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RESEARCH

EPIDEMIOLOGICAL PROFILE OF HUMAN ANTIRABIC CARE IN A PLANNING AREA OF THE CITY OF *RIO DE JANEIRO*

PERFIL EPIDEMIOLÓGICO DO ATENDIMENTO ANTIRRÁBICO HUMANO EM UMA ÁREA DE PLANEJAMENTO DO MUNICÍPIO DO RIO DE JANEIRO

PERFIL EPIDEMIOLÓGICO DE LA ATENCIÓN ANTIRRÁBICA HUMANA EN UN ÁREA DE PLANIFICACIÓN DEL MUNICIPIO DE RÍO DE JANEIRO

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ABSTRACT

Rabies is considered a public health problem in Brazil and worldwide. Anti-rabies care is among the three most reported health problems in the country. **Objectives:** to describe and characterize the epidemiological profile of anti-rabies care in the city of *Rio de Janeiro*, in the program area 2.1, from 2010 to 2015. **Methodology:** a retrospective descriptive study of the records of human anti-rabies care inserted in the Notification Disease Information System of the municipality of Rio de Janeiro. For data selection, we used the TabWin 32 program. The organization and analysis were developed in Excel©. **Results:** 8,681 records were found, and 8,235 of them (94.9%) were seen for probable post-exposure to the rabies virus. In these 8,235 notifications, 70% were white, 56% female, with emphasis on the age group from 20 to 59 years old (54.7%). The main aggression was the bite (83.1%) in the hands/feet (41%), and the main aggressor was the dog (74.4%), and 72.3% of the cases indicated observation and vaccine. **Conclusion:** the epidemiological profile of anti-rabies care in program area 2.1 occurred in female white people with exposure type of the bite on hands and feet, with the dog as an aggressor. These data help to think about prevention strategies. The expansion of the services that perform anti-rabies care is important, especially linked to the Family Health Strategy. Broaden this service is at least a risk reducer for the occurrence of the disease, as it allows immediate basic care.

Keywords: Rabies; Rabies Vaccines; Epidemiological Monitoring; Primary Health Care; Public Health.

RESUMO

A raiva é considerada um problema de saúde pública no Brasil e no mundo. O atendimento antirrábico está entre os três agravos de maior notificação no país. ***Objetivos:*** *descrever e caracterizar o perfil epidemiológico do atendimento antirrábico no município do Rio de Janeiro, na área programática 2.1, no período de 2010 a 2015.* ***Metodologia:*** *estudo descritivo retrospectivo dos registros referentes aos atendimentos antirrábicos humanos inseridos no Sistema de Informação de Agravos de Notificação do município do Rio de Janeiro. Para a seleção dos dados utilizou-se o programa TabWin 32; a organização e análise foram desenvolvidas no Excel©.* ***Resultados:*** *foram encontrados 8.681 registros. Destes, 8.235 (94,9%) foram atendimentos por provável pós-exposição ao vírus rábico. Das 8.235 notificações, 70% eram brancas, 56% do sexo feminino, com destaque para a faixa etária de 20 a 59 anos (54,7%). A principal forma de agressão foi a mordedura (83,1%) em mãos/pés (41%), e o principal agressor os cães (74,4%), sendo indicadas em 72,3% dos casos observação e vacina.* ***Conclusão:*** *constatou-se que o perfil epidemiológico do atendimento antirrábico na área programática 2.1 ocorreu em pessoas brancas do sexo feminino com o tipo de exposição mordedura em mãos e pés, tendo como animal agressor o cão. Esses dados ajudam a pensar estratégias de prevenção. Torna-se importante a ampliação dos serviços que realizam o atendimento antirrábico, sobretudo vinculado à Estratégia de Saúde da Família. A capilarização desse atendimento é, no mínimo,*

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um redutor de risco para a ocorrência da doença, por permitir os cuidados básicos imediatos.

Palavras-chave: *Raiva; Vacinas Antirrábicas; Monitoramento Epidemiológico; Atenção Primária à Saúde; Saúde Pública.*

RESUMEN

La rabia se considera un problema de salud pública en Brasil y en todo el mundo. La atención antirrábica se encuentra entre los tres problemas de salud más notificados en el país. ***Objetivos:*** *describir y caracterizar el perfil epidemiológico de la atención antirrábica en el municipio de Río de Janeiro, en el área del programa 2.1, de 2010 a 2015.* ***Metodología:*** *estudio descriptivo retrospectivo de los registros relacionados con la atención antirrábica humana insertados en el Sistema de Enfermedades de Declaración Obligatoria del municipio de Río de Janeiro. Para la selección de datos utilizamos el programa TabWin 32; La organización y el análisis se desarrollaron en Excel©.* ***Resultados:*** *se encontraron 8.681 registros. De éstos, 8.235 (94,9%) fueron casos de probable exposición posterior al virus de la rabia. De las 8.235 notificaciones, el 70% eran de personas blancas, el 56% mujeres, con énfasis en el grupo de edad de 20 a 59 años (54,7%). La principal forma de agresión fue la mordedura (83,1%) en las manos / pies (41%), y el agresor principal fue el perro (74,4%), en el 72,3% de los casos se indicaron observación y vacunación.* ***Conclusión:*** *se encontró que el perfil epidemiológico de la atención antirrábica en el área del programa 2.1 se produjo en mujeres blancas con el tipo de exposición mordedura en manos y pies, provocadas por perros. Estos datos ayudan a pensar en estrategias de prevención. Es importante ampliar los servicios que brindan atención antirrábica, especialmente vinculados a la Estrategia de salud familiar. La capilarización de este servicio es al menos un reductor de riesgo de la enfermedad, ya que permite la atención básica inmediata.*

Palabras clave: *Rabia; Vacunas Antirrábicas; Monitoreo Epidemiológico; Atención Primaria de Salud; Salud Pública.*

INTRODUCTION

Human rabies is a zoonosis of viral etiology, which affects the central nervous system (CNS), and is characterized by rapid and lethal progressing encephalitis. The symptomatology is quite diverse, in which the patient may have the classic phobias of rabies (hydrophobia and aerophobia), the triad paresthesia, paresis and paralysis, Guillain-Barré syndrome, and other signs and symptoms. It has been considered a public health problem for a long time in Brazil and many parts of the world.[1]

The animal is the host, reservoir, and transmitter of the disease, and its transmission to human beings happens through biting, scratching, or licking. This transmission occurs when the rabies virus of the genus Lyssavirus present in the saliva of the infected animal penetrates the organism, multiplying at the inoculation site and reaching peripheral innervation, spreading to the central nervous system, reaching the brain and later reaching various salivary organs and glands, replicating and being eliminated in the saliva of infected people and animals.[2]

The National Rabies Prophylaxis Program (*Programa Nacional da Profilaxia da Raiva*) was created in 1973 to control rabies, by agreement of the Ministry of Health (MH), (*Ministério da Saúde*,BR), Ministry of Agriculture (*Ministério da Agricultura*, BR), Central Medication (*Central de Medicamentos*, BR) and the Pan American Health Organization/World Health Organization (PAHO/WHO). The objective was to promote systematic actions to combat human rabies through vaccination in domestic animals, prophylactic treatment of exposed people, epidemiological surveillance, laboratory diagnosis, animal population control, and health education.[3,4]

The structuring of a national rabies prophylaxis program, its expansion, and territorial improvement over the years have represented an important advance in reducing the number of cases of animal rabies, especially in dogs, but also in cases of human rabies. In the period from 1986 to 1993 (eight-year interval), Brazil recorded 443 cases of human rabies, an average of 55.4 cases per year. However, between 1994 and 2008 (15-year interval), almost twice as long the country recorded 317 cases, an average of 21.3 cases per year.[5]

Some of the epidemiological surveillance strategies commonly used nationwide for rabies prevention and control are: an investigation of all the suspected cases of human and animal rabies, and the determination of its source of infection and the active search for people under exposure; the determination of risk areas; animal rabies monitoring; performing vaccine blocks in areas with confirmed cases; canine and feline rabies vaccination campaigns; and, finally, carrying out educational activities on a continuous basis.[2]

Despite important advances, Brazil has not yet controlled animal viral circulation throughout the country, with endemic areas for the urban and rural cycles. Between 2011 and 2016, 5,448 cases of animal rabies were reported in Brazil, most of them in rural herbivores (4112/75.5%). However, 5.9% (321) were urban cycle animals, showing the still present vulnerability to animal rabies.[6]

Historically, the main risk factors for the spread of rabies in Brazil are: increased food supply (herd numbers); disordered occupation and environmental changes that lead bats to migrate to other areas searching for food; the provision of artificial shelters (tunnels, cisterns); and the poor performance in the implementation of state herbivore rabies control programs in some Brazilian states.[7]

In recent years, the vaccine that would be one of the main strategies to ensure the control of human and animal rabies through the states and municipalities has been weakened. More than 200 animals died throughout Brazil in 2010 following the application of the animal rabies vaccine, causing a strong impact on the credibility of national animal vaccination campaigns and the suspension of campaigns by the *Ministério da Saúde*(BR).[8,9] Problems with the production of the human rabies vaccine (HARV) and serum for human beings have also been common since 2015, according to the Informative Note from the General Coordination of the National Immunization Program (CGPNI) (*Coordenação Geral do Programa Nacional de Imunização*-CGPNI), whose content directed to the states

warned of reduced rabies vaccine distribution and production difficulties of human anti-rabies serum (HARS).[10]

The state of *Rio de Janeiro* (ERJ) is living a special situation as its HARS quota has been continuously reduced throughout 2016, a situation that has been aggravated by the reduction of HARV. Since August 2016, the state's vaccine quota has been reduced by almost 83% from 17,000 doses/month to 2,200 doses.[11] This also reinforces the fragility detected in the rabies surveillance program of the RJ state, as shown in some publications.[4]

The situation of the RJ state becomes even more worrying because of the decreasing animal vaccine coverage after 2010 and the significant increase in rabies cases of bats.[11] The impact of this scenario affects all the cities in the state, especially in the capital, whose animal population is relevant and the occurrence of bats diagnosed with rabies are common.[12,13]

Thus, the evaluation of the quality of rabies prophylaxis programs is essential to understand the profile of people involved in accidents with potentially virus-bearing animals, as well as which animals are involved and, especially, whether prophylactic therapy has been applied correctly. In times of immunobiological production crisis, ensuring high levels of efficiency in vaccine and serum prescribing is critical to mitigating the effects of low supply of this component.

In the city of *Rio de Janeiro*, human anti-rabies care was performed in first-aid centers until November 2016. They are specific units that centralized care in the program areas (PAs). Both care and vaccination were performed in these units, and those users who indicated serum were sent to the referral hospitals. Since November, the care has been decentralized to primary care units; however, vaccination remains centralized in a few units.

In this context, this study aims to describe the epidemiological profile of anti-rabies care in program area 2.1 (PA 2.1) of the city of Rio de Janeiro, from 2010 to 2015. Anti-rabies care one of the three problems with the highest number of notifications in the country, with over 500,000 notifications in the *Sistema de Informação de Agravos de Notificação* (SINAN) per year.[14]

This type of study allows the understanding of the profile of the patient victim of accidents with potentially rabies-transmitting animals living in the south of *Rio de Janeiro*, the characteristics of the accidents, and the behaviors and outcomes of the cases attended. Thus, developing intervention actions that may qualify the care, increasing the assertiveness of the behaviors, and developing preventive activities are possible, especially in an unfavorable environment regarding immunobiological production.

METHODOLOGY

It is a retrospective descriptive study of the records of human anti-rabies care after the exposure to accidents with animals potentially transmitting the rabies virus, inserted in SINAN of Rio de Janeiro.

For post-exposure prophylaxis treatment, the reports of individuals possibly exposed to the disease virus due to bite, mucosal licking or scratching caused by transmitting animals were considered, and whose necessarily treatment possibilities are the re-exposure scheme, the treatment dispensation, the animal observation, the observation + vaccine, the vaccine, and the serum + vaccine.

The specific target population was the residents of PA 2.1 that is an area including the neighborhoods of the southern part of the city: *Flamengo, Glória, Laranjeiras, Catete, Cosme Velho, Botafogo, Humaitá, Urca, Leme, Copacabana, Ipanema, Leblon, Lagoa, Jardim Botânico, Gávea, Vidigal, São Conrado*, and *Rocinha*. According to IBGE 2010 data, the population of the territory is 638,059 people. The time frame includes the period between 2010 and 2015.

Data selection in the municipal database was developed using the TabWin 32 program, and for data organization and analysis, Excel© was used. Statistical analysis used absolute and relative frequencies.[15] For profile analysis, ignored or blank data were not considered. Data selection by TabWin used the following selection filters: 1 – year of notification (2010 to 2015); 2 – municipality of residence (*Rio de Janeiro*), 3 – PA of residence (2.1) and 4 – indicated treatment (re-exposure scheme, treatment dispensation, animal observation, observation + vaccine, vaccine, and serum + vaccine).

The following variables were related to the characterization of the epidemiological profile of care: social (race/skin color, gender, education and age group); aggression (form of exposure to the virus, wound site, extent of wound and type of wound); aggressor animal (species of animal, condition of animal at the time of aggression, observation of the animal and final condition of the animal); treatment (type of prophylaxis indicated, history of previous treatment, discontinuation of prophylaxis, reason for discontinuation, and active search for the abandoned patient). Supporting analysis of the completeness of these variables was performed.

Ethics and Research Committee of the *Universidade Federal do Estado do Rio de Janeiro* and the *Secretaria Municipal de Saúde do Rio de Janeiro* approved this study in 2016, opinions 1,672,490 and 1,754,782, respectively.

RESULTS

There were 8,681 SINAN records of PA 2.1 residents within the proposed time frame. Of these records, 8,235 (94.9%) were assistance for probable post-exposure to the rabies virus, 361 (4.2%) calls for pre-exposure scheme and 85 (1%) ignored or blank. Therefore, 8,235 human anti-rabies visits after exposure to the rabies virus were part of the study.

The chronological distribution of the cases occurred as follows: 2010 – 986 cases; 2011 – 1,029 cases; 2012 – 1,336 cases; 2013 – 1,432 cases; 2014 – 1,651 cases and 2015 – 1,801 cases (Figure 1). Between 2010 and 2015, there was an increase of 82.2% in the number of registrations. Approximately 70% (5,677) of the attendances during this period were performed in primary care units of PA 2.1, and the remaining (2,558) were performed in units outside the territory of residence.

Figure 1 - Human anti-rabies visits in PA 2.1 residents of *Rio de Janeiro*, between 2010 and 2015.

Regarding the race/skin color of the aggressed individuals, this data was ignored in 2,283 (27.7%) notifications. Excluding these records, 70% (4,166) of the visits were in white individuals, 20.9% (1,244) in brown individuals, 8.4% (502) in black individuals, 0.4% (25) in yellow and 0.3 % (15) in indigenous (Table 1). Regarding their gender, only one record was ignored. Most of the individuals with some aggression were female (56.7%/4,668).

Table 1 - Distribution of cases of human anti-rabies care by post-exposure, according to race/skin color, gender, education level and age group – PA 2.1 of the city of *Rio de Janeiro* (RJ), 2010 to 2015

Variables	N	%
Race/skin color		
White	4166	70.0
Brown	1244	20.9
Black	502	8.4
Yellow	25	0.4
Indigenous	15	0.3
Total	**5952**	**100.0**
Gender		
Male	3566	43.3
Female	4668	56.7
Total	**8234**	**100.0**
Education level		
Complete Higher Education	1240	33.3

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Table 1 - Distribution of cases of human anti-rabies care by post-exposure, according to race/skin color, gender, education level and age group – PA 2.1 of the city of *Rio de Janeiro* (RJ), 2010 to 2015

Variables	N	%
Education level		
Complete high school	624	16.8
Incomplete 1st to 4th grade of Elementary school	427	11.5
Incomplete 5th to 8th grade Elementary School	421	11.3
Incomplete higher education	339	9.1
Incomplete high school	256	6.9
Complete elementary education	205	5.5
Complete 4th grade of Elementary school	177	4.8
Illiterate	31	0.8
Total	**3720**	**100.0**
Age group		
20-39	2347	28.5
40-59	2156	26.2
60 e +	1470	17.9
10-19	995	12.1
5-9	748	9.1
1-4	438	5.3
<1 Year old	79	1.0
Total	**8233**	**100.0**

The most frequent exposure to the virus was the bite, present in 83.1% (7,439) of the records. Then, there was the scratching, recorded in 15.2% (1,363) of cases; licking at 0.8% (69); indirect contact in 0.4% (37); and other forms by 0.5% (49) (Table 2). The most prevalent place of the injury was the hands/feet, with 41% (3,765) of the reports, followed by lower limbs (25,9%/2,381), upper limbs (16,9%/1,557), head/neck (10%/917), trunk (3.8%/350) and mucosa (2.4%/221). Regarding the number of injuries caused by the aggression, 1.3% (104) of the records ignored it, and 0.4% (30) of the records were in blank. In reports with injury records, 51.7% (4,190) were single injuries, and 48.3 (3,911) were multiple injuries. Regarding the type of injury, 80.2% (6,619) were deep, 17.6% (1,454) superficial and 2.2% (182) lacerating.

Among the species of aggressor animals, 74.4% (6,123) were canines, 21.7% (1,787) were felines, 1.4% (113) were chiropractors, 1.1% (87) were primates, 0.2% (14) were herbivores and 1.3% (111) were other animals (Table 3). In the consultations with the animal condition evaluated, 76% (6,136) were healthy, 7.9% (634) were suspects, 16.1% (1,296) were dead/missed and 0.04% (3) had rabies. In the three cases with animal evaluation as rabid, one was of the canine species, one was a bat, and one was of another species.

Table 2 - Distribution of cases of human anti-rabies care by post-exposure, by type of exposure, place of exposure, amount of injuries and type of injury – PA 2.1 of *Rio de Janeiro* (RJ), 2010 to 2015

Variables	N	%
Type of exposure		
Bite	7439	83.1
Scratch	1363	15.2
Licking	69	0.8
Indirect contact	37	0.4
Other	49	0.5
Total	**8957***	**100.0**
Place of exposure		
Hands/feet	3765	41.0
Lower Limbs	2381	25.9
Upper Limbs	1557	16.9
Head/Neck	917	10.0
Trunk	350	3.8
Mucosa	221	2.4
Total	**9191***	**100.0**
Quantity of injuries		
Single	4190	51.7
Multiple	3911	48.3
Total	**8101**	**100.0**
Type of injury		
Deep	6619	80.2
Superficial	1454	17.6
Lacerating	182	2.2
Total	**8255***	**100.0**

* Total greater than several people treated due to multiple injuries.

Tabela 3 - Distribution of cases of human anti-rabies care by post-exposure, according to the aggressor animal, the animal condition, the possibility of observation (dogs and cats) and the final condition of the animal – PA 2.1 of *Rio de Janeiro* (RJ), 2010 to 2015

Variables	N	%
Aggressor animal		
Canine	6123	74.4
Feline	1787	21.7
Chiropteran (bat)	113	1.4
Primate (monkey)	87	1.1
Domestic Herbivore	14	0.2
Other	111	1.3
Total	**8235**	**100.0**
Animal condition		
Healthy	6136	76.0
Suspect	634	7.9

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Tabela 3 - Distribution of cases of human anti-rabies care by post-exposure, according to the aggressor animal, the animal condition, the possibility of observation (dogs and cats) and the final condition of the animal – PA 2.1 of *Rio de Janeiro* (RJ), 2010 to 2015

Variables	N	%
Animal condition		
Rabid	3	0.04
Dead/Missed	1296	16.1
Total	**8069**	**100.0**
Possibility of observation (dogs and cats)		
Yes	6113	91.5
No	567	8.5
Total	**6680**	**100.0**
Final condition of the animal		
Negative clinical rabies	5024	98.9
Negative laboratory rabies	39	0.8
Dead/Missed	19	0.4
Total	**5082**	**100.0**

In the assistance of cases causes by dogs and cats – which should be evaluated for the possibility of follow-up – 15.5% (1,230) had no response regarding the possibility of observation for ten days, as directed by the Health Surveillance Guide (*Guia de Vigilância em Saúde*)[2]. In the assistance with answers, 91.5%/6,113 reported that the animals involved in the aggression were under observation. Regarding the observed animals, there was no answer to the final condition after the surveillance period in 1,031 (16.9%) of the cases. In those cases with records, 99.7% (5,063) were negative for rabies (clinical and laboratory criteria), and 0.4% (19) were dead or missed.

In the indication of therapeutic behavior, 72.3% (5,957) of the consultations had indication of "observation + vaccine", 16.1% (1,323) had "serum + vaccine", 7.7% (632) only "vaccine", 2.2% (180) "animal observation", 1.2% (99) "re-exposure regimen" and 0.5% (44) had no treatment (Table 4). Approximately 12% (998) of the users attended had already had a previous HARV therapeutic regimen, in which 151 in pre-exposure regimens and 847 in post-exposure regimens. Among the 847 cases of exposure to HARV before the treatment for post-exposure to the rabies virus, only 687 had a record of the period of previous treatment: 91.6% (629) had occurred more than 90 days ago (Table 4).

Only 6.5% (536) of the cases had no such response recorded in the completion of treatment (if treatment was discontinued). Among the registered cases, the treatment was discontinued in 24.2% (1,861) of cases, and 75.8% (5,838) continued the treatment until the end. Regarding the reasons for interruption, 89.3% (1,662) were due to treatment abandonment, 10.5% (195) indicated the health unit, and 0.2% (4) due to the transfer of the

unit. In those who dropped out, 89.5% (1,373) were sought by the health unit for continued treatment.

Table 4 - Distribution of cases of human anti-rabies care by post-exposure, by treatment indicated, history of post-exposure treatment, history of pre-exposure treatment, previous treatment completion, treatment discontinuation and reason for discontinuation, active unit search – PA 2.1 of the municipality of *Rio de Janeiro* (RJ), 2010 to 2015

Variables	N	%
Treatment indicated		
Observation + vaccine	5957	72.3
Serum + Vaccine	1323	16.1
Vaccine	632	7.7
Observation of the animal (whether dog or cat)	180	2.2
Re-exposure Scheme	99	1.2
Treatment abandonment	44	0.5
Total	**8235**	**100.0**
History of post-exposure treatment		
Yes	847	12.9
No	5713	87.1
Total	**6560**	**100.0**
History of pre-exposure treatment		
Yes	151	2.3
No	6425	97.7
Total	**6576**	**100.0**
Previous treatment completion		
Up to 90 days	58	8.4
After 90 days	629	91.6
Total	**687**	**100.0**
Treatment Discontinuation		
Yes	1861	24.2
No	5838	75.8
Total	**7699**	**100.0**
Reasons for discontinuation		
Indicated by the unit	195	10.5
Abandon	1662	89.3
Transference	4	0.2
Total	**1861**	**100.0**
Active unit search		
Yes	1373	89.5
No	161	10.5
Total	**1534**	**100.0**

DISCUSSION

The results showed that the profile of human anti-rabies care in the planning area 2.1 of the city of Rio de Janeiro has a progressive increase in the number of care given to white women. The main exposure was the bite, in the hands and feet, with single and deep injuries. The dog was the main aggressor, and most of them were healthy. The most observed therapeutic approach was observation + vaccine and the completion of the treatment, most of them continued treatment until the end.

Until 2010, PA 2.1 had two units that provided anti-rabies care. In 2013, two new units started to offer this type of service, and in 2014 the area gained one more unit. This expansion of service locations expanding reception in the territory may have contributed to the increase in the number of services. However, it is not possible to rule out the interference of environmental factors for this increase in demand, such as the increase in the number of abandoned animals on the streets. In any case, the greater the access, the greater the possibility of receiving people who are victims of accidents with potentially rabies virus-transmitting animals, as well as making post-exposure treatments more accessible.[16]

Regarding data quality, one of the indicators used to evaluate database performance is the level of the incompleteness of the fields, that is, the frequency the information is no longer filled in the information capture instrument.[17] In this sense, the two fields or variables with the highest rates of incompleteness were the race/skin color and education of the notified individuals. These are variables traditionally recognized by the high rate of non-filling or filling as ignored in health information systems, especially in SINAN, as observed in several studies.[18,19]

Although at lower frequencies, other variables also presented a high level of incompleteness (between 15 and 20% of notifications), which were directly related to the type of aggression: a history of pre-exposure treatment, history of post-exposure treatment, possibility of animal observation and final condition of the animal. This information is critical for treatment management, defining not only the number of vaccine doses to be administered but also the use or not of HARS.

The findings on race/skin color of the users attended are similar to the study applied in *Porto Alegre* in 2006 and *Pernambuco* in 2007, in which most users were white, followed in smaller proportions by individuals of brown and black color.[16,20]

Unlike several other studies[14,20,21], the gender of the users assisted had females as the highest number of records. As these studies referred to municipal populations from different states, including rural areas, unlike the sample of residents of PA 2.1 exclusively having residents of urban areas, this may be the justification for this difference, since most of the workers/residents of rural areas are male citizens.

The fact that most injuries records were in the hands/feet and head/neck, deep and lacerating, most accidents are serious, requiring at least two doses of the vaccine, as well as the follow-up of animals for observation. Several studies reported the bite as the most common type of exposure to the rabies virus,

as it is an animal defense mechanism. Regarding the attack region, although the classification of hands and feet as a single category hinders to define the region of the most affected anatomical longitudinal axis, some studies showed that the lower limbs are the most affected because they are at the same height as the animal attack line.[14] Recategorization of hands and feet separately would promote a better knowledge of this information, although from the pathophysiological point of view both sites present the same risk of virus neurotropism.

Historically, both rabies transmission and prophylactic care for rabies have been mostly caused by canine accidents, a trend also reported in PA 2.1 residents.[10] The records of the three assistance with rabid aggressors occurred in 2012 (01 chiropterans) and 2014 (one canine and one of another unidentified species); however, animal rabies records in the municipality of *Rio de Janeiro* in 2012 did not report cases in bats[22] and 2014, there were only records of rabies in herbivores in the state of Rio de Janeiro.[23]

In areas with low risk for rabies transmission such as in *Rio de Janeiro*, animal observation is a fundamental strategy for the definition of prophylactic behavior, allowing the rationalization of the use of immunobiological since there is no precedent for rabies transmission in animals that have been survived ten days of observation.[24] In this sense, the high percentage of animals observed in accidents involving residents of PA 2.1 allows this better definition of behavior, especially since most of the animals observed survived after the 10th day of surveillance. This is the main reason why more than 72% of cases have "observation + vaccine" treatment behavior, performance far superior to the 50.4% found nationwide.[14] Although 847 cases had previous post-exposure treatment, only 99 cases were treated as a "re-exposure scheme," highlighting the need for technical clarification in the care units.

Approximately one-quarter of the sample in this study discontinued their treatment, most of them due to abandonment, an extremely high performance compared to the national frequency.[14] However, the technical evaluation of the profile of these abandonments is fundamental. A study conducted in *Porto Alegre* with a sample of 280 individuals who reported that they had abandoned treatment at SINAN showed that only 33.6% of this sample had in fact abandoned the prescribed therapeutic approach. Most of the study participants had completed the scheme in a different health facility from the one in which they first received care; however, this information was not used to close the case, being considered as treatment abandonment.[16]

FINAL CONSIDERATIONS

From the profile in this study, although rabies is under control and there are no human cases in the state of *Rio de Janeiro* during the study period, the disease is a latent concern for the local public health system by being transmitted by social animals with high population density; by the fall in animal vaccination coverage, which ends up making this population more vulnerable; and by identifying bats infected with rabies virus in the city.

Thus, we can highlight some important points for the maintenance of rabies control, such as health education, the technical qualification of professionals who provide care, intensification of health surveillance actions, and action on risk factors for the spread of the virus.

Finally, we suggest to act on risk factors for the spread of rabies, to control the population of street animals, to act on artificial shelters that favor the occupation of bats and the maintenance of the urban forests that are their habitat and, also we hope the execution of the state rabies control program to be effective.

The limitations in the study are related to the lack of completeness of all notification fields, as well as the analysis in only one PA of the city of RJ, which may also be a potentiality for further studies.

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