

Case Report

Epidemiological Profile of Canine Rabies in Bouca in the Central African Republic

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Abstract

Rabies is a deadly viral disease transmissible to humans and remains a major public health issue in several regions of Africa in general, and in the Central African Republic in particular; due to a high population of stray dogs and a low rate of canine vaccination. This study examines the epidemiological situation of rabies through a retrospective descriptive study, based on records of people bitten by dogs in all healthcare facilities and veterinary posts in the town of Bouca, which is located in the Ouham prefecture at 6°30'26" North, 18°16'31" East. The study was conducted on an estimated canine population of 7,955 (dogs and cats) and 38,163 people distributed across four localities. We recorded 30 individuals bitten by dogs. Nearly all of the bitten persons were recorded in Bouca Center (28 cases), accounting for 93.66%. The highest frequency of bites was among farmers, representing 40%, followed by students at 30%, and traders at 23%. More than 80% of the bitten individuals were not vaccinated. However, after exposure, 93% of them received post-exposure vaccination. Community awareness, systematic vaccination, and proper management of the canine population are essential to reduce transmission and prevent human cases. These results indicate that the rabies virus still circulates in the Bouca region, highlighting the need to strengthen rabies control programs in this isolated area to improve public health and control the spread of this major zoonotic disease under surveillance. Urgent and appropriate measures must be implemented to protect both human and animal populations.

Keywords

Rabies, Epidemiology, Central African Republic, Public Health, Risk Factors

1. Introduction

Rabies is a deadly viral disease caused by Lyssavirus viruses, which mainly affects mammals, including humans. According to the WHO, an estimated 59,000 people die each year from rabies, with the vast majority of deaths occurring in Asia and Africa [1, 5]. This viral anthroozoonosis has a significant tropism for nerve cells [1] and is accidentally transmitted to

humans through bites, scratches, or licking of broken skin [1-3]. The incubation period of the disease is silent, lasting an average of 21 days, but can be either shorter (7 days) or longer (up to 1 year) [1, 4]. Symptoms generally manifest as drowsiness, fatigue, pain, or paresthesia in the area of the bite, followed by paralysis, agitation, mood disorders, and hydrophobia. The

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Received: 26 June 2025; **Accepted:** 9 July 2025; **Published:** 7 August 2025



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disease is almost always fatal once symptoms appear [2]. The diagnosis of rabies is based on clinical signs, epidemiological data, and laboratory confirmation by detecting rabies viral RNA by RT-PCR [1]. Treatment is preventive, either by post-exposure rabies vaccination, post-exposure prophylaxis, or pre-exposure prophylaxis [5].

In the Central African Republic, rabies is one of the five (5) priority zoonoses and is endemic. Over the past two years, epidemiological surveillance has reported an increasing number of dog bite cases in the districts of Batangafo, Kobo, Kaga Bandoro, Kemo, and Bouca. As such, canine rabies is a major public health problem in the country due to low public awareness, low vaccination rates, and the large number of stray dogs. During epidemiological week 1-13 of 2024, a significant number of dog bite cases were recorded in the country, including 164 cases in health regions 3 and 9 cases mainly in the Bouca health district [6]. The present study aims to assess the epidemiological profile of canine rabies in the locality of Bouca and its surroundings, and to analyze the associated epidemiological factors in order to propose measures for the control of the disease.

2. Methodology

This study consisted of evaluating the epidemiological survey conducted in April 2024 in the Bouca Health District, 289 km northeast of Bangui. This locality has a human population of 119,200 and an estimated canine population of 17,028 dogs and cats. It included collecting data on dogs, their vaccination status, and their behavior, as well as analyzing suspected cases in dogs. The data was collected during a field

investigation based on interviews with dog owners, local veterinary stations, and analysis of cases reported in the district's health facilities.

2.1. Study Period

The field surveys were conducted from April 6 to 12, 2024.

2.2. Location of the Investigation

The investigations took place in the Bouca Health District, 289 km northeast of Bangui. This locality has a human population of 119,200 and an estimated canine population of 17,028 dogs and cats.

Communes investigated and estimated to be affected by the epidemic:

- 1) Bouca center, which houses the district office and hospital as well as the livestock sector. Eight groups and 52 neighborhoods are registered in this commune. The human population is 27,791, and the canine population is estimated at 5,971 dogs and cats.
- 2) Gbangola, located 18 km south of Bouca center, is home to the health center and has 4,287 inhabitants and 913 dogs and cats.
- 3) Gbabilia, located 15 km north of Bouca center, is home to the Health Center and has 3,487 inhabitants and 599 dogs and cats.
- 4) Yangou-mara, located 12 km north of Bouca center, is home to the Health Center and has 2,598 inhabitants and 472 dogs and cats.

3. Results

3.1. Human/Dog Ratio

Table 1. Ratio of dogs to population.

Locations	Human Population	Dog Population	Male/dog ratio
Bouca centre	27791	5971	21,48537296
Gbangola	4287	913	21,29694425
Gbabilia	3487	599	17,17809005
Yangou-mara	2598	472	18,1678214
Total	38163	7955	20,84479732

Table 1 shows the human-dog ratio in the town of Bouca, which varies between 17% and 21%, with an overall average of 20.84%. The highest ratio was observed in Bouca center

(21.48%), followed by Gbangola (21.29%), and the lowest was observed in Gbabilia (17.17%). The average attack rate was 0.07%.

3.2. Profile of People Bitten

Table 2 shows the profile of people bitten by dogs during the study period. According to the results, farmers are most likely to be bitten (40%), followed by students (30%), while those without a profession are least likely to be bitten (2%).

Table 2. People bitten.

	Number of cases	Percentage
Cultivators	12	40%
Students	9	30%
Retailers	7	27%
Non-professional	2	7%
Total	30	100%

3.3. Characteristics of Biting Animals

The registered dog population in Bouca was 7,955, the majority of which are stray or semi-stray dogs (80%) with low vaccination coverage. 90% of biting animals in the sub-prefecture are dogs with unknown vaccination status, 70% of which are female and disappeared after biting people. 1% of biting dogs were euthanized and their brains tested positive in the laboratory.

3.4. Knowledge About Rabies

Random interviews were conducted with a sample of 379 people in the community targeted by the investigations. The median age of those interviewed was 39. Ninety percent of those interviewed said they knew that dogs, cats, and/or bats are carriers of rabies. 98% of them said they knew that rabies is transmitted through bites or scratches from an animal suspected of having rabies, or through direct contact with the saliva of the suspected animal. Only 47% of people were aware that rabies can be prevented by post-exposure rabies vaccination.

3.5. Attitude After a Bite

16% of those bitten knew that it was essential to immediately clean the wound with soap and water, then go to a health care center to see a doctor or health worker; and knew that it was also necessary to check whether the biting animal had been vaccinated against rabies, and if so, take the animal to the veterinarian to check whether it was infected.

68% of respondents said that the health authorities should be notified in the event of a bite. 109 respondents said they had been bitten at least once by a biting animal (dog or cat), but only 19 (17%) had received post-exposure prophylaxis.

3.6. Vaccination Status of Exposed Individuals

The vaccination status of exposed individuals is shown in the table. Of a total of 30 individuals surveyed, 93% were vaccinated. Table 3 shows that all exposed individuals received various levels of treatment.

Table 3. Vaccinated individuals.

Vaccination status	People bitten	Frequency %
People vaccinated	28	93%
Unvaccinated Persons	2	7%
Total	30	100%
Number of doses received		
People who received 4 doses	11	
People who received 3 doses	4	
People who received 2 doses	13	
People who received 0 doses	0	

4. Discussion

The study highlights the active circulation of canine rabies in the Central African Republic in general and in Bouca in particular. In our study, the most exposed individuals are farmers (40%), which is lower than the results obtained by [7] (47.5% among children under 15 years of age). The high rate of young children exposed in our series could be explained by the fact that children consider these animals as friends but also as toys, and they are often subjected to their aggression.

4.1. Characteristics of the Animal Involved

Dogs are the animals most often involved in cases of exposure. Regardless of the study, dogs are the animals most frequently involved due to their proximity to humans, either as pets or guard animals [9-11]. In the majority of cases, the animal was not vaccinated. Morvan [8] found that 87% of animals were not vaccinated in a study conducted on the epidemiological profile of people exposed to rabies in Abidjan, Côte d'Ivoire, in 2010 [15].

Tiembré [11] found that 69.5% of animals were not vaccinated in a study conducted in 2008 in the same department. These high rates of unvaccinated animals could be due to ignorance or negligence on the part of pet owners in having them vaccinated, the high cost of the vaccine, the failure to enforce legislation on animal owners, and finally the inadequacy of public veterinary infrastructure [12].

4.2. Vaccination Status of Exposed Individuals

Due to poor knowledge of rabies, patients are often more concerned about the lesions than about post-exposure prophylaxis. Therefore, it is only after treating these lesions at home or in a health center that they think of going to the CAR, which leads to a delay in consultation.

4.3. Almost All Patients Received the Rabies Vaccine Exclusively

due to the low availability of rabies immunoglobulins. Individuals who have abandoned post-exposure prophylaxis are at risk of death from human rabies. This risk has increased further compared to the Tiembré study in 2009 (55% vs. 46.9%) [9]. This poor compliance with post-exposure prophylaxis could be explained by the population's lack of knowledge about rabies. with a relatively high prevalence of 93.66% and an attack rate of 0.07%, which corresponds to the average rate reported by (Mahaman Laouali HAROUNA AMADOU et al) Maradi in Niger. Dogs remain the main attacking animal, accounting for 99.02% of all exposures. Regardless of the study, dogs are the most frequently implicated animals due to their proximity to humans [13, 14].

5. Conclusion

Rabies is still endemic in CAR. It is therefore necessary to increase rabies prevention and control measures by improving prophylaxis and animal health control, as well as providing better information and education to the population about this disease, particularly in rural areas. In addition, a multisectoral control approach, combining veterinary services with a domestic animal vaccination program and the culling of stray animals, is needed. However, further research is needed in the form of sociological and veterinary studies.

Abbreviations

CAR	Central African Republic
RNA	Ribonucleic Acid
RT-PCR	Reverse Transcription Polymerase Chain Reaction

Author Contributions

Ndonide Nicaise: Conceptualization, Data curation, Formal Analysis, Investigation, Methodology, Supervision, Validation, Writing - original draft, Writing - review & editing

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Conflicts of Interest

The authors declare no conflicts of interest.

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