Human Rabies Prophylaxis: Clinical and Epidemiological Profile and Assessment of Prophylactic Management

Profilaxia Antirrábica Humana: Caracterização Clínico-Epidemiológica e Análise das Condutas Profiláticas

Profilaxis Antirrábica Humana: Caracterización Clínico-epidemiológica y Análisis de las Conductas Profilácticas

RESUMO

Objetivo: Analisar o perfil clínico-epidemiológico e a adequação profilática dos atendimentos antirrábicos humanos no município de Camaçari-Ba entre abril de 2022 a dezembro de 2024 **Método:** Estudo epidemiológico, transversal e quantitativo, com dados do Sistema de Informação de Agravos de Notificação. **Resultados:** A faixa etária de 1 a 19 anos foi a mais acometida, com predominância masculina. A mordedura foi a principal forma de exposição, tendo o cão como principal animal agressor e mãos/pés as regiões mais afetadas. Observou-se inadequação da conduta profilática em 20,9% dos casos analisados. **Conclusão:** A presença de condutas inadequadas evidencia fragilidades na tomada de decisão em profilaxia antirrábica humana, indicando a necessidade de educação permanente e de ferramentas de apoio à aplicação dos protocolos.

DESCRITORES: Prevenção primária; Vírus da Raiva; Humano; Prescrição inadequada.

ABSTRACT

Objective: To analyze the clinical-epidemiological profile and the adequacy of prophylactic conduct in human rabies care in Camaçari-BA, from April 2022 to December 2024. **Method:** Cross-sectional quantitative study using data from the Notifiable Diseases Information System. **Results:** The 1–19-year age group was the most affected, with male predominance. Bites were the main exposure, with dogs as the primary aggressor and hands/feet the most affected regions. Inadequate prophylactic conduct occurred in 20.9% of cases. **Conclusion:** These findings indicate weaknesses in decision-making in human rabies prophylaxis, highlighting the need for continuing education and tools to support adherence to protocols.

DESCRIPTORS: Disease Prevention, Rabies virus; Humans; Inappropriate Prescribing

RESUMEN

Objetivo: Analizar el perfil clínico-epidemiológico y la adecuación de las conductas profilácticas en la atención antirrábica humana en Camaçari-BA, entre abril de 2022 y diciembre de 2024. **Método:** Estudio epidemiológico, transversal y cuantitativo con datos del Sistema de Información de Agravos de Notificación. **Resultados:** El grupo de 1 a 19 años fue el más afectado, con predominio masculino. La mordedura fue la principal forma de exposición, con el perro como principal agresor y manos/pies como las regiones más afectadas. Se observó inadecuación de la conducta profiláctica en el 20,9% de los casos. **Conclusión:** Los hallazgos evidencian fragilidades en la toma de decisiones en la profilaxis antirrábica humana, destacando la necesidad de educación permanente y herramientas de apoyo para la aplicación de los protocolos.

DCRIPTORES: Prevención primaria; Virus de la Rabia; Humano; Prescripción inadecuada.

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Rilandia Lima Santos
Bachelor of Nursing from the Faculty of Technology and Sciences of Feira de Santana, Master's student in Public Health at the State University of Feira de Santana
ORCID: https://orcid.org/0009-0004-9472-3601

Maricelia Maia de Lima
Ph.D. in Public Health from the Graduate Program in Public Health at the State University of Feira de Santana
ORCID: https://orcid.org/0000-0003-2320-4340

Magali Teresopolis Reis Amaral
Ph.D. in Biometrics, Full Professor at the State University of Feira de Santana (UEFS)
ORCID: https://orcid.org/0000-0003-1474-9154

INTRODUCTION

Rabies is a zoonosis transmitted to humans through exposure to the virus present in the saliva of infected animals, primarily via bite, scratch, or lick [1], and is nearly 100% fatal. It is important to note that immediate cleaning of the wound with soap and water or detergent is recommended in all cases, as it reduces the risk of infection [2]. In cases of animal bites or scratches from a rabid animal, the victim should seek medical attention to determine the appropriate prophylactic measures, which range from observing the animal to administering the vaccine and rabies immune globulin [1].

Human rabies prophylaxis is the primary preventive measure; due to its importance, all human rabies cases must be reported to the Notifiable Diseases Information System (SINAN).

The prophylactic regimen must be prescribed by a physician or nurse in accordance with the protocols of the Ministry of Health [2]. Given the above, as a health professional working in Public Health Surveillance in the municipality of Camaçari, Bahia, there is a clear need to analyze how human rabies cases occur in the municipality.

Thus, the study adopts the following research question: How are the prophylactic measures adopted in human rabies care in Camaçari, Bahia, characterized according to the clinical-epidemiological profile of the attacks and current protocols? The study is relevant because it supports health management and surveillance actions aimed at improving care.

METHOD

This is a cross-sectional, descriptive epidemiological study with a quantitative approach, developed using secondary data from SINAN (the National Notifiable Diseases Information System) from the municipality of Camaçari, Bahia, covering the period from April 2022 to December 2024. The time frame was defined based on the publication of Technical Note No. 08/2022, which established new recommendations for human rabies prophylaxis.

The study's outcome variable was the rabies management strategy adopted following exposure, while the independent variables included characteristics of the victim- (sex, age, occupation, residential district), the exposure (type and severity of the wound), and the attacking animal (species, clinical condition, and possibility of observation).

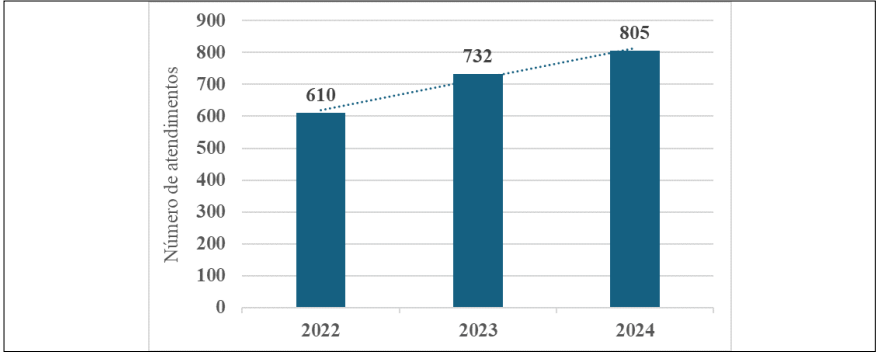
All rabies-related cases reported by the municipality's health units during the study period were included, excluding records prior to Technical Note No. 08/2022 and those from return visits.

Data analysis was performed using the Statistical Package for the Social Sciences (SPSS), version 25, employing descriptive statistics to characterize the distribution of events in the study population. As this was a study using secondary data, an exemption from the Informed Consent Form was requested, and the project was approved by the Research Ethics Committee of the State University of Feira de Santana (UEFS), under opinion No. 7,730,879.

RESULTS

During the study period, 2,147 human rabies cases were recorded in the municipality of Camaçari, Bahia. In 2022 (April 1 to December 31), 610 cases (29%) were reported; in 2023, 732 (33.4%); and in 2024, 805 (36.7%) of the total sample (Figure 1).

Figure 1 - Distribution of rabies-related medical consultations by year in Camaçari, Bahia, from April 2022 to December 2024.



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Regarding the sociodemographic profile (Table 1), males predominated, accounting for 52.6%. The highest proportion of cases occurred in the 1–19 age group (30.8%), followed by the 40–59 age group (27.3%) and the 20–39 age group (24.8%). Individuals aged 60 years or older accounted for 15.4% of cases, and those under 1 year of age accounted for 1.7%. Based on simple frequency, in the 1–19 age group, the ages of 7 years (2.5%), 9 years (2.2%), 10 years (2.1%), 12 years (2.0%), and 3 years (2.0%) stood out.

For the race/color variable, 47.7% of the records were missing or had no information. Among those with completed data, brown-skinned individuals (30.1%) and Black individuals (14.1%) predominated, followed by White individuals (7.2%). Educational attainment showed a high rate of missing information (57.7%); among the valid records, high school (14.2%) and elementary school (11.8%) stood out, while the "not applicable" category accounted for 11.7%.

Regarding residence, two-thirds of the cases involved residents of the Costa Health District.

Regarding occupation, records were grouped into economically active, economically inactive, and missing. A high proportion of missing data was observed, at 75.9%. Among the reported cases, non-economically active individuals predominated, accounting for 16.5%, mainly students (9.1%), retirees/pensioners (4.4%), and domestic workers (3.0%). The economically active accounted for 7.6%, notably construction and maintenance workers (2.5%), followed by general services (1.7%) and commerce/administrative services (1.3%).

Table 1—Sociodemographic characteristics of rabies treatment cases in Camaçari, Bahia, from April 2022 to December 2024.

Variables	N= 2.147	
	Frequency	
	n	%
Gender		
Female	1016	47,30%
Male	1131	52,70%
Age Group		
Under 1 year	37	1,70%
1 to 19 years	661	30,80%
20 to 39 years old	532	24,80%
40 to 59 years old	587	27,30%
60 and older	330	15,40%
District of residence		
Headquarters	646	30,10%
Coast	1440	67,10%
Not reported	61	2,80%
Race/Ethnicity		
Unregistered/Unknown	1025	47,70%
White	154	7,20%
Black	302	14,10%
Yellow	11	0,50%
Brown	647	30,10%
Indigenous	8	0,40%
Education		
No information (Missing + Not recorded)	1239	57,71%
Not applicable	251	11,69%
Illiterate	2	0,10%
Elementary	254	11,83%

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High school	304	14,16%
Higher education	97	4,52%
Occupation		
Missing / not reported	1629	75,87%
Economically inactive	355	16,53%
Economically active	163	7,60%

Source: Sinan Net Camaçari-Ba, April 2022 to December 2024

Regarding the characteristics of the injuries (Table 2), bites were the primary form of exposure, accounting for 87.4% of cases. The most commonly affected regions were the hands/feet (38.9%), lower limbs (33.6%), and upper limbs (21.8%). Single injuries (56.4%) and superficial wounds (49.4%) predominated, although 39.3% were deep.

Dogs were the primary attacking animals (78.5%), followed by cats (19.1%). Most animals were healthy (67.3%), and animal observation was the most frequent management strategy (57.6%), followed by serum + vaccine (14.6%) and vaccination alone (14.0%).

Table 2 – Epidemiological characterization of human rabies cases according to exposure variables and prophylactic management in Camaçari, Bahia, from April , 2022, to December 2024.

Variable	N=2.147	
	Frequency	
	n	%
Type of exposure		
Indirect contact	9	0,40%
Scratch	355	16,50%
Lick	45	2,10%
Bite	1876	87,40%
Other type of exposure	14	0,70%
Location		
Mucosa	56	2,60%
Head/Neck	164	7,60%
Hands/Feet	835	38,90%
Trunk	118	5,50%
Upper limb	467	21.8%
Lower limb	721	33,60%
Injury		
Single	1211	56,40%
Multiple	780	36,30%
No injury	16	0,70%
Unknown	140	6,50%
Characteristic of the injury		
Deep wound	843	39,30%
Superficial wound	1061	49,40%
Laceration	133	6,20%
Attacking animal		
Canine	1685	78,50%
Feline	411	19,10%

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Chiroptera (Bat)	15	0,70%
Primates (Monkeys)	10	0,50%
Fox	1	0,00%
Domestic herbivore	3	0,10%
Other	22	1,00%
Animal condition		
Healthy	1445	67,30%
Suspect	320	14,90%
Angry	7	0,30%
Dead/Missing	191	8,90%
Unregistered	184	8,60%
Observation passivity		
Yes	1431	66,70%
No	389	18,10%
No record	327	15,20%
Type of prophylaxis indicated		
Pre-exposure	20	0,90%
No treatment required	21	1,00%
Animal observation (if dog or cat)	1236	57,60%
Examination + vaccine	170	7,90%
Vaccine	300	14,00%
Serum + vaccine	313	14,60%
Re-exposure schedule	0	0,00%
No record	87	4,10%

Source: SINAN Camaçari-BA, April 2022 to December 2024

Table 3 presents an overview of practices regarding the adequacy of prophylaxis. Prophylactic practices, classified according to Technical Note No. 8/2022 and the Health Surveillance Guide, showed greater adequacy in 2023 (73%), followed by 2024 (69%) and 2022 (67.0%). Inappropriate practices ranged from 17.5% to 26%, while unclassified cases ranged from 8% to 11%. This last category refers to records that could not be classified due to the absence of essential information for assessing the appropriateness of the prophylactic practice.

Tabela 3 - Classificação das condutas quanto à adequação da indicação profilática no municipio de Camacari-BA, entre abril de 2022 a de dezembro de 2024

Classification of prophylactic measures	N=2.147					
	2022		2023		2024	
	n	%	n	%	n	%
Adequate prophylaxis	408	67%	532	73%	553	69%
Inadequate Prophylaxis	156	26%	127	17%	165	21%
Unclassified	46	8%	73	10%	87	11%
Total	610	100%	732	100%	805	100%

Source: SINAN NET Camaçari-BA, April 2022 to December 2024

Prophylactic inadequacies totaled 448 cases in the entire sample. To facilitate analysis, these were classified into two analytical categories: Under-IPN Inadequacy, characterized by under-treatment (risk of illness), totaling 239 cases (53.5%), and Over-IPM Inadequacy, characterized by over-treatment (unnecessary use of immunobiologicals), totaling 209 cases (46.5%), as shown in Table 4.

In the IPM category, 189 cases involving dog attacks and 50 involving cat attacks were identified, totaling 239 cases attributed to these two species.

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In the IPN category, dog attacks predominated, accounting for 152 cases, followed by cats, with 54 cases. There was also 1 case involving a bat, 1 involving a fox, and 1 involving domestic herbivores, totaling 209 cases. There were no records of IPN associated with primates or the "other species" category.

Table 4-Inadequate prophylaxis by attacking animal, Camaçari-Bahia, April 2022 to December 2024

							N=448
	Canine	Feline	Chiroptera (Bat)	Primate (Monkey)	Fox	Domestic herbivore	Other
Inadequate for more	189	50	0	0	0	0	0
Inadequacy for less	152	54	1	0	1	1	0

Source: SINAN Camaçari-BA, April 2022 to December 2024

DISCUSSION

Of the data analyzed, 20.9% showed inappropriate prophylactic indications. These findings are consistent with the literature, which points to recurring errors in the implementation of human rabies prophylaxis, often related to the difficulty of interpreting regulatory criteria [3, 4, 5].

Inappropriate practices decreased in 2023 but began to rise again in 2024. This finding may be related to staff turnover in healthcare facilities, possibly due to the expiration of employment contracts.

There was also an increase in cases that could not be classified regarding appropriateness due to the absence of essential information, reaching 11% in 2024, which compromises the epidemiological analysis and may mask the true magnitude of the inadequacies.

Regarding the attacking animal, dogs remained the primary source of exposure, followed by cats—a pattern widely described in Brazilian studies, such as those by Geraldo and Martins [3,5], which identified these animals as the main aggressors involved in rabies-related cases. Noteworthy is the record of an animal classified as rabid in the forms, although the municipality did not report any confirmed cases of rabies during the study period, suggesting a possible error in interpretation when filling out this field.

Regarding attacks by bats and other wild animals, these were less frequent; however, they should not be overlooked, given their epidemiological relevance as reservoirs of the rabies virus. It is important to note that in the municipality of Camaçari, there are records of bats testing positive for rabies, highlighting the need for proper prophylaxis.

Regarding the most commonly affected regions, the results show that hands/feet and limbs are the most affected. This finding is similar to that observed by Graeff [4] . This distribution has already been reported in other studies and may be associated with the victims' defensive reflexes during the attack, when arms and legs are more exposed [6,7] .

The predominance of bites confirms the literature, which identifies them as the primary route of rabies virus transmission to humans[8] . Cases of head/neck and mucosal lesions deserve special mention, even though they were less frequent in this study, due to the possibility of a shorter incubation period and greater clinical severity [9] .

Regarding age, all age groups were found to be susceptible to exposure. Simple frequency analysis avoided biased interpretations based solely on absolute values, an approach already employed in other studies [10] . The 1–19-year-old age group was found to be the proportionally most affected. In this age group, based on simple frequency, the age of 7 stood out, followed by 9 and 10 years, in addition to significant numbers at 3 and 12 years. These findings indicate that childhood and school-age represent periods of greater vulnerability associated with typical exploratory behavior and lower risk perception[6,7] .

Male patients predominated in the consultations; this finding is consistent with the literature, which points to greater vulnerability among men [4,5,6,7] , which may be associated especially with greater exposure to outdoor activities, risky behaviors, and direct contact with animals—factors that increase the likelihood of accidents [6] .

Although males predominate, exposure is also observed among adult women, indicating the need to include them in educational and preventive initiatives.

Regarding occupation, a high rate of missing data was observed. Since this field is not mandatory, its omission may be common, compromising the identification of possible relationships between occupational activity and risk of exposure to the virus.

Among the available records, the economically inactive group stood out, suggesting frequent occurrences of assaults in the domestic or peridomestic environment. Among the economically active, the construction and maintenance sector predominated, especially bricklayers, followed by electricians, painters, and laborers. The incompleteness of the records compromises data quality and hinders the construction of an epidemiological profile.

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CONCLUSION

Rabies is a lethal disease, but one that can be prevented through appropriate prophylaxis. The results of this study highlighted the persistence of inadequate prophylactic practices, which may expose patients to both the risk of illness and the unnecessary use of immunobiologicals.

These findings indicate that the availability of the protocol does not guarantee its proper application, reinforcing the need for continuing education to train professionals involved in human rabies care.

Finally, it is hoped that the results presented will assist healthcare managers and professionals in formulating interventions aimed at improving human rabies care, promoting greater patient safety, efficiency in the use of public resources, and progress in human rabies prevention efforts.

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