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SPOROTRICOSIS IN ENDEMIC REGION: WHAT IS THE LEVEL OF KNOWLEDGE OF THE POPULATION?

ESPOROTRICOSE EM REGIÃO ENDÊMICA: QUAL O NÍVEL DE CONHECIMENTO DA POPULAÇÃO?

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ABSTRACT

Sporotrichosis is a severe zoonosis, caused by fungi of the *Sporothrix schenckii* complex, classified as global epidemiology. The awareness of the population and the care of tutors for their animals (responsible guardianship) are extremely important for the control of this dermatophytosis. This study aimed to assess the tutors' knowledge about this mycosis, as well as to develop an understanding of sporotrichosis. The study was carried out between November 2018 and December 2019 in the city of Pelotas (RS), where sporotrichosis is endemic. The study was developed from a semi-structured questionnaire to assess the general knowledge of the population about sporotrichosis. One hundred twenty-eight interviews were carried out, of which 83% of participants owned pets such as dogs and cats, however, when asked about sporotrichosis, 77% had never heard about this disease. In addition, the majority of respondents did not know how to answer correctly about the main aspects of transmission, clinical signs, and ways of prevention. In the end, the interviewed tutors were informed about sporotrichosis with a focus on epidemiology, the manifestation of clinical signs, risks, and appropriate forms of prevention. In this sense, although sporotrichosis is an emerging zoonosis, tutors have little knowledge of the main aspects of transmission, clinical signs, and prevention. Therefore, it is imperative to implement health education actions aimed at expanding the population's

knowledge regarding the recognition of the disease, management, and correct treatment of infected cats, consequently leading to a decrease in zoonotic cases.

KEY-WORDS: Cats; fungi; public health; zoonoses.

INTRODUCTION

Sporotrichosis is a severe zoonosis caused by fungi of the *Sporothrix schenckii* complex, classified as global epidemiology and being identified as the most frequent subcutaneous mycosis in Latin America (CHAKRABARTI *et al*., 2015; SANCHOTENE *et al*., 2015). It is considered a mycosis of implantation transmitted by traumatic inoculation of the fungus either by contaminated soil, plants, and organic matter in the skin or mucosa, that is, by animal transmission and zoonotic transmission, which has been mainly associated with scratches or bites from infected cats (GOVENDER *et al*., 2015; RODRIGUES *et al.,* 2016; ZHAO *et al*., 2017). Cats are highly susceptible to sporotrichosis, developing multiple and with a large number of yeast cells in the lesions, differing from the other species (GREMIÃO *et al*., 2015; POESTER *et al*., 2018b; SCHUBACH *et al*., 2008). As a result, cats can quickly spread the disease between and within species due to their lifestyle. These factors contribute to the high density of infected animals and the progressive increase in the number of cases of human sporotrichosis in endemic areas (POESTER *et al*., 2018a).

The main form of sporotrichosis in humans is through scratches and/or bites from sick animals, especially cats, constituting a zoonosis of great importance in public health (SCHUBACH *et al*., 2008). Therefore, cat guardians must be aware of the responsible tutoring and people who deal with sick animals must follow a series of biosafety rules as a way of preventing transmission (GREMIÃO *et al*., 2017; MICHELON *et al*., 2019; POESTER *et al*., 2018a).

However, sporotrichosis has been neglected in recent years to the point of developing into the main epidemic zoonosis of expansion in the country (POESTER *et al*., 2018b). Its main occurrence is in Rio de Janeiro (RJ), where the disease is already classified as an urban epidemic, with more than 5,000 cases of zoonotic sporotrichosis (GREMIÃO *et al.,* 2017; GUTIERREZ-GALHARDO *et al*., 2015; POESTER *et al*., 2018b). The state of Rio Grande do Sul (RS) also has a relevant occurrence of feline-transmitted zoonotic sporotrichosis (MADRID *et al.,* 2012; POESTER *et al.,* 2018b; SANCHOTENE *et al*., 2015) and is considered the second

state on alert for epidemic (BRANDOLT *et al*., 2019). The municipality of Pelotas is endemic with increasing records of zoonotic transmission (BRANDOLT *et al.*, 2019; POESTER *et al*., 2018b).

Considering that sporotrichosis is an emerging zoonosis with a rising number of cases and that prevention and control methods are directly linked to the management and care of affected cats, this study aimed at assessing the population's knowledge about sporotrichosis in the region endemic and also inform about the main aspects of this dermatophytosis.

MATERIALS AND METHODS

The study was carried out between November 2018 and December 2019 in the city of Pelotas, in the southern region of Rio Grande do Sul, an endemic region for sporotrichosis. Data were collected from a semi-structured questionnaire with nine questions regarding the general knowledge of the population about sporotrichosis. The questions were about the disease, whether the participants had a pet, and about the etiology of sporotrichosis, transmission, hosts susceptible to the disease, clinical presentation, care and treatment of animals, and preventive measures. One hundred and twenty-eight interviews were carried out at public events in the city that had audiences from different neighborhoods in the city of Pelotas. Thus, the interviewees were randomly invited among the public to answer the questionnaire, and people who were not from Pelotas were excluded to keep the answers from interviewees from an endemic region. The identity of the interviewees was preserved to maintain the confidentiality of their personal data. Before starting the questions, the interviewer informed the interviewee to be as sincere as possible. From there, the interviewer asked the questions without interfering and influencing the answers, adopting a totally impartial posture, to make the most legitimate assessment possible. After filling out the questionnaires, an informative folder (Fig. 1) from the Zoonosis Control Center of the Municipality of Pelotas (CCZ-Pelotas) was handed over to tutors, and the main factors related to sporotrichosis were explained, such as forms of transmission, clinical presentation in animals and humans, and preventive measures, aimed at spreading knowledge to the population.

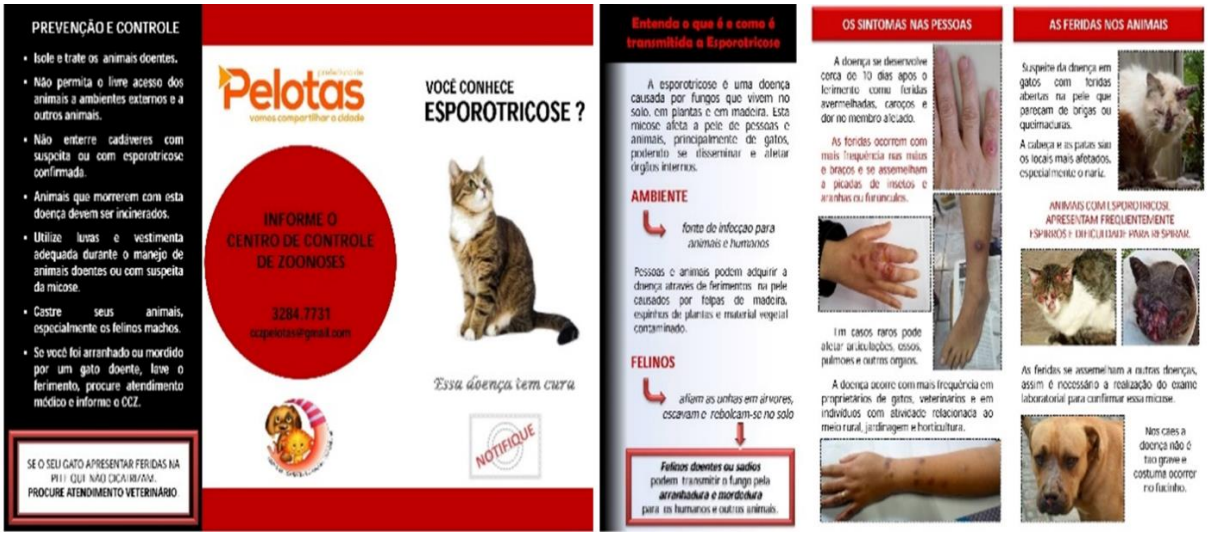

Figure 1. Folder of the Pelotas Zoonosis Control Center distributed to the population that was part of this study for the purpose of educating them about sporotrichosis.

RESULTS AND DISCUSSION

The interviewees were between 11 and 65 years of age and 106 (83%) of them had dogs and/or cats as pets and 22 (17%) did not have pets. The study showed that of the 128 (100%) interviews carried out, 99 (77%) had never heard of sporotrichosis and 29 (23%) already knew the disease. This result directly reflects the difficulty in controlling this emerging mycosis in the studied region and, possibly, it is also reflected in the other regions with the increasing development of feline sporotrichosis and zoonotic cases (BARROS *et al.*, 2010).

Regarding the knowledge of the studied population about whether or not sporotrichosis is a zoonosis, it was observed that the majority of 72 (56%) recognized it as a zoonosis, while 21 (16%) did not know and 35 (28%) stated that it is not a zoonosis (Table 1). However, it is important to note that although 56% related mycosis to zoonosis, only 23% previously stated that they knew the disease. This was also observed in a study with other zoonoses by SAMPAIO (2014) in which a large part of the interviewees (69%) did not know or did not remember what zoonoses were.

Table 1. Interviewee's answers regarding sporotrichosis, Pelotas, 2020

Knowledge area	Questions	Answers		
		Correct n (%)	Incorrect n (%)	Do not know n (%)
Transmission	What is the main way to get the disease?	40 (31)	23 (18)	65 (51)
	Which animal inoculates sporotrichosis?	58 (45)	70 (55)	0 (0)
	Is sporotrichosis a zoonosis?	72 (56)	35 (28)	21 (16)
	Is there disease transmission between humans?	60 (47)	45 (35)	23 (18)
Clinical manifestation	What are the clinical signs of this disease?	37 (29)	10 (8)	81 (63)
Treatment and prevention	Is there a treatment or cure for the disease?	64 (50)	37 (29)	27 (21)
	What are the prevention methods for sporotrichosis?	47 (37)	22 (17)	59 (46)

It was observed that 58 (45%) of the participants knew that the infected domestic cat is the main animal responsible for spreading sporotrichosis, while the majority (70, 55%) did not mention the infected domestic cat. Again, it was observed that although an important percentage responded correctly, 77% had answered at the beginning that they did not know the disease. Thus, it may be possible that part of the answers is related to the involvement of the domestic feline in other important zoonoses, such as Toxoplasmosis and Bartonelose (CHAKRABARTI *et al*., 2015; DAGUER *et al*., 2004; SIMÕES *et al*., 2018). Felines play a determining role in the sporotrichosis transmission cycle from bites and/or scratches. Nonetheless, there are rare reports of transmission by armadillos (*Dasypus septemcinctus*) and other animals are usually susceptible, such as dogs and equines; however, these animals do not have the characteristic transmission since the number of fungal elements in their lesions is lower than what is seen in cats (LARSSON, 2011; SOUZA *et al*., 2009).

When asked about the main clinical presentation of the disease in the affected animals, 37 (29%) answered correctly and said it is the wounds, 5 (4%) said sneezing and coughing, 5 (4%) answered vomit, blisters, and warts, and 81 (63%) did not know (Table 1). Because the city of Pelotas is an endemic region, possibly part of these interviewees already knew these signs in sick cats, since the percentage of correct responses (29%) was close to the percentage of responders who knew the disease (23%). Cutaneous sporotrichosis is the most common in

cats, in which nodules are observed and can progress to erosive lesions that coalesce. It often progresses to disseminated cutaneous sporotrichosis and to the systemic form, where respiratory signs may be present (GONÇALVES *et al*., 2019; SANTOS *et al*., 2018), although they are not the main clinical sign. It should be noted that human sporotrichosis, mainly lymphocutaneous form, has a different clinical form from that presented by felines (SILVA *et al*., 2020).

It was shown that only 5 participants (4%) listed scratches and fights as ways of transmitting sporotrichosis, while 65 (51%) did not know how sporotrichosis transmission occurs, 35 (27%) stated that transmission occurs through direct contact and secretions, and 23 (18%) reported that it occurs through feces, urine, fleas or poisonous plants. It is quite worrying that only 4% of the interviewed population know the main form of sporotrichosis' transmission, especially considering that the region is endemic. The most common form of human sporotrichosis in Brazil is by the zoonotic route with infected cats carrying the fungus on their lesions, oral cavities and nails, and contaminating people through scratching, biting and contact with wound exudates (NOBRE *et al*., 2003; RODRIGUES *et al*., 2013; SCHUBACH *et al*., 2004; SILVA *et al*., 2012). It is worth highlighting that there is often a breakdown of the skin barrier with microlesions that are not visible (LARSSON, 2011). Thus, people with sick cats at home might be the most likely population to contract the infection (SANTOS *et al*., 2018). Although it is not common in Brazil, contamination can occur in a sapronotic way by plant material containing fungi propagules present in the environment penetrating wounds (PEREIRA *et al*., 2014; PEREIRA *et al*., 2015). Likewise, there is an environmental risk, through the contamination of the sick cat's feces, with the perpetuation of the fungus in the environment and thus the possible transmission to people and other animals (GONÇALVES *et al*., 2019).

Moreover, the participants were asked if the transmission of sporotrichosis from human to human could occur and 60 (47%) answered correctly by stating that transmission between humans does not occur. The other interviewees said yes (45, 35%) or did not know how to answer (23, 18%). It is important to note that interhuman transmission is very rare (BARROS *et al*., 2011) and one case has been reported in China (JIN *et al*., 1990).

When asked if there is a cure or treatment for sporotrichosis, 64 (50%) participants answered that there is a cure or treatment, 27 (21%) did not know how to answer and 37 (29%) stated that there is no cure or treatment. Itraconazole alone or associated with potassium iodide

is the most widely used drug in the treatment of feline sporotrichosis (GONÇALVES *et al*., 2019; GREMIÃO *et al*., 2020; MICHELON *et al*., 2019). It is important that half of the interviewees answered correctly about the existence of treatments for sporotrichosis, which can minimize the abandonment of sick cats. It is noteworthy that a large part of the affected cats is from suburban areas or collected from the street and therefore have access to the street and have contact with other felines and humans (SILVA *et al*., 2012) closing the cat-environment-man cycle. According to SANTOS *et al*. (2018), care must be taken to discourage the abandonment and extermination of cats infected with sporotrichosis to prevent the propagation of the disease since it can be properly treated. However, this is challenging since several factors can hinder the cure of feline sporotrichosis, such as, the choice of medication and therapeutic doses (KINNISSON *et al*., 2015), therapeutic administration being given to cats as prescribed by the veterinarian (SIVEN *et al*., 2017), antifungal susceptibility (BORBA-SANTOS *et al*., 2015; BRILHANTE *et al*., 2016; STOPIGLIA *et al*., 2014), the need for prolonged and regular treatment, difficulty in administering oral medications to cats (PEREIRA *et al*., 2009) and high treatment costs (GREMIÃO *et al*., 2015; MICHELON *et al*., 2019; SCHUBACH *et al*., 2004).

Regarding preventive measures for sporotrichosis, 18 (14%) participants answered correctly about responsible ownership, confinement, and avoiding contact with sick animals, 27 (21%) correctly stated that rapid diagnosis, veterinary care, the use of medications and hygiene are forms of prevention, 22 (17%) stated that the preventive measure is vaccination, the majority (59, 46%) did not know how to answer, and 2 (2%) stated that euthanasia is a preventive measure. Since Pelotas is an endemic region, knowledge about preventive measures is of extreme importance. Therefore, to have effective prevention of feline sporotrichosis, it is important to educate the population, especially tutors, regarding the responsible guarding of animals, castration, and restriction of cats' access to the street. Care must be taken when handling the affected animals, the environment must be properly cleaned with 1% hypochlorite, euthanasia can be performed in cases without therapeutic possibility, and correct disposal of the dead bodies of animals killed as a result of the disease. Although there are some studies regarding vaccination, there is no vaccine available for sporotrichosis on the market (PIRES, 2017; SANTOS *et al*., 2018).

At the end of each interview, a conversation was held about sporotrichosis with information on epidemiology, risks, and appropriate forms of prevention. This conversation aimed to educate the interviewees and contribute to public health in connection with the health of animals and the environment (LEE, 2017). The distribution of the folder was important in

cases of other doubts that existed after the conversation, enabling further clarification and contact with the Zoonosis Control Service of the local city hall.

Despite the importance of sporotrichosis, the population's lack of knowledge about the disease is notorious and makes prevention measures quite difficult, which has contributed to the progression of the number of cases of this mycosis over the years (GONÇALVES *et al*., 2019; GREMIÃO *et al*., 2017; MARTINS *et al*., 2015; POESTER *et al*., 2019). The lack of information about the disease and the fact that it is not compulsory to report it impairs the knowledge of the health areas of the municipalities about the epidemiological situation of sporotrichosis. However, considering that sporotrichosis is an emerging zoonosis in several Brazilian regions, all health services should be aware of this problem as an epizooty. Thus, the population's awareness of zoonoses and the care of animal guardians for their animals (responsible guardians) are extremely important for the control of the disease in Brazil (GONÇALVES *et al*., 2019).

CONCLUSIONS

It is concluded that only a small part of the population knows about sporotrichosis, highlighting the importance of implementing more health education actions aimed at disseminating information and making the population aware of this mycosis, especially in endemic areas, to limit the expansion of this emerging disease.

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