAD clinical studies over an 8-month period

Recruitment and Inclusion and Exclusion Criteria

- Patients with a known diagnosis of PAD in vascular clinic and from 2 additional PAD research studies at NMH
- Inclusion criteria: PAD diagnosis, ABI ≤ 0.9, history of leg revascularization or amputation for PAD, or lab report from certified vascular laboratory indicating PAD diagnosis
- Exclusion criteria: non-English speaking, illiteracy, inability to provide informed consent, inability to complete the paper survey, or having completed the survey prior

Measurement of Participant Health History and Medical Knowledge

- 55-item paper questionnaire
- Assessment of patient's own medical history, general knowledge of PAD risk factors and consequences, and education preferences, in addition to demographic and socioeconomic status information
- Electronic medical record (EMR) used to certify participant responses on personal medical history

Analysis

- Standard descriptive statistics
  - Bivariate analysis in factors associated with awareness of PAD diagnosis
  - Two-sample T-test in age compared to awareness of PAD diagnosis
  - Chi-squared test in associations between categorical variables and awareness of PAD diagnosis, and preferred PAD education topics and source of education
- "PAD Knowledge Score"
  - Calculation from percentage of correct responses to 19 questions on PAD risk factors and consequences
  - Participants with >6 missing responses were excluded
  - Pearson correlation coefficient and two-sample T-test tested association between knowledge score and categorical factors
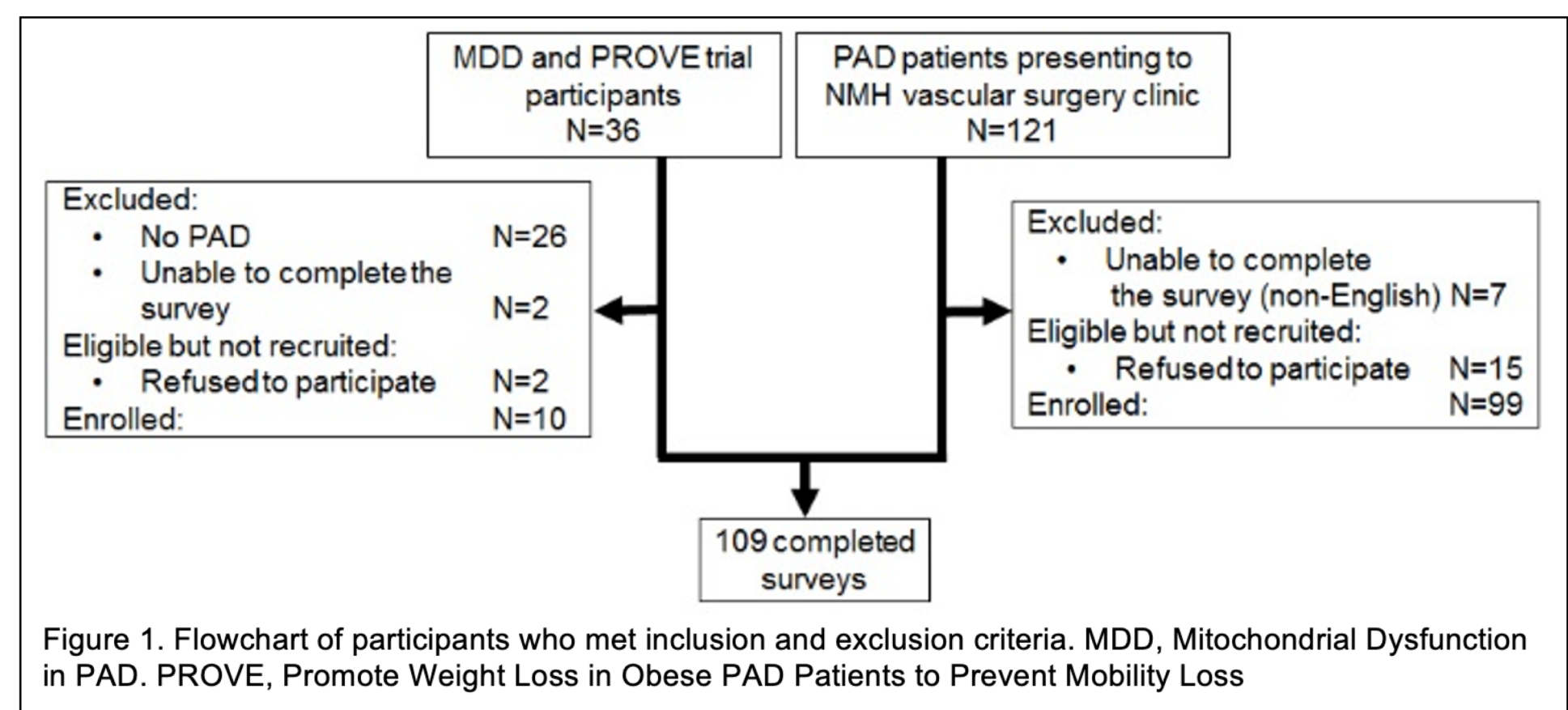

Figure 1. Flowchart of participants who met inclusion and exclusion criteria. MDD, Mitochondrial Dysfunction in PAD. PROVE, Promote Weight Loss in Obese PAD Patients to Prevent Mobility Loss

Table 1. Basic Cohort Characteristics

Basic Cohort Characteristics (N=109)	
Age (years)	69.4 ±11.0
Female sex	43 (39.4%)
Race	
Caucasian	62 (56.9%)
African-American	38 (34.9%)
Other	9 (8.3%)
Annual household income	
> $60,000	32 (29.4%)
$25-$60,000	22 (20.2%)
< $25,000	31 (28.4%)
Unsure or prefer not to answer	11 (10.1%)
Ambulatory status	
Can ambulate without assistance	58 (53.2%)
Can ambulate with assistance	32 (29.4%)
Non-ambulatory	13 (11.9%)
Smoking	
Current	12 (11.0%)
Former	68 (62.4%)
Never	26 (23.9%)
PAD symptoms	
Critical limb-threatening ischemia	86 (78.9%)
Other	23 (21.1%)

Table 2. Awareness of Personal Health History

	Correct responses	
Overall awareness of PAD diagnosis	64.2% (70/109)	
Awareness of other diagnoses*		Awareness of PAD diagnosis
Diagnosis	Prevalence	Correct responses	
Diabetes mellitus	56/106 (52.8%)	88.7% (94/106)	63.2% (67/106)
TIA or stroke	24/106 (22.6%)	88.7% (94/106)	63.2% (67/106)
CABG or coronary PCI	32/106 (30.2%)	84.0% (89/106)	63.2% (67/106)
Hypertension	88/106 (83.0%)	79.2% (84/106)	63.2% (67/106)
Hyperlipidemia	84/106 (79.2%)	73.6% (78/106)	62.3% (66/106)

* Denominator excludes missing data in electronic medical record
TIA, transient ischemic attack. CABG, coronary artery bypass graft. PCI, percutaneous coronary intervention.

Table 3. Bivariate analysis of variables associated with awareness of PAD diagnosis and PAD knowledge score

	PAD Diagnosis Awareness		PAD Knowledge Score	
Variable	Frequency	P value	Correlation Coefficient	P Value
Age (years), mean ± SD		.43	-0.125	.20
Aware of PAD diagnosis	70.2 ±10.6			
Unaware of PAD diagnosis	68.5 ±10.3			
Variable			Mean score±SD	P value
Female sex	35/43 (81.4%)	<.01	57.5±23.6	.50
Male sex	35/64 (54.7%)		54.5±21.3	
Race		.91		.30
Caucasian	40/62 (64.5%)		57.3±22.8	
Non-Caucasian	26/41 (63.4%)		52.6±21.6	
Highest education level		.68		.99
High school or some college	37/59 (62.7%)		55.7±22.5	
College degree or higher	30/45 (66.7%)		55.6±22.5	
Annual household income		.33		.49
≤ $60K	32/52 (61.5%)		56.5±22.7	
> $60K	23/32 (71.8%)		59.9±22.1	
Comorbidities				
Diabetes	32/54 (59.3%)	.25	52.8±25.1	.12
No diabetes	35/50 (70%)		59.5±17.5	
Hypertension	56/86 (65.1%)	.75	53.4±22.7	<.01
No hypertension	11/18 (61.1%)		68.1±13.0	
Hyperlipidemia	55/82 (67.1%)	.21	55.3±23.4	.57
No hyperlipidemia	11/21 (52.4%)		58.4±16.2	
Smoking	7/12 (58.3%)	.75	53.1±20.6	.59
Non or former smoker	60/92 (65.2%)		56.7±22.2	
PAD surgery history				
History of percutaneous leg revascularization	44/56 (78.6%)	<.01	55.3±23.5	.72
No history of percutaneous leg revascularization	23/48 (47.9%)		56.8±20.4	
History of surgical bypass	23/38 (60.5%)	.53	60.3±19.0	.12
No history of surgical bypass	44/66 (66.7%)		53.3±23.4	
History of major amputation	11/17 (64.7%)	.98	65.0±16.3	.06
No history of major amputation	56/87 (64.4%)		54.2±22.6	
History of minor amputation	14/25 (56.0%)	.36	56.4±21.8	.82
No history of minor amputation	51/77 (66.2%)		55.3±22.2	
History of any leg revascularization	51/74 (68.9%)	.13	56.9±22.5	.53
No history of any leg revascularization	16/30 (53.3%)		53.9±20.9	
History of any amputation	20/34 (58.8%)	.47	58.7±21.5	.31
No history of any amputation	45/68 (66.2%)		54.0±22.2	
History of leg revasc. or major amputation	51/76 (67.1%)	.35	56.9±22.2	.50
No history of leg revasc. or major amputation	16/28 (57.1%)		53.6±21.7	
PAD symptoms		.59		.72
Claudication	16/23 (69.6%)		54.5±17.5	
Rest pain or tissue loss	52/82 (63.4%)		56.4±23.0	
Ambulatory status		.82		.54
Ambulates independently	39/58 (67.2%)		58.4±19.3	
Ambulates with assistive device	19/31 (61.3%)		53.1±27.1	
Non ambulatory	9/13 (69.2%)		54.7±22.7	

Bold indicates P<.05

Results

- 109 completed surveys from 126 eligible participants
- Mean age 69.4 ± 11.0 years
- 80% with critical limb threatening ischemia (CLTI)

PAD Knowledge Awareness

- 65.4% of participants aware of their PAD diagnosis, less than awareness of related comorbidities
- Factors positively associated with PAD awareness:
  - Female sex (81% v. 55%; p=.004)
  - History of percutaneous leg revasc. (79% v. 48%; p=.001)
- PAD knowledge score correlates:
  - PAD awareness positive correlation (59.1% vs. 48.7%; P=.02)
  - History of hypertension negative correlation (53.4% vs. 68.1%; P=.001)

Education Preferences

- 73% reported receiving PAD education materials
- 87% expressed the desire to be further educated about PAD
- Causes, dietary recommendations, and treatments for PAD were most popular topics for further PAD education

Conclusion

Patients with PAD have major deficits in their awareness of this diagnosis and general knowledge about PAD. Future research should prioritize the development of effective educational strategies, which could improve early diagnosis and treatment, alter the natural history of the disease, and lead to better patient outcomes.

Limitations

- Modest sample size
- Single-center, single-practice study with large proportion CLTI
- Recruitment during COVID-19 pandemic in 2021 with restricted in person appointments at NMH
- Full assessment of healthy literacy further needed

References

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