

## Clinical-epidemiological characteristics of Sporotrichosis cases in Rio Grande do Sul, Brazil: a 16-year study

### Características clínico-epidemiológicas dos casos de Esporotricose no Rio Grande do Sul, Brasil: um estudo de 16 anos

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## ABSTRACT

**Background:** Sporotrichosis is a subcutaneous fungal infection that occurs worldwide, although its highest incidence is in tropical and subtropical areas. In Brazil, it is an hyperendemic disease that affects animals and humans. **Objective:** To report cases of sporotrichosis in a dermatology referral service, in the state of Rio Grande do Sul. **Methods:** Retrospective, observational, descriptive study, from 2003 to 2019. Data were selected from patients who had skin lesions suggestive of sporotrichosis, and who had positive direct and/or cultural mycological examinations of *Sporothrix* spp.. **Clinical records** were reviewed in charts. **Results:** 61 cases of sporotrichosis were identified, with an annual average of 4 cases. There was a predominance of males (54.1%; n=33) and white skin color (77.0%; n=47). The mean age was 45.9 years (standard deviation = 21.2), with the predominant age group between 25 and 60 years (41.0%; n=25). The sample consisted mainly of patients residing in the interior of the state of Rio Grande do Sul (47.5%; n=29). **Conclusions:** This study contributes with updates on the epidemiological situation of sporotrichosis in the state of Rio Grande do Sul.

**Keywords:** Sporotrichosis, epidemiology, mycoses, zoonosis, *Sporothrix* spp., neglected diseases, public health, observational study.

## RESUMO

**Introdução:** A esporotricose é uma infecção fúngica subcutânea que ocorre em todo o mundo, embora sua maior incidência seja em áreas tropicais e subtropicais. No Brasil, é uma doença hiperendêmica que acomete animais e humanos. **Objetivo:** Relatar os casos de esporotricose em um serviço de referência em dermatologia, no estado do Rio Grande do Sul. **Métodos:** Estudo retrospectivo, observacional, descritivo, de 2003 a 2019. Foram selecionados dados de pacientes que apresentavam lesões cutâneas sugestivas de esporotricose e que apresentavam exames micológicos diretos e/ou culturais positivos para *Sporothrix* spp.. Os registros clínicos foram revisados em prontuários. **Resultados:** foram identificados 61 casos de esporotricose, com média anual de 4 casos. Houve predomínio do sexo masculino (54,1%; n=33) e da cor da pele branca (77,0%; n=47). A média de idade foi de 45,9 anos (desvio padrão = 21,2), com faixa etária predominante entre 25 e 60 anos (41,0%; n=25). A amostra foi composta principalmente por pacientes residentes no interior do estado do Rio Grande do Sul (47,5%; n=29). **Conclusões:** Este estudo contribui com atualizações sobre a situação epidemiológica da esporotricose no estado do Rio Grande do Sul.

**Palavras-chave:** Esporotricose, epidemiologia, micoses, zoonose, *Sporothrix* spp., doenças negligenciadas, saúde pública, estudo de observação.

## 1 INTRODUCTION

Sporotrichosis is a chronic fungal infection that can affect humans and animals, whose etiological agents are the dimorphic fungi of the genus *Sporothrix*<sup>1-3</sup>. The fungal species of the *Sporothrix* complex are thermodynamorphic, presenting a saprophytic phase that grows as mycelium at 25°C, and as yeast at 35-37°C, constituting the parasitic phase. Geographic distribution, frequency of occurrence, ecological niche and virulence vary widely within the genus *Sporothrix*<sup>1,4</sup>. These fungi have already been isolated from soil, plants, water, algae, insects and spiders, marine animals, cats, dust and decaying organic matter. Due to this wide

distribution in nature, people involved in professions related to gardening, agriculture and construction are more predisposed to sporotrichosis. The main species of the genus *Sporothrix* causing sporotrichosis in humans and animals are *S. schenckii*, *S. brasiliensis* and *S. globosa*, with *S. brasiliensis* being the main species associated with zoonotic transmission by scratches and bites from infected animals<sup>1,4</sup>. A murine virulence model verified that *S. brasiliensis* is the most virulent species, followed by *S. schenckii* and then by *S. globosa*<sup>1,5</sup>.

The clinical manifestations are varied, from localized to disseminated infection, such as the cutaneous and extracutaneous lymphatic forms. Between 80% and 95% of cases are cutaneous lymphatic sporotrichosis, which spreads through the lymph nodes, occurring mainly on the face, upper and lower limbs<sup>1-3,6</sup>. These manifestations result from several factors, such as the host's immune response, the virulence of the fungal isolate, the amount of inoculum and the depth of inoculation<sup>1,6</sup>. In humans and other mammals, the main route of entry is through the skin, traumatized by injury with material contaminated by the fungus. Another possibility of infection is through bites and scratches from infected animals<sup>1,4</sup>.

The treatment of sporotrichosis must be defined considering the type of clinical manifestation, the immunological situation of the host and also the causal species of *Sporothrix*<sup>1</sup>, as the species of the genus present different responses to antifungals *in vitro*<sup>1,7</sup>. Potassium iodide and/or itraconazole are the treatments initially indicated for cutaneous and lymphocutaneous sporotrichosis. Amphotericin B is used as a second-line treatment for cutaneous and lymphocutaneous sporotrichosis, in addition to being used in disseminated, systemic, pulmonary and osteoarticular forms. Terbinafine is suggested as a potent antifungal against *S. brasiliensis*, however, more studies are needed to confirm the effectiveness and safety of its use<sup>1,7,8</sup>.

Sporotrichosis is widespread throughout the world, however, in some places the disease is more frequent, such as in America, Asia and Africa<sup>9-11</sup>. In recent years, in Brazil, sporotrichosis in humans and cats by *S. brasiliensis* has become a public health problem, reaching epidemic levels mainly in the South and Southeast regions<sup>1,5,7,10</sup>. In other endemic regions, the disease is mainly related to environmental transmission by inoculation by contaminated plant debris and by zoonotic transmission, and the main etiological agents are *S. schenckii* and *S. globosa*<sup>7,10-12</sup>.

Considering that the southern region of Brazil presents a public health problem with sporotrichosis, it is essential to know the epidemiology of the disease. Thus, the aim of the present study is to report the clinical-epidemiological characteristics of sporotrichosis cases treated at a dermatology referral service in the state of Rio Grande do Sul, in southern Brazil.

## 2 MATERIAL AND METHODS

### 2.1 STUDY REGION

Rio Grande do Sul is located on the coast of the extreme south of Brazil, bordering Argentina and Uruguay. It covers 281,707,149 km<sup>2</sup>, distributed in seven health districts (South, Vale, Metropolitano, Serra, Norte, Missão and Midwest). The estimated population is 11,422,973 inhabitants.<sup>13,14</sup>

Retrospective, descriptive study carried out at the Dermatology Service of the Complexo Hospitalar da Irmandade Santa Casa de Misericórdia de Porto Alegre, southern Brazil (30° 01' 58" S 51° 13' 48" O), from January 1, 2003 to December 30, 2019. This study is a follow-up to a previous study that analyzed cases of sporotrichosis in the same service, from 1967 to 2002.<sup>15</sup>

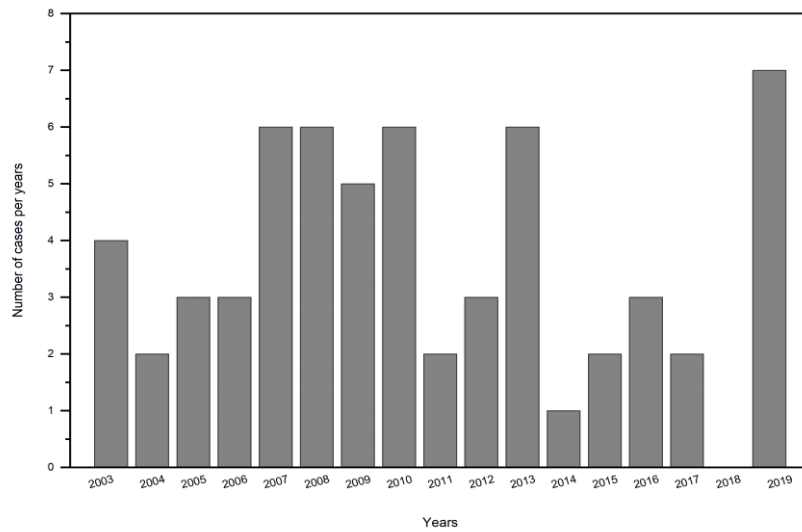
Data were selected from patients who had skin lesions suggestive of sporotrichosis and for whom direct and/or cultural mycological examinations were positive for *Sporothrix* spp. Clinical data were reviewed in medical records to obtain demographic information and clinical characteristics of the disease in patients.

Data were organized in a Microsoft Excel spreadsheet (2010) and processed and analyzed in the software Statistical Package for Social Science (SPSS) version 26. Mean, standard deviation and percentage were used to describe the data. The Shapiro-Wilk test was performed to determine the normality of distribution in continuous variables. For parametric data, Student's t test was used, and nonparametric data were analyzed using the chi-square test and Fisher's exact test. The statistical significance level used was 0.05. The study followed the ethical criteria guided by the National Health Commission, respecting the confidentiality and anonymity of users.

## 3 RESULTS

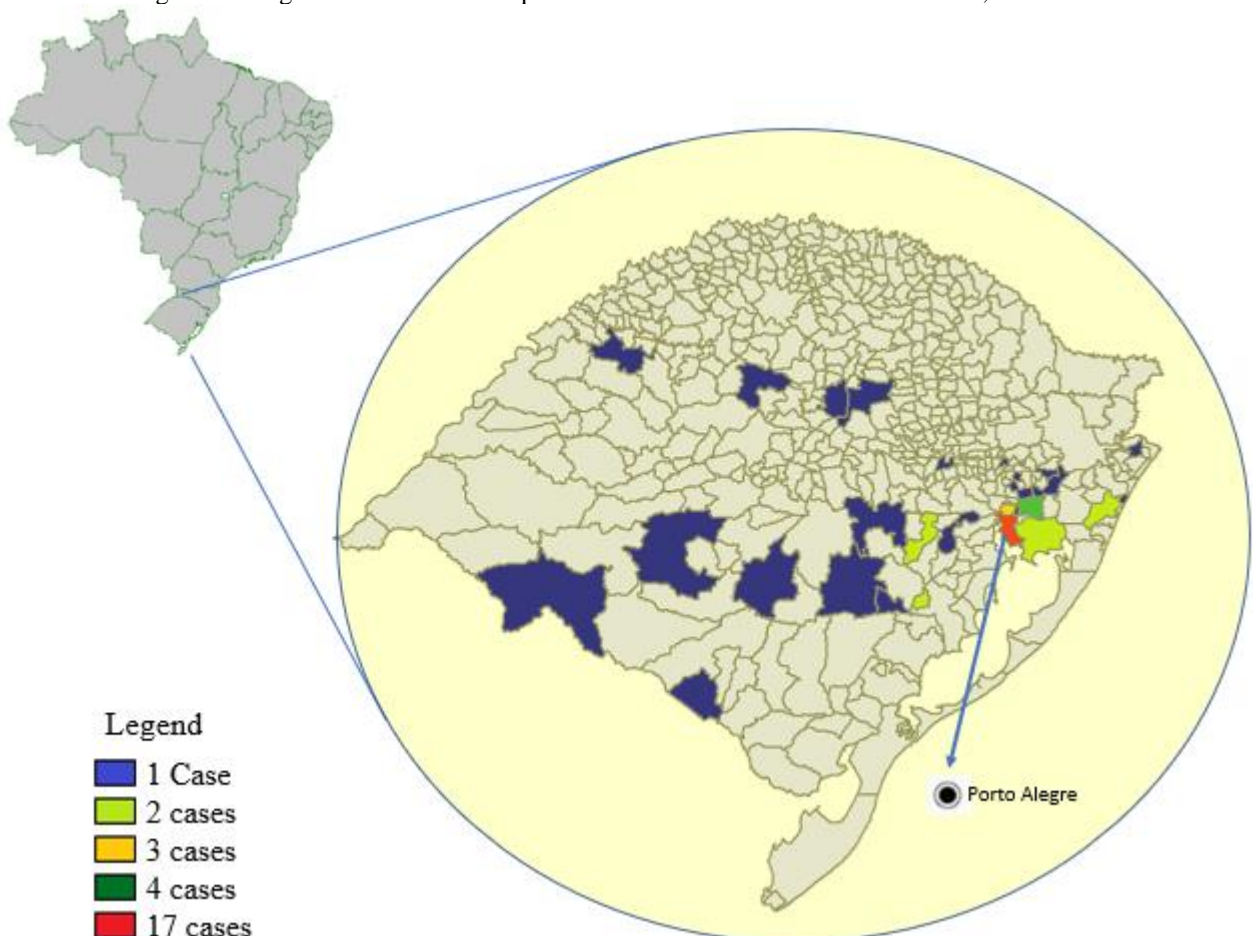
In the period from 2003 to 2019, 61 cases of sporotrichosis were identified, with an annual average of four cases (Figure 1). The Center-South and East regions of Rio Grande do Sul were the regions that presented more than one case of sporotrichosis in our study (Figure 2). The male gender predominated in the sample (54.1%; n=33) and the most frequent skin color was white (77.0%; n=47). The mean age of the patients was 45.9 ± 21.2 years, with the predominant age group between 25 to 60 years (41.0%; n=25). The sample consisted mainly of patients residing in municipalities outside the metropolitan region of Porto Alegre, capital of the state of Rio Grande do Sul (47.5%; n=29) (Table 1).

Figure 1 – Number of sporotrichosis cases per year, in the period 2003 – 2019, in the Dermatology Service of the Complexo Hospitalar da Irmandade Santa Casa de Misericórdia de Porto Alegre, southern Brazil.



Source: From Authors, 2023.

Figure 2 – Regional distribution of sporotrichosis in State of Rio Grande do Sul, Brazil.



Source: From Authors, 2023.

Table 1 – Sociodemographic data of patients diagnosed with sporotrichosis in the period 2003 – 2019, in the Dermatology Service of the Complexo Hospitalar da Irmandade Santa Casa de Misericórdia de Porto Alegre, southern Brazil.

Characteristic	Total N=61	%
<b>Age</b>		
0 – 24 years	14	23.0
25 – 60 years	25	41.0
60 years or >	19	31.10
Not informed	3	4.90
<b>Sex</b>		
Female	28	45.9
Male	33	54.1
<b>Race/Skin color</b>		
White	47	77.0
Black	3	5.0
Not informed	11	18.0
<b>Region of residence</b>		
Porto Alegre	17	27.9
Metropolitan region	9	14.8
Outside the metropolitan region	29	47.5
Not informed	6	9.8

Source: From Authors, 2023.

The lesions were classified into four groups, according to their location on the body: upper limbs, lower limbs, face and trunk. In 75.5% (n=43) of the cases, the lesions were in the upper limbs, and in this group, males had a higher incidence (62.8%; n=27). The cases in the lower limbs corresponded to 24.6% (n=15) of the total number of cases, being more present in females (60.0%; n=9) (Table 2). There was no association between lesion site and sex (p=0.91).

Table 2 – Clinical data of patients diagnosed with sporotrichosis in the period 2003 – 2019, in the Dermatology Service of the Complexo Hospitalar da Irmandade Santa Casa de Misericórdia de Porto Alegre, southern Brazil.

Sex	Injury site								Total N= 61	
	Upper limbs	%	Lower limbs	%	Face	%	Trunk	%	Total	%
Female	16	37.2	9	60.0	2	100.0	1	100.0	28	45.9
Male	27	62.8	6	40.0	0	0,0	0	0,0	33	54.1
Total	43	100.0	15	100.0	2	100.0	1	100.0	61	100.0

Source: From Authors, 2023.

#### 4 DISCUSSION

In this study, a set of 61 cases of sporotrichosis diagnosed in the Dermatology Service of the Complexo Hospitalar da Irmandade Santa Casa de Misericórdia de Porto Alegre, Rio Grande do Sul, Brazil, was presented in the period from 2003 to 2019. Currently, the Dermatology Service is one of the main references for assistance to patients residing in municipalities outside the metropolitan region, and approximately 60% of consultations per

month are performed with this public; therefore, almost half of the sample (47.5%; n=29) is expected to be patients from these municipalities.<sup>16</sup>

Previous studies suggest that the state of Rio Grande do Sul is on the way to becoming an endemic state in cases of sporotrichosis in humans, considering the significant number of occurrences of the disease in felines, which usually precede cases in humans.<sup>10,16-18</sup> Even so, when comparing with the annual average of cases of the previous study in the same Dermatology Service, which was 10.5 cases per year,<sup>15</sup> there was a reduction in the number of cases of sporotrichosis in recent years. However, considering that the cases discussed in the present study come from a single care center, it is not possible to say that there was a reduction considering the state of Rio Grande do Sul as a whole.

Despite sporotrichosis being an emerging neglected disease that affects both animals and humans, with the potential to generate serious public health problems,<sup>17</sup> it is still not considered by the Ministry of Health as a notifiable disease. This situation reduces the possibilities of carrying out analyzes to verify the incidence and prevalence of the disease. Existing studies are mainly based on medical records of care services, which often makes it difficult to define the epidemiological profile of sporotrichosis, mainly due to incomplete filling of medical records. It is observed that in the previous study in the same Dermatology Service, it was possible to document more complete results, including, for example, duration of symptoms, form of the disease and type of treatment.<sup>15</sup> In the present study, due to incomplete medical records, these data, among others relevant, were not included.

Some characteristics of sporotrichosis cases were outlined, with the main occurrences of the disease in the economically active age group, in males and with a mean age similar to that found in the literature.<sup>19-21</sup> However, there are studies in other regions of Brazil that indicate the predominance of females in cases of sporotrichosis.<sup>22</sup> It was not possible to characterize the sample in terms of work activity, which could explain the predominance of cases in males and in the economically active age group.

The predominance of white skin color is in accordance with the predominant characteristics in the study area. In the state of Rio Grande do Sul, in 2019, according to the State Department of Economics and Statistics, 79% of the population had white skin color.<sup>23</sup> Therefore, the result obtained for this variable was already expected, also based on the data found in the literature.<sup>21</sup> In addition, dermatological diseases are more easily identified and described in light skin. Dermatologists even use the Fitzpatrick skin color model that defines the phototype, categorizing white skin, but avoiding defining ethnicity.<sup>24</sup>

The findings related to the location of the lesions are in agreement with the literature, with a higher frequency of cases with lesions in the upper limbs.<sup>13,26-27</sup>

## **5 CONCLUSIONS**

Our data are significant for defining the epidemiological profile of sporotrichosis in southern Brazil, although it has limitations. The main difficulties encountered were in collecting data from medical records, which were incomplete in relation to several important epidemiological aspects. The fact that sporotrichosis is not a notifiable disease in Brazil, even though it is endemic, makes it difficult to carry out studies that can indicate the prevalence and incidence of the disease. Therefore, studies like ours, even with their limitations, are important to understand the public health impact caused by sporotrichosis in Brazil.



## REFERENCES

1. Carnero LCG, Pérez NEL, Hernández SEG, Martínez JAM. Immunity and Treatment of Sporotrichosis. *J Fungi (Basel)*. 2018; 4: 100.
2. Bonifaz A, Vázquez-González D. Diagnosis and Treatment of Lymphocutaneous Sporotrichosis: What Are the Options?. *Curr Fungal Infect Rep*. 2013; 7: 252–259.
3. Lopes-Bezerra LM, Mora-Montes HM, Zhang Y, Nino-Vega G, Rodrigues AM, de Camargo ZP, et al. Sporotrichosis between 1898 and 2017: The evolution of knowledge on a changeable disease and on emerging etiological agents. *Med Mycol*. 2018; 56: 126-143.
4. Marimon R, Cano J, Gené J, Sutton DA, Kawasaki M, Guarro J. *Sporothrix brasiliensis*, *S. globosa*, and *S. mexicana*, three new *Sporothrix* species of clinical interest. *J Clin Microbiol*. 2007; 45: 3198-3206.
5. Della Terra PP, Rodrigues AM, Fernandes GF, Nishikaku AS, Burger E, de Camargo ZP. Exploring virulence and immunogenicity in the emerging pathogen *Sporothrix brasiliensis*. *PLoS Negl Trop Dis*. 2017; 11: e0005903.
6. Carvalho GSM, Veasey JV. Immunoreactive cutaneous sporotrichosis. *An Bras Dermatol*. 2020; 95: 737-739.
7. Koehler A, Pagani DM, Hellwig AH da S, Scroferneker ML. In-vitro antifungal susceptibility of the genus *Sporothrix* and correlation with treatment options for sporotrichosis: a systematic review. *Rev Med Microbiol*. 2021; 32: 219-227.
8. Song Y, Li S, Shi Y, Zhao L, Cui Y, Yao L, et al. In vitro antifungal susceptibility of *Sporothrix globosa* isolates from Jilin Province, northeastern China: comparison of yeast and mycelial phases. *Braz J Microbiol*. 2021; 52: 81-90.
9. Rodrigues AM, Della Terra PP, Gremião ID, Pereira SA, Orofino-Costa R, de Camargo ZP. The threat of emerging and re-emerging pathogenic *Sporothrix* species. *Mycopathologia*. 2020; 185: 813-842.
10. Queiroz-Telles F, Buccheri R, Benard G. Sporotrichosis In Immunocompromised Hosts. *J Fungi (Basel)*. 2019; 5: 8.
11. Hernández-Castro R, Pinto-Almazán R, Arenas R, Sánchez-Cárdenas CD, Espinosa-Hernández VM, Sierra-Maeda KY, et al. Epidemiology of Clinical Sporotrichosis in the Americas in the Last Ten Years. *J Fungi*. 2022; 8: 588.
12. Rodrigues AM, de Hoog GS, de Camargo ZP. *Sporothrix* Species Causing Outbreaks in Animals and Humans Driven by Animal-Animal Transmission. *PLoS Pathog*. 2016; 12: e1005638.
13. Brasil IB. Instituto Brasileiro de geografia e Estatística. Censo demográfico. 2010;2010:11.
14. Instituto Brasileiro de Geografia e Estatística, IBGE. Diretoria de Pesquisas, Coordenação de População e Indicadores Sociais, Estimativas da população residente com data de referência.

15. da Rosa AC, Scroferneker ML, Vettorato R, Gervini RL, Vettorato G, Weber A. Epidemiology of sporotrichosis: a study of 304 cases in Brazil. *J Am Acad Dermatol.* 2005; 52: 451-459.
16. Santa Casa de Porto Alegre I. Relatório Anual 2020 Balanço social. [cited 2022 Jun 21]. Available at: <https://www.santacasa.org.br/download/relatorio-anual-2020>
17. Poester VR, Mattei AS, Madrid IM, Pereira JTB, Klafke GB, Sanchotene KO, et al. Sporotrichosis in Southern Brazil, towards an epidemic? *Zoonoses Public Health.* 2018; 65: 815-821.
18. Michelon L, Piñeiro MBC, Madrid IM, Osório L da G, Bruhn FRP, Soares GF, Xavier MO, Nobre M de O. Dados epidemiológicos da esporotricose felina na região Sul Do Rio Grande do Sul: uma abordagem em saúde pública / Epidemiological data on feline sporotrichosis in Southern Rio Grande Do Sul: a public health approach. *Braz. J. Hea. Rev.* [Internet]. 2019 Nov. 14 [cited 2023 May 8];2(6):4874-90. Available from: <https://ojs.brazilianjournals.com.br/ojs/index.php/BJHR/article/view/4260>.
19. Brandolt TM, Madrid IM, Poester VR, Sanchotene KO, Basso RP, Klafke GB, et al. Human sporotrichosis: A zoonotic outbreak in southern Brazil, 2012-2017. *Med Mycol.* 2018; 57: 527-533.
20. Xavier JRB, Waller SB, Osório LDG, Vives PS, Albano APN, Aguiar ESV, et al. Human sporotrichosis outbreak caused by *Sporothrix brasiliensis* in a veterinary hospital in Southern Brazil. *J Mycol Med.* 2021; 31: 101163.
21. Caus ALO, Zanotti RL, Faccini-Martínez ÁA, Paterlini GV, Falqueto A. Epidemiological and Clinical Aspects of Sporotrichosis in Espírito Santo State, Southeast Brazil: A Study of Three Decades (1982-2012). *Am J Trop Med Hyg.* 2019; 100: 706-713.
22. Grisolia JC, Santos LA, Coelho LML, Silva RR, de Camargo ZP, Velloso TRG, et al. Seroepidemiological survey on sporotrichosis-infection in rural areas of the south of Minas Gerais State, Brazil. *Braz J Microbiol.* 2021; 52: 41-47.
23. Veasey JV, Neves Neto MF, Ruiz LRB, Zaitz C. Clinical and laboratory profile of urban sporotrichosis in a tertiary hospital in the city of São Paulo. *An Bras Dermatol.* 2021; 96: 245–248.
24. Secretaria de Planejamento, Governança e Gestão. Panorama das desigualdades de raça/cor no RS 2021. [cited 2022 Jun 22]. Available at: <https://dee.rs.gov.br>
25. de Almeida AJ, Nahn Júnior EP, Vieira da Motta O, Lourenço CDS, Bernardino MLA, Nahn GPBP. Diagnosis of human sporotrichosis in Campos dos Goytacazes, Rio de Janeiro, Brazil. *J Infect Dev Ctries.* 2019; 13: 768-772.
26. Benvegnú AM, Dallazzem LND, Chemello RML, Beber AAC, Chemello D. Case series of sporotrichosis at a teaching hospital in Brazil. *Rev Soc Bras Med Trop.* 2020; 53: e20190509.
27. Estrada-Castañón R, Chávez-López G, Estrada-Chávez G, Bonifaz A. Report of 73 cases of cutaneous sporotrichosis in Mexico. *An Bras Dermatol.* 2018; 93 :907-909.