

## *Strongyloides stercoralis* in Low-Income Immigrants from Portuguese Speaking African Countries in Lisbon, Portugal

### *Strongyloides stercoralis* em Imigrantes de Baixo Rendimento Oriundos de Países Africanos de Língua Oficial Portuguesa em Lisboa, Portugal

**Palavras-chave:** Africa; Emigrantes e Imigrantes; Estrongiloidiase/diagnóstico; Estrongiloidiase/epidemiologia; Portugal/epidemiologia; *Strongyloides stercoralis*

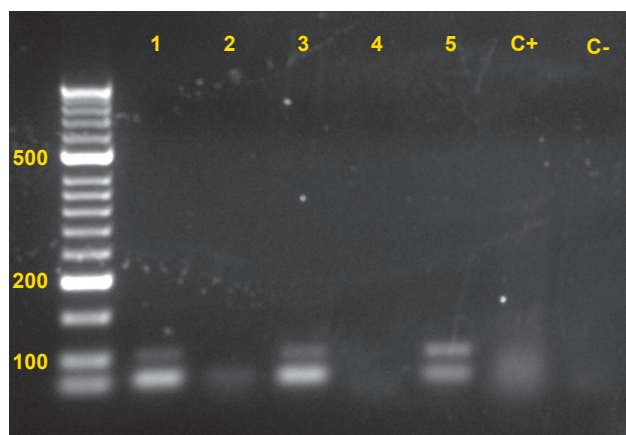
**Keywords:** Africa; Emigrants and Immigrants; Portugal/epidemiologia; *Strongyloides stercoralis*; Strongyloidiasis/diagnosis; Strongyloidiasis/epidemiology

*Strongyloides stercoralis* is a soil-transmitted helminth (geohelminth) with fecal-oral transmission and autoinfection,<sup>1</sup> and through solid organ transplant,<sup>2</sup> although dogs can act as reservoirs.<sup>3</sup> Prevalence can be high in low-income countries.<sup>1</sup> Infection in susceptible individuals may lead to a superinfection syndrome or disseminated strongyloidiasis with a high mortality rate.<sup>1</sup>

With the aim of estimating the prevalence and characterizing the population and risk factors for strongyloidiasis in a community of low-income immigrants from Portuguese-speaking African countries in Portugal, we conducted a cross-sectional study, with non-random convenience sampling, that included an epidemiological questionnaire applied between April and June of 2022 to adult users of Centro Padre Alves Correia, a non-profit institution that provides immigrants with medical care, food and other support.

Ethical approval was granted by the Instituto de Higiene e Medicina Tropical Ethics Committee (ref. 6.22, 25-04-2022).

A total of 150 people answered the questionnaire and provided stool samples, with a 92.6% response rate. Most participants were female, between 18 and 76 years old (average 42.7), from Guinea-Bissau or São Tomé and Príncipe, 94% lived in an urban environment before settling in Portugal, and 86% had been in Portugal for less than 10 years (47.3% under five years). Direct parasitological diagnosis of intestinal helminths was made with the Willis and Telemann-Lima methods,<sup>4</sup> and *S. stercoralis* larvae culture on Koga Agar were negative. However, in three samples an 18S fragment was amplified by the polymerase chain reaction (PCR) (Fig. 1),<sup>5</sup> with sequence TAGCTTACATTGATTACGTCCTGCCCTTTGTACACACCGCCCGTGCGTCCCG (Sanger sequencing), confirmed by a Basic Local Alignment Search Tool (BLAST) search as genus *Strongyloides*. This corresponds to a 2% infection prevalence rate (0.68% - 5.7%, 95% confidence interval). All detected cases, to whom treatment was offered, were present in women aged between 40 and 60, from São Tomé and Príncipe or Guinea-Bissau, who used a shared family bathroom. Among the three cases, one reported sometimes walking barefoot before moving to Portugal, one reported



**Figure 1** – PCR amplification results of *S. stercoralis* 18S. Agarose (1.5%) gel electrophoresis at 100 V, stained with ethidium bromide. 1 - 5: samples 158, 181, 205, 206 and 244, respectively; C+: *S. stercoralis* positive control; C-: negative control; molecular marker: 50 bp HyperLadder™ (Meridian Bioscience) with band sizes indicated in base pairs (bp).

not always washing her hands after using the toilet, and one reported some gastrointestinal symptoms, but none reported any rashes.

Although a low *S. stercoralis* prevalence rate was found in this migrant population, it is recommended that further studies, with larger samples, be conducted to evaluate if and what control strategies should be implemented, including further diagnostic tests. Although it has been suggested that the most cost-effective strategy could be to preventatively treat all immunosuppressed immigrants from endemic regions, or even all migrants from endemic regions,<sup>6</sup> there is no evidence from clinical studies so far. We recommend increasing awareness among clinicians of strongyloidiasis in immigrant populations from endemic areas, along with improvements in Ivermectin accessibility for clinical use, recognized as the most effective treatment for this infection.

#### PREVIOUS AWARDS AND PRESENTATIONS

This study is part of Diamarize Carinton's master's thesis.

#### AUTHOR CONTRIBUTIONS

All authors contributed equally to this manuscript and approved the final version to be published.

#### PROTECTION OF HUMANS AND ANIMALS

The authors declare that the procedures were followed according to the regulations established by the Clinical Research and Ethics Committee and to the Helsinki Declaration of the World Medical Association updated in 2013.

#### DATA CONFIDENTIALITY

The authors declare having followed the protocols in use at their working center regarding patients' data publication.

**COMPETING INTERESTS**

IM is a paid section editor for Gene (Elsevier) and the coordinator of the MulheresTrop network.

All other authors have declared that no competing interests exist.

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**REFERENCES**

1. Buonfrate D, Bisanzio D, Giorli G, Odermatt P, Fürst T, Greenaway C, et al. The global prevalence of strongyloides stercoralis infection. *Pathog*. 2020;9:1-9.
2. Sanpool O, Intapan PM, Rodpai R, Laoraksawong P, Sadaow L, Tourtip S, et al. Dogs are reservoir hosts for possible transmission of human strongyloidiasis in Thailand: molecular identification and genetic diversity of causative parasite species. *J Helminthol*. 2019;94:e110.
3. Abad CL, Bhaimia E, Schuetz AN, Razonable RR. A comprehensive review of Strongyloides stercoralis infection after solid organ and hematopoietic stem cell transplantation. *Clin Transplant*. 2022;36:e14795.
4. World Health Organisation. Basic laboratory methods in medical parasitology. Geneva: World Health Organization; 1991.
5. Sanprasert V, Kerdkaew R, Srirungruang S, Charuchaibovorn S, Phadungsaksawasdi K, Nuchprayoon S. Development of conventional multiplex PCR: a rapid technique for simultaneous detection of soil-transmitted helminths. *Pathog*. 2019;8:152.
6. Agbata EN, Morton RL, Bisoffi Z, Bottieau E, Greenaway C, Biggs BA, et al. Effectiveness of screening and treatment approaches for schistosomiasis and strongyloidiasis in newly-arrived migrants from endemic countries in the EU/EEA: a systematic review. *Int J Environ Res Public Health*. 2018;16:11.

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