Analysis of information system indicators for notifiable diseases related to sporotrichosis, 2021 – 2022

ABSTRACT

Sporotrichosis is a zoonotic disease, considered a public health problem in Brazil. The objective was to compare the indicators of the Notification System for Notifiable Diseases related to human sporotrichosis. The health indicators that can promote changes in the epidemiological situation of the municipality were analyzed: increase in the number of notified cases, increase in the number of suspected people treated in the municipality, number of people undergoing treatment in the municipality, clinical or laboratory diagnosis and disease progression. The notification form serves to communicate the problem to the health service and must have fields that allow obtaining epidemiological data: identification of the source of infection and the transmission mechanisms of the pathogen that causes the disease. Currently, the main cause of underreporting is the lack of training of professionals when filling out the form and the lack of information on the part of professionals regarding the conditions that require compulsory notification. The analysis of health indicators is important for planning actions related to health services and can facilitate decision-making by managers, as they reflect the current epidemiological situation of the population in relation to diseases.

Key words: Health indicators, notifiable diseases, sporotrichosis, one health.

INTRODUCTION

Sporotrichosis is a potentially zoonotic disease and considered a public health problem in Brazil. Among the challenges of disease control and prevention, there are important factors to consider: the disease is considered neglected, the habit of cat ownership among the Brazilian population, and the large number of stray cats (Rodrigues et al., 2013).

Sporotrichosis is a disease caused by a fungus of the Sporothrix schenckii complex (Schubach, 2010). It is currently the most common fungal infection affecting cats in Brazil. Due to the close interaction between these animals and humans, there has been an exponential increase in the number of human sporotrichosis cases (Silva et al., 2023).

The disease is present in most countries worldwide, with hyperendemic areas in Brazil, China, and South Africa. However, there is a higher prevalence in tropical climates, which favors the development of the fungus (Chakrabarti et al., 2015). The fungus has its natural habitat in the environment, decomposing organic matter, and plants, being known as the "gardener's disease." However, in Brazil, the predominant strain of the fungus is Sporothrix brasiliensis, and transmission occurs mainly through infected cats (Etchecopaz et al., 2021).

The mode of transmission involves trauma to cutaneous and subcutaneous tissues caused by scratches or bites from animals or through thorn scratches from plants. The lesion develops at the site of fungal inoculation, and dissemination occurs through the lymphatic vessels within the first two to three weeks of infection. The lesions can progress to larger
skin lesions, nodules, with the possibility of suppuration and ulceration. In cats, the disease generally behaves more aggressively, and if left untreated, it can evolve into a chronic form and lead to death (Rossow et al., 2020; Gremião et al., 2020).

In Brazil, felines are considered the main source of disease transmission. This can be explained by their free-roaming habits, such as wandering the streets, fighting with other animals, and burying their feaces, which increase their chances of contracting the fungus (Almeida et al., 2018). As the Brazilian population has a habit of owning cats, and there is also a large number of stray cats, the epidemiological risk becomes high, as evidenced by the increasing number of cases in humans and animals (Montenegro et al., 2014).

Furthermore, the inefficiency of programs or actions to control sporotrichosis in humans and animals, lack of awareness among the population regarding the availability of free medication for treatment, and lack of information about disease control measures by the population characterize the epidemic situation in an increasing number of Brazilian municipalities, including the municipality of Jaboatão dos Guararapes (BRASIL, 2021).

For the diagnosis of sporotrichosis, clinical evaluation, epidemiological data collection, and complementary tests should be performed (Araujo et al., 2020). The gold standard for diagnosing the disease is culture, which can be obtained from exudates of lesions, abscess aspirates, tissue fragments, synovial fluid, ocular conjunctiva swabs, cerebrospinal fluid, and respiratory secretions in cases of extracutaneous forms. However, serological, histopathological, and molecular methods have recently been adopted as auxiliary tools for detection (Araujo et al., 2020; BRASIL. Portaria nº 204, de 17 de fevereiro de 2016).

Prompt diagnosis is crucial because delayed diagnosis, particularly delayed treatment, favors the progression of sporotrichosis and compromises treatment effectiveness. This delay in diagnosis and treatment is often associated with healthcare professionals' lack of knowledge about the disease (Almeida et al., 2018). Early detection of characteristic clinical manifestations of the disease is essential for addressing sporotrichosis, as it results in better control and less clinical impairment for the patient (Rossow et al., 2020).

The main treatment currently available involves the use of medications such as itraconazole, potassium iodide, amphothericin B, and terbinafine (Rios et al., 2018). For the most common forms of the disease, the most applied treatment is itraconazole. Treatment lasts for three to six months for simpler forms (Silva et al., 2023) and can be extended for systemic forms or in patients. Despite being a disease with a high probability of cure, the high cost of itraconazole, along with the long duration of its use, hinders patients from completing treatment. Therefore, it is important to provide medication through primary care, as well as monitor infected patients and animals, preventing the progression of the disease to more severe forms (Queiroz-Telles et al., 2011).

There are reports of sporotrichosis cases in all regions of the country, but the majority is concentrated in the southern and southeastern regions of Brazil. Specifically, in Rio de Janeiro, which is currently experiencing a hyper-epidemic condition, it is considered a mandatory notifiable disease in humans and animals (Almeida-Paes et al., 2014). In the states of São Paulo (Guarulhos), Pernambuco, and Rio Grande do Norte, the disease is also considered a compulsorily notifiable disease (Barroso Pereira et al., 2008).

The notification form is the instrument used by epidemiological surveillance to monitor and investigate suspected and confirmed cases of compulsorily notifiable diseases. Through these forms, healthcare professionals from all categories can notify surveillance about the occurrence or suspicion of cases, and from there, patients can be directed according to the healthcare flow of each municipality (Rosa et al., 2017). Therefore, healthcare professionals must be attentive to complete the forms accurately, as they play a fundamental role in this context.

The Notifiable Disease Information System (SINAN) was regulated in 1998 and is the national system for collecting, transmitting, and disseminating epidemiological data. The information collected in the notification forms is included in SINAN, allowing for an understanding of the real epidemiological situation in a particular community and enabling the planning of health promotion, prevention, and control actions (Portaria n. 264, de 17 de fevereiro de 2020).

Sporotrichosis has gained importance in recent years due to its global prevalence, and Brazil has been following this trend. It is also considered a public health problem in Brazil and a neglected disease. Additionally, the recognition of species classified within the originally described species and their distinct ecology, distribution, and epidemiology worldwide serve as a warning for prevention and control of this disease (Chakrabarti et al., 2015).

There is currently no specific notification form for sporotrichosis in the municipality of Jaboatão dos Guararapes. However, this would be an important step to identify specific data on how sporotrichosis presents in the area. Given this scenario, the objective of this study is to analyze the health indicators of Jaboatão dos Guararapes municipality in Pernambuco, Brazil, in order to provide the necessary subsidies for decision-making regarding health management and population healthcare, offering quality services in accordance with the local reality.

METHODS

This study was a descriptive research with a quantitative approach conducted in the municipality of Jaboatão dos Guararapes, Pernambuco, Brazil. Secondary data were used
The study was conducted in the municipality of Jaboatão dos Guararapes, located in the Metropolitan Region of Recife, northeastern Brazil. The municipality is the second most populous in the state of Pernambuco, and the health service is structured in seven health regions that compose the municipal health network.

The study population consisted of confirmed and suspected notified cases of human sporotrichosis in individuals residing in the municipality of Jaboatão dos Guararapes, Pernambuco. These data, collected in the Notifiable Diseases Information System (SINAN), were entered through compulsory notification forms for sporotrichosis and serve as parameters for planning actions and public policies related to the disease. SINAN indicators are generated in .xls format and were organized and analyzed using Microsoft Excel 2007 software.

Additionally, notified and confirmed cases of animal sporotrichosis were also analyzed, specifically among dogs and cats, between the years 2018 and 2021. These data were obtained from the Environmental Surveillance Center (CVA) of the municipality.

After the initial evaluation, the data were compared with the scientific literature and internally discussed among the epidemiological surveillance team with the aim of devising strategies for monitoring human sporotrichosis.

Health indicators were analyzed, including the increase in the number of notified cases, suspected individuals attended in the municipality, individuals receiving treatment through the municipality, clinical or laboratory diagnosis, and disease progression. An important limitation of the study is the incompleteness of information, which affects the quality of the available data, but this factor did not preclude data analysis.

The research began only after the approval of the Municipal Health Secretariat, and the project was submitted to the Brazil Platform, with protocol number CAEE 45049021.6.0000.9547, complying with the requirements regulating scientific research involving human subjects. The project was approved on 05/05/2021.

RESULTS AND DISCUSSION

The number of suspected individuals attended in the municipality and the number of confirmed cases can be evaluated through the notification forms received by epidemiological surveillance, as the form can be filled out in the presence of suspected or confirmed cases of the disease. The significant discussion regarding the notification forms is still ongoing because it is believed that these numbers are underreported, especially in the years 2020 and 2021, due to the COVID-19 pandemic, as well as the lack of knowledge among healthcare professionals about the disease being compulsorily notifiable, self-medication by the population, and to a lesser extent, cases diagnosed in other health services, such as the private sector.

At the municipal level, Jaboatão dos Guararapes shows a stable number of notified and confirmed cases, with few variations. Therefore, it is believed that there was not enough time to analyze changes in these items, as changes in the notification behavior of healthcare teams may take several months to be reflected in epidemiological data. This is especially relevant considering the trainings conducted in the municipality during 2021 and 2022 by the municipal epidemiological surveillance. However, sporotrichosis has been compulsorily notifiable in the state of Pernambuco since 2018 (Table 1).

It can be observed that there was a slight increase in the number of notified cases during the years 2019 and 2020. When compared to the data from the epidemiological bulletin of the state of Pernambuco released in June 2021, this increase can also be observed in the same years. Regarding the data from the state of Pernambuco, the increase was much higher, with 7 (seven) suspected cases in 2016, 34 suspected cases in 2017, 63 suspected cases in 2018, 179 suspected cases in 2019, and 115 suspected cases in 2020 (Table 2).

The number of ignored cases means that these cases have not yet been closed in the system. These are cases of patients who were not found in active search, and there was also no feedback from the healthcare teams regarding case closure. This may have occurred because the patients moved or the phone number does not exist, but the case

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of reported cases</th>
<th>Number of confirmed cases</th>
<th>Ignored</th>
<th>Discarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>12</td>
<td>7</td>
<td>00</td>
<td>05</td>
</tr>
<tr>
<td>2019</td>
<td>22</td>
<td>16</td>
<td>02</td>
<td>04</td>
</tr>
<tr>
<td>2020</td>
<td>19</td>
<td>13</td>
<td>05</td>
<td>01</td>
</tr>
<tr>
<td>2021</td>
<td>14</td>
<td>06</td>
<td>07</td>
<td>01</td>
</tr>
<tr>
<td>2022</td>
<td>14</td>
<td>09</td>
<td>05</td>
<td>00</td>
</tr>
</tbody>
</table>

was not closed in the system.

The discarded cases are those that were not diagnosed as sporotrichosis. This can happen because the notification form must be filled out for suspected cases of the disease, so after clinical diagnosis or test results, the diagnosis may be another disease.

According to the Ministry of Health, Brazil is experiencing a significant outbreak of sporotrichosis, a neglected zoonotic disease that is not mandatory to report in the country (BRASIL, 2020). In 2016, approximately 13,500 cases were recorded in animals and 580 cases in humans in the states of Rio de Janeiro and Pernambuco. In the same year, Guarulhos recorded 59 suspected cases in humans and confirmed 489 cases in animals (Alves et al., 2023). After the rapid increase in the number of cases, these states decided to make sporotrichosis notification mandatory.

This data can be explained by the fact that sporotrichosis is being seen in healthcare units, no longer being a disease forgotten by professionals. The acquired knowledge about the disease being a mandatory reportable condition and information regarding diagnosis and treatment contribute to the increase in these numbers. Additionally, it is also associated with a large number of abandoned cats or those not receiving proper treatment from their owners (Barros et al., 2011).

There is currently no vaccination against the disease, which reinforces the importance of health education to promote responsible pet ownership in order to preserve the relationship between humans and animals, prevent cases of aggression such as bites and scratches (the main transmission routes of the disease in Brazil), and safeguard animal health (Sales-Macêdo et al., 2018).

Another indicator of the disease is the cure rate at the time of case closure, which is still being ignored during the completion of the notification form. However, a small improvement can be observed in the percentage, where in 2021, 81.2% were closed as ignored, and in 2022, this percentage decreased to 69.2%. This number can be explained by the difficulty of finding the patient after treatment completion due to address or phone number changes, excessive workload on the part of surveillance professionals, patient treatment abandonment, or self-medication.

Correct completion of notification forms is a relevant issue raised by epidemiological surveillance, as the main activity of the department is the notification and
monitoring of suspected and/or confirmed cases of notifiable diseases. The forms are effective tools for creating and monitoring public policies, being one of the Ministry of Health’s key strategies as they provide essential data on the diseases monitored by epidemiological surveillance (Falcão et al., 2020).

The notification form serves to communicate the disease to the health service and should have specific fields for data collection to obtain epidemiological information, such as identifying the source of infection and the mechanisms of pathogen transmission that cause the disease. This information is crucial for planning surveillance actions and controlling this condition in both humans and animals. The main cause of underreporting is currently the lack of training among professionals regarding the completion of the notification form and lack of information about mandatory notifiable diseases (Teixeira et al., 2018).

The main confirmation criterion continues to be clinical-epidemiological rather than laboratory criteria. Sporotrichosis can be diagnosed using either of the mentioned criteria. In cases where the medical professional has knowledge and/or experience with the disease, a clinical-epidemiological diagnosis can be made. However, if there is a need for laboratory testing, the patient can be referred to the state’s reference laboratory, and with the result, a diagnosis can be confidently made (Queiroz-Telles et al., 2011).

Regarding the number of cats attended to and monitored by the CVA, there has been a significant increase in recent years. This data explains the epizootic nature of the disease in cats. According to Silva et al. (2018), who evaluated the increasing number of cases in cats in the city of Recife, further studies are still needed to obtain more consistent epidemiological data to explain the factors leading to a significant increase in the number of cases in the city. One of the causes of spread among animals in the state of Pernambuco is that after the diagnosis of the first cases that occurred in the municipality of Abreu e Lima, owners who were alerted to the possibility of contracting the disease may have abandoned their cats. Another possibility was the lack of access to treatment for animals, as the treatment for cats is long and expensive, and there was a lack of information about the disease.

Table 3 shows the increasing number of animals attended to in the municipality of Jaboatão dos Guararapes, as well as the number of animals monitored, which refers to confirmed cases in animals.

After analyzing the results, a Technical Note is intended to be developed to establish procedures to be adopted by healthcare professionals in suspected cases of human sporotrichosis. It may also be added to the municipal sanitary code. An audio-visual material has also been produced, which will allow professionals to obtain accessible, permanent, and easily understandable information.

**Conclusion**

The analysis of health indicators is essential for planning actions related to health services. Indicators can also be useful in facilitating decision-making by managers, as they reflect the current epidemiological situation of the population regarding notifiable diseases. In addition, indicators can trigger a process of health education through the discussion and dissemination of epidemiological data.

The mandatory reporting of diseases needs to be disseminated among healthcare professionals in the municipality, and complete completion of the notification form should be encouraged to improve the organization of surveillance measures.

The use of a specific notification form for the disease can be an efficient way to reduce underreporting of cases, but it will require efforts from municipal management and epidemiological surveillance to monitor reported cases and train healthcare professionals.

**IMPLICATIONS FOR POLICY AND PRACTICE**

Municipal managers play a key role in managing and delivering health services at the local level. Through the analysis of indicators, managers can identify the main needs and health problems of the population, allocating resources and developing health policies and programs suited to local demands.

The continuous analysis of health indicators makes it possible to detect trends and disease epidemics, helping to prevent and control outbreaks. Managers can identify
emerging issues, implement preventive measures, and respond quickly and effectively to public health situations.

Therefore, the assessment of health indicators is essential for municipal managers, as it provides valuable information for planning, monitoring, decision-making and accountability in the context of local public health. This practice contributes to ensuring the effectiveness, efficiency and quality of health services offered to the population.

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