

Perception of the peripheral arterial occlusive disease in Fontaine class I or II patients included in a Family Health Program

Percepção da doença arterial obstrutiva periférica por pacientes classe I ou II de Fontaine de um Programa de Saúde da Família

Juliana Nogueira Diniz¹, Regina Coeli Cançado Peixoto Pires²

Abstract

Background: Peripheral arterial occlusive disease (PAOD) is characterized by the impairment of patients' quality of life when it is associated with high risk of cardiovascular or cerebrovascular events. The Ankle Brachial Pressure Index (ABPI) is a sensitive and specific diagnostic method, and the control of risk factors is optimized with early detection of PAOD.

Objective: To assess the perception of PAOD in Fontaine stage I and II patients by Family Health Strategy in Pará de Minas (MG), Brazil, through an analysis of the socioeconomic characteristics and life quality determinants.

Methods: After the sample calculation, stratified by genre and age, 123 individuals diagnosed with Fontaine stage I or II PAOD were given a questionnaire elaborated for the purposes of this study. Aiming at associations, the χ^2 and Fisher's Exact tests were used ($p < 0.05$).

Results: Among the participants who answered the questionnaire, 96 (78%) were women and had low schooling. We observed association between intermittent claudication, the most common symptom, and sensation of pressure on the legs, cramps, foot paresthesia, fatigue, swelling, and tingling. There was no association with smoking, systemic arterial hypertension, diabetes and cholesterol alterations. Among the participants, 76 (61.8%) had never heard about the disease even though they had it. Pain during activities at home or elsewhere was reported by 48 individuals (39%). The practice of physical activities was more recommended by clinicians – mentioned by 18 (14.6%) individuals – and walking, which was the only activity practiced according to the recommended levels, was reported by 102 participants (27.7%).

Conclusion: This population must be better oriented about the clinical and non-pharmacological treatment intended to the control of irreversible chronic manifestations. We emphasize the importance of conveying information about the silent development and the symptomatology of the disease.

Keywords: arteriosclerosis obliterans; intermittent claudication; quality of life.

Resumo

Contexto: A doença arterial obstrutiva periférica (DAOP) se destaca por deteriorar a qualidade de vida dos pacientes, quando associada a elevado risco de eventos cardiovasculares e cerebrovasculares. O diagnóstico clínico é sensível e específico, por meio do índice tornozelo-braquial (ITB), que, se precocemente detectado, otimiza o controle dos fatores de risco.

Objetivo: Avaliar a percepção da DAOP em pacientes classe I ou II de Fontaine assistidos pela Estratégia de Saúde da Família em Pará de Minas (MG), analisando características socioeconômicas e determinantes da qualidade de vida.

Métodos: Após cálculo amostral estratificado por gênero e idade, um questionário elaborado para o estudo foi respondido por 123 indivíduos com diagnóstico de DAOP classe I ou II de Fontaine. Para as associações, utilizaram-se testes do χ^2 e exato de Fisher ($p < 0,05$).

Resultados: Dos indivíduos que responderam o questionário, 96 (78%) eram do gênero feminino e tinham baixa escolaridade. Observou-se associação entre claudicação intermitente, o sintoma mais frequente da doença, e aperto nas pernas, câimbras, adormecimento dos pés, cansaço, inchaço e agulhadas. Não houve associação com tabagismo, hipertensão arterial sistêmica, diabetes e alteração do colesterol. Dos participantes, 76 (61,8%) nunca ouviram falar da doença, apesar de serem portadores. Dor durante execução de tarefas dentro e fora de casa foi relatada por 48 (39%) indivíduos. A prática de atividade física foi mais recomendada por médico clínico geral – mencionada por 18 (14,6%) indivíduos – sendo que a caminhada, única atividade praticada em níveis recomendados, foi relatada por 102 (27,7%).

Conclusão: É necessário esclarecimento para essa população quanto ao tratamento clínico não-farmacológico para controle das manifestações crônicas irreversíveis. Ressalta-se a relevância da veiculação de informações sobre a evolução silenciosa e sintomatologia da doença.

Palavras-chave: arteriosclerose obliterante; claudicação intermitente; qualidade de vida.

Introduction

Peripheral arterial occlusive disease (PAOD) is a severe degenerative systemic vascular disease resulting from the peripheral artery narrowing and stiffening, especially in the lower limbs. It is highly prevalent in the population and causes restrictions, thereby impairing patient's quality of life. Moreover, PAOD is associated with high risk of fatal and nonfatal cardiovascular events such as death, acute myocardial infarction and stroke^{1,2}.

The most common PAOD symptom is intermittent claudication (IC), which manifests as a discomfort in the affected muscles during walking that is relieved by rest^{3,4}.

It is disturbing that PAOD be often underdiagnosed, because the clinical diagnosis is sensitive and very specific, made by the objective and simple Ankle Brachial Pressure Index (ABPI), which is based on the ratio of systolic blood pressure in the ankle and arm of less than 0.9. It is fundamental that the patient evaluation be done with instruments that provide objective and reproducible data, for the peripheral arterial obstruction may be diffuse, with many clinical presentations. The investigation with simple but reliable methods is important especially in regions economically restricted in terms of advanced technological resources. In these regions, it is necessary to detect the large number of asymptomatic patients presenting history of sedentary lifestyle or associated diseases that limit physical activity. These patients often interpret the discomfort in the lower limbs as an age-related factor and do not seek medical advice^{3,4}. Early diagnosis improves the control of risk factors by medication, changes in eating habits and/or supervised exercises. Clinical management is preferred due to its noninvasive characteristics, presenting low incidence of complications, besides exerting a systemic action on the atherosclerotic disease progression^{1,5,6}.

Practicing regular physical activities under professional orientation makes it possible for PAOD patients to walk longer distances without pain or with less discomfort. In addition, professional supervision assures the correct posture during physical activity, thus avoiding overloads that, at long term, may aggravate the underlying vascular problem.

The current recommendations for PAOD treatment, which emphasizes regular and oriented physical activities, are not properly followed according to clinical observation. The patients are often instructed by their doctors to practice exercises without professional supervision or are told that

there are contraindications to such activities based on their symptomatology.

Objective

To assess the perception of Fontaine stage I and II PAOD mainly with regard to symptomatology and to treatment, starting from the detection of exercise practice, in order to determine the influence of the disease on individuals' well-being.

Methods

This is a cross-sectional, descriptive and analytical study of a case series conducted in Pará de Minas, Minas Gerais, Brazil.

The studied population was selected based on medical records from *Policlínica Municipal*, a reference in specialized medical care, and all the patients assisted by the Service of Angiology in January 2008 who had a medical record indicating Fontaine stage I or II PAOD were enrolled for the study.

Using the proportional random sample with a 10% margin of error, a representative sample was calculated and stratified by genre and age group (30 to 39, 40 to 49, 50 to 59, and 60 to 65 years old).

Partially or entirely illegible medical records were excluded from the study, as well as individuals younger than 30 years or older than 65 years of age in 2007, with medical records indicating conditions such as surgical or endovascular surgery therapy for PAOD, limitation or deficiency that restrains regular practice of exercises, wounds in the lower limbs that are under treatment or have been treated, and/or amputation at any level of the lower limbs; patients who were assisted by the private health system before migrating to the public health system of Pará de Minas were also selected.

A specific questionnaire was designed for the study with questions concerning socioeconomic characteristics, knowledge of the participants about PAOD and practice of physical activity. It was composed according to the International Physical Activity Questionnaire (IPAQ) aiming at the classification of patients by daily activities.

As to data collection, a list based on the medical records was created, grouping individuals according to genre and age group, being then separated by area of assistance from the Family Health Strategy (ESF). Community Health Agents (ACS) were given envelopes identified with full names and random addresses, containing the questionnaire

and the informed consent form. The agents were oriented about the questionnaire application, and the importance of not interfering with the answers was emphasized – including opinions expressed by other people living in that same address.

Data were analyzed by the software Statistical Package for Social Science (SPSS) for Windows' version 13.0. The descriptive analysis of the variables was expressed in tables of frequency distribution starting from the analysis of cross tables, and valid associations were observed by means of the χ^2 and Fisher Exact tests, with significance level set at $p < 0.05$. The analysis of the open questions was carried out by answer categorization.

This study was approved by the Ethics Research Committee of *Universidade Vale do Rio Verde de Três Corações* (UninCor) and registered on the SISNEP (in Portuguese, *Sistema Nacional de Informação sobre Ética em Pesquisa envolvendo Seres Humanos*), having an Ethics Certificate (CAAE) 0026.0.380.000-08. The participants were instructed and, afterwards, they signed the informed consent form.

Results

The sample gathered 123 medical records of patients diagnosed with Fontaine stage I or II PAOD. We verified that 96 (78%) participants were women and 27 (22%) were men, with predominance of the age groups from 50 to 59 years old (45 patients; 36.6%) and from 60 to 65 years old (39 patients; 31.7%).

Patients' schooling was considered low: 79 individuals (64.2%) attended up to the fourth grade of the elementary school. The individual income distribution was concentrated on the range of up to one minimum wage (59 participants, 48%), which identifies a population with lower schooling and income, thus preventing the access to specialists at private clinics.

The workday was classified according to workload and work shifts mostly reported by patients: 26 (21.1%) individuals reported working 8-hour shifts, and 29 (23.6%) reported early-morning or afternoon shift work.

When assessing the presence of four main risk factors on PAOD patients (hypertension, smoking, cholesterol alterations and *diabetes mellitus*), we observed 61 (49.6%) hypertensive patients and 27 smokers (22.0%), followed by those who declared having serum cholesterol alterations (24 – 19.5%) and diabetes (13 – 10.6%), respectively.

When analyzing the knowledge of the studied population about arterial occlusive disease, 46 individuals

(37.4%) had heard about the subject; it is worth emphasizing that 77 (63.6%) patients who declared not to have heard about the disease, as the medical record indicated (Table 1).

The three most mentioned alternatives of treatment for PAOD (alternative therapies, analgesic/anti-inflammatory and antihypertensive/anti-lipidemia drugs) are indicated in Table 2. The two other options were: regular physical activity and oral hypoglycemic/anticoagulant drugs. The importance of regular exercise must be emphasized, as well as the control of risk factors for the initial conditions of the disease⁵.

In regard to the interpretation of the exercises practiced by the participants, the objective was to classify the individuals according to their physical effort and to IPAQ⁷.

The practice of physical activities was reported by 47 participants (38.2%), and 73 (59.3%) of them did not practice any. Regarding the modalities, five options were

Table 1 – Distribution of individuals with Fontaine stage I and II PAOD according to intermittent claudication and risk factors, Pará de Minas (MG), Brazil, 2009

	Intermittent claudication		Total – n (%)	
	Yes – n (%)	No – n (%)		
Smoking	Yes – n (%)	15 (57.7)	11 (42.3)	26 (100.0)
	No – n (%)	53 (55.8)	42 (44.2)	95 (100.0)
Diabetes	Yes – n (%)	8 (61.5)	5 (38.5)	13 (100.0)
	No – n (%)	59 (55.7)	47 (44.3)	106 (100.0)
Cholesterol alterations	Yes – n (%)	15 (62.5)	9 (37.5)	24 (100.0)
	No – n (%)	52 (57.1)	39 (42.9)	91 (100.0)
Systemic arterial hypertension	Yes – n (%)	34 (55.7)	27 (44.3)	61 (100.0)
	No – n (%)	34 (58.6)	24 (41.4)	58 (100.0)

Table 2 – Distribution of individuals with Fontaine stage I and II PAOD according to PAOD information source, Pará de Minas (MG), Brazil, 2008

PAOD information	Yes – n (%)	No – n (%)	Total – n (%)
Heard about the disease	46 (37.4)	77 (62.6)	123 (100)
Physician	26 (21.1)	97 (78.9)	123 (100)
TV	17 (13.8)	106 (86.2)	123 (100)
Friends	17 (13.8)	106 (86.2)	123 (100)
Radio	8 (6.5)	115 (93.5)	123 (100)
Newspaper	6 (4.9)	117 (95.1)	123 (100)
Other source	2 (1.6)	121 (98.4)	123 (100)

PAOD: peripheral arterial occlusive disease.

suggested, and walking was practiced by 38 people (30.9%), followed by group gymnastics (13 individuals, 10.6%) performed by ESF professionals in sports courts or squares of the city as preventive activities, thus promoting the health of the population (Table 3).

Eighteen participants (14.6%) reported being oriented for the practice of physical activity by their clinicians.

It was observed, however, that practicing any kind of physical activity did not result in IC, because the percentage of individuals with IC was very similar among those who did practice and those who did not practice exercises – 25 (54.3%) and 40 (55.6%) participants, respectively (p=0.524).

The question about walking for at least ten minutes presented alternatives from zero to seven days/week according to the practice at work, during leisure time and from one place to another. By analyzing the answers based on IPAQ⁷, the participants who walked four days/week or less, and those who walked five days/week or more were grouped. A higher prevalence of individuals walking four days or less in relation to the frequency of those walking five days/week or more was observed in all options considered (at work, from one place to another, during leisure time) (Table 4).

Pain during exercises at home or somewhere else was considered to be mild by 21 individuals (17.1%), moderate by 23 (18.7%), and severe by 48 individuals (39%).

Table 3 - Distribution of individuals with Fontaine stage I and II PAOD according to the information received about the disease and to intermittent claudication, Pará de Minas (MG), Brazil, 2009

		Intermittent claudication		Total – n (%)
		Yes – n (%)	No – n (%)	
Patient had heard about PAOD	Yes – n (%)	27 (58.7)	19 (41.3)	46 (100.0)
	No – n (%)	40 (54.1)	34 (45.9)	74 (100.0)
Total – n (%)		67 (55.8)	53 (44.2)	120 (100.0)

PAOD: peripheral arterial occlusive disease.

Identification of daily activities put 2 individuals (1.6%) in the group of vigorous activities practiced less than three times/week, and 13 individuals (10.6%) in the group that practiced them from 3 to 7 days/week. Lifting and carrying heavy objects, wood sawing, mowing grass and house painting were considered to be vigorous activities⁷. As to the practice of moderate activities, 43 participants (35%) reported a frequency of 5 days/week and 65 (52.8%) reported 5 to 7 days/week. In this group, the following activities were gathered: lifting and carrying small objects, standing up, housekeeping activities such as sweeping or cleaning the floor, carrying children, doing the laundry by hand, going up and down the stairs and swimming⁷.

According to Table 5, 107 (87%) participants affirmed that they performed daily activities such as lifting and carrying small objects, standing up and carrying children, and 106 (86.2%) reported housekeeping activities and doing the laundry by hand. This result can be explained by the fact that the studied population consisted predominantly of women: 96 (78%) were females, 39 (31.7%) were housekeepers and 17 (13.8%) affirmed that housekeeping was one of their occupations, which is consonant with the activities developed by this portion of the population.

As to symptomatology of peripheral vascular disorders, 95 individuals (77.2%) reported fatigue on the legs as most frequent, followed by cramps (75 individuals, 61%), and burning pain (74 individuals, 60.2%). The classical PAOD symptomatology was declared by 68 (55.3%) patients, and the swelling on the legs by 67 participants (54.5%). Itching on the legs was reported by 55 individuals (44.7%); sensation of pressure by 53 (43%); and paresthesia of the toes by 50 (40.6%). Prick pain was the symptom less declared by the studied population (47 individuals, 38.2%).

When the participants were asked about the decision they made at the moment they felt pain on the legs during exercise, 64 (52%) affirmed that they maintained the activity

Table 4 - Distribution of individuals with Fontaine stage I and II PAOD according to practice and type of physical activity, Pará de Minas (MG), Brazil, 2008

Physical activity	Yes – n (%)	No – n (%)	No answer – n (%)	Total – n (%)
Practice of physical activity	47 (38.2)	73 (59.3)	3 (2.4)	123 (100)
Walking	38 (30.9)	84 (68.3)	1 (0.8)	123 (100)
Group gymnastics	13 (10.6)	109 (88.6)	1 (0.8)	123 (100)
Cardiovascular Gym	6 (4.9)	116 (94.3)	1 (0.8)	123 (100)
Regular Gym	3 (2.4)	119 (96.7)	1 (0.8)	123 (100)
Running	1 (0.8)	121 (98.4)	1 (0.8)	123 (100)

either way, but reducing the rhythm, 31 (25.2%) stopped the practice until the pain was gone, and 15 (12.2%) declared that they completely interrupted the exercises.

Discussion

There was an increasing prevalence of PAOD according to aging, which was also observed by Makdisse et al.⁸ The inversion of the genre prevalence is the reality of recently published Brazilian studies on PAOD^{8,9}. Nevertheless, an association between the socioeconomic condition of a population and PAOD has not been documented.

The predominance of hypertensive patients in this study among the analyzed risk factors determines an independent characteristic of this population, for there are no studies that confirm this finding. The prevalence of smoking as one of the main risk factors is confirmed despite the absence of statistical significance, probably due to the limitations of the sample size.

The association of IC with the main risk factors (Table 6) was not significant in this study possibly because of the number of patients analyzed. The statistical test (p=0.522) showed that there was no significant association between IC and smoking. The proportion of smokers presenting IC (15 patients; 57.7%) is practically the same as non-smokers individuals (53 patients; 55.8%). It is known that smoking is a risk factor for the disease¹⁰, but not for the symptom. The IC among diabetic (8 individuals; 61.5%) and non-diabetic patients (59 individuals; 55.7%) was not statistically different (p=0.462). In this manner, having diabetes or not was not associated with IC. The proportion of patients with IC was rather similar between the group that reported having cholesterol alterations (62.5%) and the group that reported not having it (57.1%). It is possible to come to the same conclusion with regard to hypertension, that is, IC was not associated with hypertension (p=0.447).

The association of PAOD with hypertension and smoking was also observed by Mota et al.¹⁰. The smoking prevalence found by Viebig et al.⁸ was the same found in this study (22%), and, when associated with PAOD, it was considered to be an important factor by Gabriel et al.¹¹ because it increases the risk of developing the disease in 1.17 times; the influence of the smoking habit on the development of atherosclerotic and atherothrombotic generalized phenomena, especially with regard to the impairment of peripheral arterial circulation, has also been reported. The study by Framingham (1948) showed the direct relation between systemic arterial hypertension (SAH) and PAOD⁹, increasing in 2.5% among men and in 3.9% among women. Gabriel et al.¹¹ also confirmed the presence of SAH as an increased risk for PAOD in 1.06.

Considering the prevalence and the clinical correlations of the peripheral arterial disease, Gabriel et al.¹¹ pointed diabetes mellitus as an important risk factor for coronary artery disease and PAOD, either asymptomatic or symptomatic, increasing in 1.76 the risk of development of the disease. In our study, we noticed that diabetes mellitus was the less prevalent risk factor, which may be explained by the lack of knowledge of individuals about presenting high glucose levels based on laboratory exams.

After analyzing the patients' knowledge about PAOD and IC, we observed that 27 participants (58.7%) who were

Table 5 - Distribution of individuals with Fontaine stage I and II PAOD according to walking modality, Pará de Minas (MG), Brazil, 2008

Walking	4 times/week n (%)	5 times/week n (%)	Total n (%)
At work	80 (65)	43 (35)	123 (100)
Coming and going	77 (62.6)	46 (37.4)	123 (100)
Leisure time	110 (89.4)	13 (10.6)	123 (100)

Table 6 - Distribution of individuals with Fontaine stage I and II PAOD according to daily activities, Pará de Minas (MG), Brazil, 2008

Vigorous and moderate activities	Yes n (%)	No n (%)	No answer n (%)	Total n (%)
Lifting and carrying heavy objects	41 (33.3)	79 (64.2)	3 (2.4)	123 (100)
Wood sawing, mowing grass and house painting	8 (6.5)	112 (91.1)	3 (2.4)	123 (100)
Lifting and carrying small objects, standing up, carrying children	107 (87)	13 (10.6)	3 (2.4)	123 (100)
Housekeeping activities, doing the laundry by hand	106 (86.2)	14 (11.4)	3 (2.4)	123 (100)
Going up stairs	82 (66.7)	38 (30.9)	3 (2.4)	123 (100)
Swimming, hydrogymnastics	2 (1.6)	118 (95.9)	3 (2.4)	123 (100)

aware of this condition reported having the symptoms, and 40 (54.1%) declared they had never heard about the subject, but presented symptoms (Table 7). However, having information about the disease does not mean having IC or not. The statistical test pointed out that there is no association between these two variables ($p=0.379$), and the percentage of individuals with IC is quite similar among those who have heard about the disease (5.7%) and those who have not (54.1%).

The importance of regular exercises must be emphasized, as well as the control of risk factors for the initial conditions of the disease⁵.

Considering that all participants were assisted by an angiologist in at least one appointment at the specialized public health service, the concern about the orientation of this population is confirmed, because only 6.5% of the sample (8 individuals) reported being oriented by their physicians.

In view of the statistical significance of the association between the most frequent PAOD symptom (IC) and other signs and symptoms listed, we observed that the patient who tends to IC also tends to other symptoms. The sensation of compression on the legs was evident in 37 IC patients (69.8%) in relation to 31 IC patients (45.6%) without evidence of compression, considering $p=0.006$. Cramps were registered in 50 IC patients (66.7%); among those who did not present cramps, 18 had IC (39.1%), and the tests showed that this percentage difference was statistically significant ($p=0.03$). The direct association of foot paresthesia and IC ($p=0.003$) revealed 36 patients (72%) in relation to 32 who did not feel it (45.1%), which reaffirms the proximity of these two symptoms.

As to the sensation of fatigue, 62 participants (65.3%) that stated to have this symptom also presented pain on the legs during exercise that was relieved by rest (IC), and 6 (23.1%) did not present fatigue but reported IC, which represents a significant association of both variables ($p=0.000$).

Table 7 - Distribution of individuals with Fontaine stage I and II PAOD according to intermittent claudication and pain on the legs during exercise, Pará de Minas (MG), Brazil, 2008

		Pain on the legs during exercise			
		Total interruption n (%)	Partial interruption n (%)	Maintenance n (%)	Total n (%)
IC	Yes	11 (19.6)	17 (30.3)	38 (67.9)	56 (100)
	No	4 (9.3)	14 (32.6)	25 (58.1)	43 (100)
Total - n (%)		15 (13.8)	31 (28.4)	63 (57.8)	109 (100)

IC: Intermittent claudication.

The IC also showed to be associated with swelling: 43 participants presenting swelling had IC (64.2%), and 25 did not present swelling (46.3%). The statistical tests classified this difference as significant ($p=0.037$). There was also a significant association between IC and prick pain on the legs ($p=0.009$). Among those who felt prick pain, 33 (70.2%) had IC and 34 (46.6%) did not have the symptom, but reported having IC.

After analyzing the answers about the decision they made in regard to felling pain during exercise and other symptoms, we observed that 38 (57.6%) presented the classical debilitating symptom of PAOD (pain on the muscles of the legs during exercise that is relieved by rest - IC), also declaring that they maintained the exercises even when feeling pain during walking (Table 8). The maintenance of physical activity despite the painful discomfort, simply reducing the rhythm of the exercise, provides gradual expansion of the peripheral vascular bed⁵.

Conclusion

The necessity of orientation for Fontaine stage I or II PAOD patients was observed in the public health service of Pará de Minas, especially in terms of non-pharmacological clinical treatment and supervised physical activity, aiming at controlling the irreversible chronic manifestations such as IC, cramps and paresthesia.

The necessity of sharing information with this population is emphasized due to their low schooling. The training of community health agents would be an effective way of disseminating the knowledge about PAOD, for they are in direct and constant contact with the families and are part of each community, which facilitates the dialogue.

Bearing in mind the importance of PAOD prevention with regard to cardiovascular diseases, we emphasize that establishing measures for the detection of the disease in a population at risk, such as the implementation of supervised physical activity programs, become essential.

Acknowledgments

We thank Priscilla for the cooperation, support and friendship. To Neverly, Maria Amália and the professionals of *Policlínica Nossa Senhora da Piedade* for helping in the preparation of this study.

References

1. Kauffman P, Wolosker N. Doença arterial obstrutiva periférica - aspectos atuais. São Paulo: Lemos Editorial; 2007.

2. Makdisse M, Nascimento-Neto R, Chagas ACP, et al. Versão em português, adaptação transcultural e validação do Questionário de Claudicação de Edimburgo. *Arq Bras Cardiol.* 2007;88:501-6.
3. TASC II – Inter-Society Consensus for the Management of Peripheral Arterial Disease (TASC II). *Eur J Vasc Endovasc Surgery.* 2007.
4. Câmara LC, Santarem JM, Wolosker N, Dias RMR. Exercícios resistidos terapêuticos para indivíduos com doença arterial obstrutiva periférica: evidências para a prescrição. *J Vasc Bras.* 2007;6: 247-57.
5. Miranda-Júnior F, Barros-Júnior N. Doença arterial obstrutiva periférica. São Paulo: EPM, 2007.
6. Cunha-Filho IT, Pereira DAG, Carvalho AMB, Campedeli L, Soares M, Freitas JS. Confiabilidade de testes de caminhada em pacientes claudicantes: estudo piloto. *J Vasc Bras.* 2008;7:106-11.
7. Benedetti TRB, Antunes PC, Rodriguez-Añez CR, Mazo GZ, Petroski EL. Reprodutibilidade e validade do Questionário Internacional de Atividade Física (IPAQ) em homens idosos. *Rev Bras MedEsporte.* 2007;13:11-6.
8. Viebig RF, Valero MP, Araújo F, Yamada A T, Mansur AJ. Perfil de saúde cardiovascular de uma população adulta da região metropolitana de São Paulo. *Arq Bras Cardiol.* 2006;86:353-60.
9. Makdisse M, Pereira AC, Brasil DP, et al. Prevalência e fatores de risco associados à doença arterial periférica no projeto corações do Brasil. *Arq Bras Cardiol.* 2008;91:402-1
10. Mota APL, Carvalho MG, Lima LM, et al. Lipoproteína (a) em pacientes portadores de doença arterial obstrutiva periférica e/ou diabetes mellitus tipo 2. *J Bras Patol Med Lab.* 2008;44:89-95.
11. Gabriel SA, Serafim PH, Freitas CEM, et al. Doença arterial obstrutiva periférica e índice tornozelo-braço em pacientes submetidos à angiografia coronariana. *Rev Bras Cir Cardiovasc.* 2007;2249-59.

Correspondence:

Juliana Nogueira Diniz
Praça da Independência, 186 – Centro
CEP 35660-007 – Pará de Minas (MG), Brazil
E-mail: julianandiniz@gmail.com

Authors' contributions

Study conception and design: JND and RCCPP
Data analysis and interpretation: JND and RCCPP
Data collection: JND
Writing of the paper: JND
Critical analysis: RCCPP
Final text approval: RCCPP
Acknowledgment: Fabiana Assis
Overall responsibility: JND and RCCPP

This study had no financial support through financing agencies.