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Research Article

Study of the Prevalence of Animal Rabies in Guinea During the Year 2022

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Abstract

This study aimed to investigate the prevalence of rabies in dogs and other domestic animals, including two sheep, using data collected from the regional veterinary laboratories in Labé, Kankan, and Nzérékoré. In total, 44 samples were submitted to these veterinary laboratories and analyzed using the direct immunofluorescence assay method. This technique is the standard diagnostic procedure recommended for rabies by both the World Health Organization (WHO) and the World Organization for Animal Health (WOAH). The results of the testing revealed a high prevalence of rabies, estimated at 84.09%, with 37 out of the 44 samples testing positive for the disease. Rabies is commonly associated with dogs, which are well-known carriers of the virus. However, it is important to recognize that rabid dogs can transmit the disease to a wide range of mammals through bites, scratches, and other forms of contact. Consequently, farm animals such as cattle, sheep, goats, and other domestic species are also at risk. Once these animals are bitten by a rabid dog, they can contract the disease and, in many cases, succumb to its effects. This underscores the importance of monitoring and controlling rabies not only in dogs but also in other animals that might be exposed to this fatal disease. Another major piece of information is that only animals that showed signs of rabies and were slaughtered for this purpose or died naturally were analyzed.

Keywords

Rabies, Guinea, Direct Immunofluorescence, Zoonosis, One Health

1. Introduction

Rabies is a significant zoonotic disease [1, 14, 15] responsible for approximately 60,000 deaths each year around the globe, with a substantial proportion of these fatalities occurring in Africa and Asia [7, 8]. Unfortunately, in Guinea, there is a notable lack of reliable and comprehensive statistics regarding the number of rabies-related deaths. The overwhelming majority of human rabies cases—over 95%—are attributable to bites from infected dogs [2]. Therefore, controlling and eventually eliminating rabies hinges largely on effective measures directed at dogs. One of the most efficient strategies to achieve this is through mass vaccination campaigns targeting dogs, which is a proven method to reduce and eventually eradicate the disease. [3]

In Guinea, the substantial population of stray dogs, which is prevalent in both rural and urban areas, significantly contributes to the transmission of rabies. Reports indicate numerous cases of dog bites affecting various farm animals, including small ruminants and cattle, as well as humans. Laboratory testing has revealed that nearly all of the cases involving rabies have been linked to stray dogs. [11] This highlights the

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urgent need for better management and control of the stray dog population to curb the spread of the disease.

Rabies is considered one of the primary animal diseases that require notification in this agropastoral country. Data from the statistical yearbook of livestock in 2019 [12] reveals that there were 2,080 reported cases of dog bites across the country. These included 256 incidents involving bites between dogs, 672 cases affecting cattle and 1,152 instances involving human victims.

The inadequacy of surveillance and monitoring for these biting dogs represents a significant obstacle in the fight against rabies in Guinea. In 2019, out of the total 2,080 reported bite cases, only 678 dogs were placed under observation [13]. This lack of comprehensive monitoring and follow-up severely hampers efforts to control and reduce the incidence of rabies, emphasizing the need for enhanced surveillance and more effective control measures to address the ongoing public health challenge. [9]

2. Materials and Methods

This study was conducted over the entire calendar year from January 1 to December 31, 2022, encompassing the full span of 12 months an involve dogs, small ruminants and cattle [10]. During this period, a total of 44 samples were collected and tested for rabies. The method used is the Direct Immunofluorescence Assay (DFA). Guinea is divided administratively into eight regions: Conakry, Kindia, Bok é, Mamou, Lab é, Faranah, Kankan, and Nz ér ékor é. The samples for this study were sourced from six out of these eight regions, representing a significant geographical portion of the country. Specifically, samples came from 12 of the 33 prefectures, in addition to the special administrative zone of Conakry. This distribution ensures that the study's findings are broadly representative of the entire nation.

Animals suspected of being infected with rabies are either deceased or have been slaughtered. In such cases, the head of the animal is carefully removed by a trained veterinarian. The specimen is then promptly sent to the laboratory in a cooler and stored at a temperature of -20 ℃ to preserve its integrity until analysis.

Upon arrival at the laboratory, the technician performs a dissection of the animal's skull to access the brain. The horn of Ammon, a region within the brain where the rabies virus is most commonly found, is extracted. A brain smear is then prepared using this area to facilitate accurate testing. The diagnostic process employs the Direct Immunofluorescence Assay (DFA), which is the most commonly used method for diagnosing rabies. [4] This technique is endorsed by both the World Organization for Animal Health (WOAH) and the World Health Organization (WHO). DFA is known for its high sensitivity (96%) and specificity (99%), making it a reliable method for detecting rabies. [5]

To prepare the sample for DFA, the fingerprint smear is fixed using cold pure acetone at -20 ℃ for one hour or for a whole night if the sample is received late. Once the smear has dried (for approximately 15 minutes in the open air), it is stained with approximately 50µl of a labeled conjugated rabies antibody combined with Evans blue dye. The prepared slides are then incubated at 37 ℃ in a humid chamber for 30 minutes. Following the incubation, the slides are washed twice with phosphate-buffered saline (PBS) to remove any excess conjugate. Slides are finally washed for a few seconds with distilled water. [6] The final reading of the samples is conducted using a fluorescence microscope, which allows for the detection of rabies virus antigens with high precision.

Table 1. *Number of received rabies samples by prefecture.*

Region	Prefecture	Received samples
Bok é	Koundara	7
Faranah	Faranah	3
Faranah	Kissidougou	1
Kankan	Kankan	5
Kankan	Mandiana	5
Kankan	Kouroussa	1
Lab é	Mali	5
Lab é	Lab é	2
Mamou	Pita	1
Nz ér ékor é	Nz ér ékor é	10
Nz ér ékor é	Beyla	3
Nz ér ékor é	Yomou	1
TOTAL		44

In this table, Nzerekore sent the largest number of samples to the laboratory during the duration of our study (10) while Kissidougou, Kouroussa, Pita and Yomou sent only one sample each.

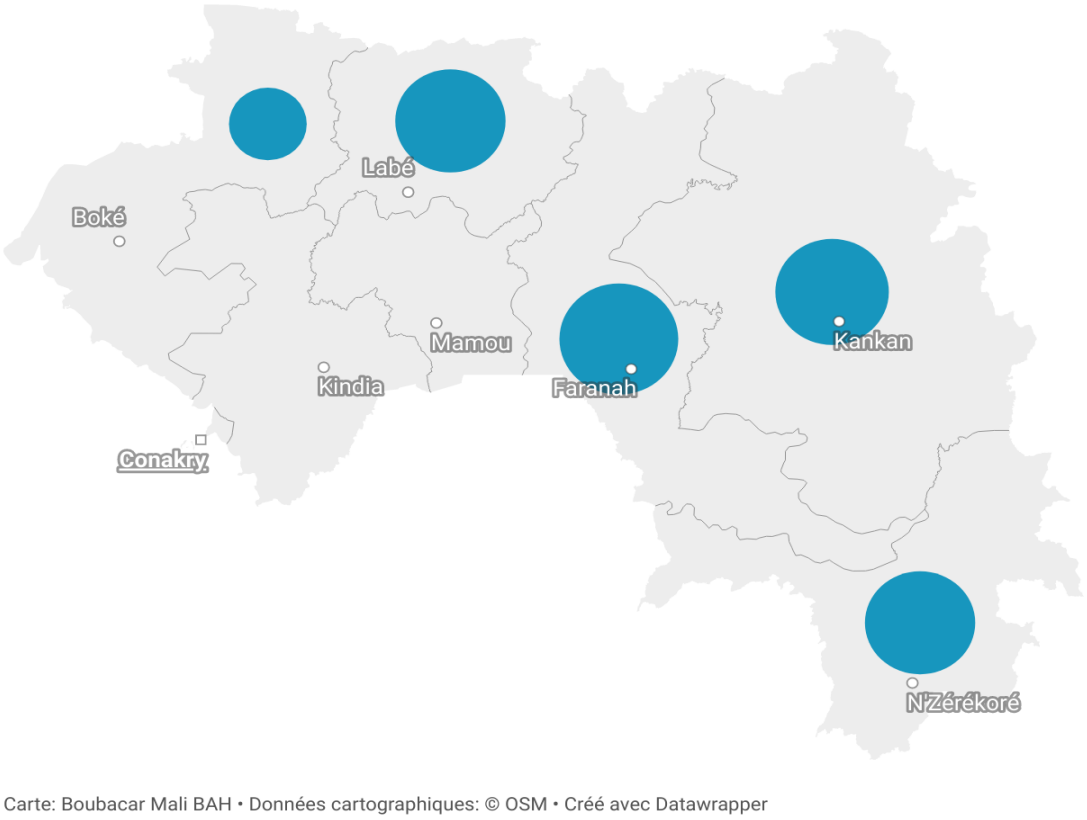

Figure 1. *Prevalence of rabies cases.*

Table 2. *Number of positive samples by region.*

Region	Received samples	Number of positives	Prevalence
Conakry	0	0	0%
Bok é	7	5	41,4%
Faranah	4	4	100%
Kankan	11	10	90,9%
Kindia	0	0	0%
Lab é	7	6	85,7
Mamou	1	0	0%
Nz é r é kor é	14	12	85,7
TOTAL	44	37	84,09

In this Table 2, we see that the administrative region of Faranah has the highest prevalence (100%) even if the number of samples reported is low (4), Kankan comes next with 90.9% prevalence (10 positive samples out of 11 received). Lab é and Nzerekore each have 85.7% prevalence. The capital Conakry and Mamou each account for 0% with 0 and one cases respectively received.

3. Conclusion

This study, despite its limitations, provides valuable insights into the prevalence of rabies across Guinea. On one hand, the study is constrained by its lack of representativeness for the entire national territory, as it does not cover every region comprehensively. On the other hand, the study's scope is limited by the relatively few cases reported in the laboratory, which may not fully reflect the true extent of rabies in the country. Nevertheless, the findings from 2022 offer a significant indication of the presence of rabies across all regions of Guinea.

The data collected reveals that rabies is indeed present in all natural regions of Guinea. The majority of the identified cases of rabies are linked to stray dogs, highlighting the critical role that these animals play in the transmission of the disease. Additionally, domestic animals that have been infected were primarily bitten by stray dogs, further emphasizing the connection between stray dog populations and the spread of rabies.

Based on these findings, it is possible to develop a targeted strategy for controlling and eventually eradicating rabies in Guinea. A fundamental aspect of this strategy should be the management of stray dog populations. One effective approach could involve conducting oral vaccination sessions for these stray animals. This method would help immunize the stray

dog population against rabies, thereby reducing the risk of transmission to other animals and humans. However, if implementing widespread vaccination proves to be unfeasible in the short to medium term, another option would be to consider the culling of stray dogs as an interim measure to control the spread of the disease.

To successfully implement these recommendations, it is crucial to have strong political will and commitment at the highest levels of government. Additionally, the involvement and active participation of decentralized livestock services will be essential. These services will need to coordinate efforts, manage logistics, and ensure the effective execution of the proposed control measures. The combined efforts of government officials, veterinary professionals, and local communities will be pivotal in achieving the goals of rabies control and eradication in Guinea.

Abbreviations

WHO	World Health Organization (WHO)
WOAH	World Organization for Animal Health
DFA	Direct Immunofluorescence Assay
PBS	Phosphate-buffered Saline

Author Contributions

Boubacar Mali Bah is the sole author. The author read and approved the final manuscript.

Conflicts of Interest

The author declares no conflicts of interest.

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