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POPULAR HEALTH EDUCATION AND PERCEPTIONS ABOUT RABIES VACCINATION: CONNECTIONS BETWEEN GUARDIANS, ZOONOSES, AND ONE HEALTH IN THE MUNICIPALITY OF SEROPÉDICA/RJ

EDUCAÇÃO POPULAR EM SAÚDE E PERCEPÇÃO SOBRE A VACINAÇÃO ANTIRRÁBICA: CONEXÕES ENTRE TUTORES, ZOONOSES E SAÚDE ÚNICA NO MUNICÍPIO DE SEROPÉDICA/RJ

EDUCACIÓN SANITARIA POPULAR Y PERCEPCIONES SOBRE LA VACUNACIÓN ANTIRRÁBICA: CONEXIONES ENTRE LOS GUARDIANES, LAS ZOONOSIS Y EL ENFOQUE UNA SOLA SALUD EN EL MUNICIPIO DE SEROPÉDICA/RJ

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ABSTRACT

Zoonoses represent approximately 60% of human infectious diseases and 75% of emerging diseases, highlighting their importance for One Health. This study analyzed pet owners' perceptions of zoonoses, animal health care, and the importance of rabies vaccination during the "D-Day" vaccination campaign in Seropédica, RJ. 284 structured questionnaires were administered to dog and cat owners at 14 vaccination points in the municipality. The majority (70.1%) reported vaccinating their animals annually, and 82.7% recognized the importance of immunization for public health. However, 30.3% were unaware of the modes of rabies transmission, and 64.4% could not name other zoonoses. The cost of vaccination and difficult access to services were the main obstacles reported. The results show that, although awareness of the importance of vaccination is high, knowledge gaps and socioeconomic

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Revista ARACÊ
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inequalities persist, limiting adherence to preventive practices. It is concluded that popular health education, combined with accessible and continuous communication strategies, is essential to expand vaccination coverage and strengthen the control of rabies and other zoonoses in urban and peri-urban contexts.

Keywords: Rabies. Animal Health. Human Health. Health Education.

RESUMO

As zoonoses representam cerca de 60% das doenças infecciosas humanas e 75% das enfermidades emergentes, evidenciando sua importância para a Saúde Única. Este estudo analisou a percepção de tutores sobre zoonoses, cuidados com a saúde animal e importância da vacinação antirrábica durante o “Dia D” de vacinação em Seropédica, RJ. Foram aplicados 284 questionários estruturados a tutores de cães e gatos em 14 pontos de vacinação do município. A maioria (70,1%) relatou vacinar anualmente seus animais e 82,7% reconheceram a importância da imunização para a saúde pública. Entretanto, 30,3% desconheciam as formas de transmissão da raiva e 64,4% não souberam citar outras zoonoses. O custo da vacinação e o difícil acesso aos serviços foram os principais entraves relatados. Os resultados evidenciam que, embora a conscientização sobre a importância da vacina seja elevada, persistem lacunas de conhecimento e desigualdades socioeconômicas que limitam a adesão às práticas preventivas. Conclui-se que a educação popular em saúde, associada a estratégias de comunicação acessíveis e continuadas, é essencial para ampliar a cobertura vacinal e fortalecer o controle da raiva e de outras zoonoses em contextos urbanos e periurbanos.

Palavras-chave: Raiva. Saúde Animal. Saúde Humana. Educação em Saúde.

RESUMEN

Las zoonosis representan aproximadamente el 60% de las enfermedades infecciosas humanas y el 75% de las enfermedades emergentes, lo que subraya su importancia para el enfoque de Una Salud. Este estudio analizó las percepciones de los dueños de mascotas sobre las zoonosis, el cuidado de la salud animal y la importancia de la vacunación antirrábica durante la campaña de vacunación del "Día D" en Seropédica, RJ. Se aplicaron 284 cuestionarios estructurados a dueños de perros y gatos en 14 puntos de vacunación del municipio. La mayoría (70,1%) reportó vacunar a sus animales anualmente, y el 82,7% reconoció la importancia de la inmunización para la salud pública. Sin embargo, el 30,3% desconocía las vías de transmisión de la rabia, y el 64,4% no pudo mencionar otras zoonosis. El costo de la vacunación y el difícil acceso a los servicios fueron los principales obstáculos reportados. Los resultados muestran que, si bien existe un alto grado de concientización sobre la importancia de la vacunación, persisten brechas de conocimiento y desigualdades socioeconómicas que limitan la adherencia a las prácticas preventivas. Se concluye que la educación sanitaria popular, combinada con estrategias de comunicación accesibles y continuas, es esencial para ampliar la cobertura de vacunación y fortalecer el control de la rabia y otras zoonosis en contextos urbanos y periurbanos.

Palabras clave: Rabia. Salud Animal. Salud Humana. Educación para la Salud.

Revista ARACÊ
ISSN: 2358-2472

1 INTRODUCTION

According to the World Health Organization (WHO, 2020), zoonoses are diseases or infections that are naturally transmissible from vertebrate animals to humans. Historically, the close coexistence between humans and animals has proven to be a striking characteristic, providing mutual benefits. However, this proximity imposes responsibilities, especially when we talk about zoonoses. Nearly two-thirds of pathogens that cause disease in humans are known to be of animal origin, which poses a significant public health concern as they can cause serious illness and even death; in addition to also imposing a relevant economic burden on society (Munyendo et al., 2023).

In this scenario, Popular Health Education (EPS) plays a fundamental role, by providing information that favors care and safety in living with animals, contributing to the reduction of infections (Morais, 2023). According to Paulo Freire, the EPS seeks to recognize and face health problems through dialogue with the popular classes, respect for different cultures and recognition of the diversity of knowledge. In this way, popular education seeks to strengthen care, recognizing traditional practices and mediating between popular knowledge and technical-scientific knowledge (EPSJV/Fiocruz, 2018).

It is known that approximately 60% of human infectious diseases originate in animals. In addition, it is estimated that 75% of emerging infectious diseases are also of animal origin (WHO, 2022). Companion animals are of great importance in this context due to the advantages that their interaction with humans can offer, however they also represent a transmission link for various zoonoses, especially when sanitary and infrastructure conditions are precarious (Gamble et al., 2023).

Among the most important zoonoses in Brazil, rabies stands out, a viral disease widely known for its high lethality rate, constituting one of the greatest challenges to global public health, transmitted through contact with infected saliva, usually by bites, licks, or scratches from carrier animals (Cruz Junior et al., 2024). With a fatal prognosis in almost 100% of cases, it represents a serious public health problem. Being an infectious-contagious disease, it predominantly affects domestic and wild mammals and its main characteristic is the impairment of the Central Nervous System (CNS) in the form of encephalitis (Babboni et al., 2011).

Between the years 2000 and January 2025, the profile of human rabies in the country changed significantly. Cases of rabies transmitted by dogs, known as the urban cycle of the disease, have been drastically reduced thanks to canine rabies control campaigns and

Revista ARACÊ
ISSN: 2358-2472

adequate anti-rabies prophylaxis for the population. However, despite advances in the control of rabies transmitted by dogs, Brazil faces new challenges, with the increase in cases of human rabies caused by variants of the rabies virus in wild animals, especially bats (Brasil, 2024).

In this context, this study aimed to analyze the perception of tutors about the knowledge of zoonoses, the health care of their animals and the importance of vaccination, focusing on the understanding of the practices adopted in the municipality of Seropédica, RJ. As specific objectives, we sought to identify the level of information of tutors about zoonoses and to evaluate the understanding of the relevance of rabies vaccination.

2 METHODOLOGY

The present work involved a field research with emphasis on the perception of zoonoses and public health that used a questionnaire as a data collection instrument, applied to residents of the municipality of Seropédica, Rio de Janeiro, who participated in the D-Day of rabies vaccination of dogs and cats.

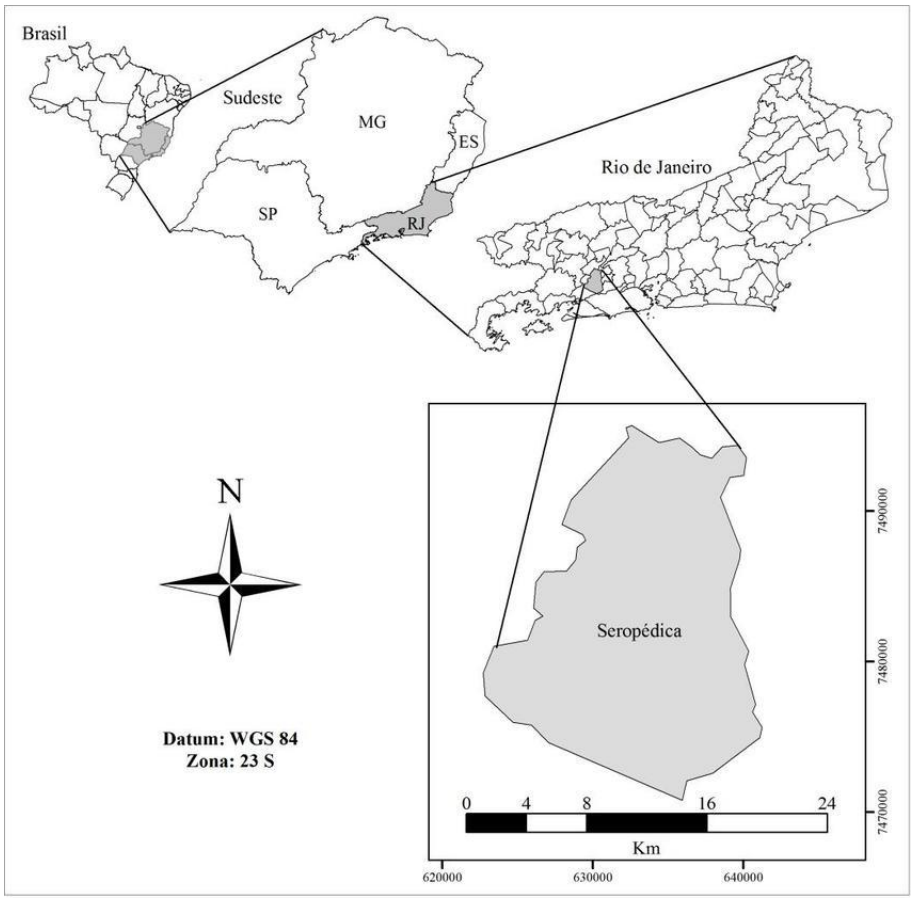
2.1 STUDY LOCATION

The study took place in the municipality of Seropédica (Figure 1), and it is one of the 13 municipalities belonging to the Baixada Fluminense of the state of Rio de Janeiro. The region has 80,569 people, according to the last census carried out by the Brazilian Institute of Geography and Statistics (IBGE, 2022), with a population density of 303.92 inhabitants per square kilometer and an average salary of formal workers of 3.6 minimum wages. The study was chosen due to its proximity to the Federal Rural University of Rio de Janeiro and due to the high number of dogs and cats with their owners.

Revista ARACÊ
ISSN: 2358-2472

Figure 1

Geographical location of the municipality of Seropédica, Rio de Janeiro, Brazil



Source: Santos, 2015.

2.2 SELECTION OF PARTICIPANTS

The research was conducted by undergraduate students participating in the Tutorial Education Program - Veterinary Medicine and other volunteer students of the campaign, who were previously trained by the advising professor. The approach of the tutors participating in the research took place randomly at 14 vaccination points distributed throughout the municipality of Seropédica during the D-Day of the anti-rabies vaccination campaign for dogs and cats, held on October 19, 2024. These points were located in several neighborhoods of different social classes in the municipality. The inclusion criterion for participation in the research was to be the guardian/guardian of the animal at the time of vaccination and to be over 18 years of age.

Revista ARACÊ
ISSN: 2358-2472

2.3 ETHICS COMMITTEE

The study did not require approval from the Ethics Committee on the Use of Animals (CEUA), as it did not involve any type of use or experimentation with animals. All stages were conducted in accordance with ethical guidelines, preserving privacy and ensuring the free and informed consent of the participants. The participation of the guardians/guardians of the animals occurred completely voluntarily, without any type of coercion to answer the questionnaire. Participants were informed about the purpose of the study, the use of the data collected, and their rights in relation to the research. During the interview process, the tutors were given a copy of the Informed Consent Form regarding the research.

2.4 DATA COLLECTION INSTRUMENT

The data collection instrument used in this research was an epidemiological questionnaire. The questionnaires contained 15 open and closed questions, starting with socioeconomic characteristics, in which questions were asked about the individual's gender, age, race, education and monthly income; Next, the information was related to their pets, including the number of animals, frequency of vaccination of their animals, perception of the importance of vaccination, frequency of consultations by the veterinarian, knowledge about necessary vaccines, difficulties encountered in carrying out vaccination, knowledge about some names of zoonoses and specific knowledge about rabies transmission.

Data collection took place in person using the online platform *Google Forms* to optimize efficiency in the collection of responses.

2.5 DATA ANALYSIS

The main objective of the research was to assess the level of knowledge of the population about the transmission and importance of rabies prevention. In addition, social groups were analyzed according to the level of income and education of the participants. The data were organized in tables using Microsoft *Excel software* and the descriptive analysis was performed using quantitative and qualitative methods.

3 FINDINGS

A total of 284 forms applied to tutors present on the D-Day of rabies vaccination in Seropédica-RJ were analyzed. In the sociodemographic profile, the most prevalent age group was 40 to 49 years (27.5%; 78/284), followed by 50 to 59 years (18.3%; 52/284), 18

Revista ARACÊ
ISSN: 2358-2472

to 29 years (17.6%; 50/284), 30 to 39 years (15.8%; 45/284), 60 years or older (16.2%; 46/284) and less than 18 years (4.6%; 13/284). Regarding gender identity, 54.6% (155/284) identified themselves as cis women, 42.6% (121/284) as cis men, 0.4% (1/284) as trans men, 1.4% (4/284) as trans women, and 1.1% (3/284) preferred not to declare. In the ethnic-racial self-declaration, 40.1% (114/284) identified themselves as brown, 36.3% (103/284) as white, 21.5% (61/284) as black, 1.1% (3/284) as yellow and 1.1% (3/284) as indigenous. Regarding education, complete secondary education (38.7%; 110/284) prevailed, followed by complete higher education (16.9%; 48/284), incomplete primary education (18.0%; 51/284), incomplete higher education (10.9%; 31/284), incomplete secondary education (10.6%; 30/284) and complete primary education (4.9%; 14/284). Family income was mainly concentrated in 1 to 3 minimum wages (46.8%; 133/284), followed by up to 1 minimum wage (31.0%; 88/284), 3 to 5 minimum wages (14.1%; 40/284), 5 to 10 minimum wages (5.3%; 15/284) and above 10 minimum wages (2.8%; 8/284).

Regarding the ownership and handling of animals, 93.7% (266/284) of the owners reported owning dogs, 31.3% (89/284) cats, 1.1% (3/284) cattle, 0.4% (1/284) pigs, 0.4% (1/284) horses and 14.1% (40/284) other animals. Regarding the number of animals per household, 49.3% (140/284) reported owning 2 to 4 animals, 32.7% (93/284) only one and 18.0% (51/284) five or more. Regarding the frequency of vaccination, 70.1% (199/284) stated that they vaccinate annually, 18.0% (51/284) only when recommended by a veterinarian, 9.9% (28/284) vaccinated for the first time and 2.1% (6/284) did not know how to answer.

Regarding the perception of vaccination, the majority (88.4%; 251/284) considered the act important, while 5.3% (15/284) answered "no" and 6.3% (18/284) "maybe". When asked about seeking veterinary advice, 44.7% (127/284) stated that they always consult, 30.6% (87/284) sometimes and 24.6% (70/284) never. Regarding the relevance of animal vaccination for public health, 82.7% (235/284) classified it as "very important", 16.2% (46/284) as "important", 0.4% (1/284) as "not very important" and 0.7% (2/284) as "not important". Regarding health problems that could have been avoided by vaccination, 19.4% (55/284) said they had already experienced this situation, while 75.4% (214/284) answered "no" and 5.3% (15/284) "I don't know".

Regarding knowledge, 25.7% (73/284) said they did not know the vaccines recommended for animals, 20.8% (59/284) said they knew all of them and 53.5% (152/284) only some. Among the factors of difficulty for vaccination, the high cost (28.9%; 82/284), the

Revista ARACÊ
ISSN: 2358-2472

difficulty of access to the service (19.7%; 56/284), lack of information (14.8%; 42/284) and the understanding that vaccination is not necessary (6.3%; 18/284) stood out. Other reasons included lack of time (2.8%; 8/284), animal reactivity (1.1%; 3/284), in addition to 18.3% (52/284) who reported more than one factor and 8.1% (23/284) who said they had no difficulties.

Regarding the transmission of rabies, 57.4% (163/284) of the interviewees stated that they knew the form of transmission, 30.3% (86/284) said they did not know and 12.3% (35/284) answered "maybe". With regard to knowledge about other zoonoses, 64.4% (183/284) stated that they did not know any, while 35.6% (101/284) mentioned at least one. Among the answer options on zoonoses, the most cited were: sporotrichosis (31.7%; 20/63), scabies (20.6%; 13/63), leishmaniasis (15.8%; 10/63), leptospirosis (11.1%; 7/63), toxoplasmosis (4.8%; 3/63), rabies (4.8%; 3/63) and brucellosis (3.2%; 2/63). Monkeypox, spotted fever, salmonellosis, avian influenza and heartworm were also mentioned less frequently (1.6%; 1/63). In addition, 19 diseases mentioned were not characterized as zoonoses.

4 DISCUSSION

Rabies is a severe viral zoonosis, almost always fatal, caused by a virus of the genus *Lyssavirus*, belonging to the *Rhabdoviridae* family. It has a lethality close to 100%, and is considered one of the most lethal infectious diseases known. The Veterinary Medicine Tutorial Education Program - MEC/FNDE develops a project to support rabies vaccination that aims to contribute to the promotion of animal and human health, through prevention. This project works in partnership with public health agencies, ensuring wide vaccination coverage, reaching tutors who sometimes do not have the financial conditions to access private veterinary clinics, which is one of the points raised in the questionnaire.

In the present study, most of the households in the region of Seropédica/RJ had a predominance of dogs (93.7%). According to the 2024 Instituto Pet Brasil yearbook (IPB, 2024), dogs make up the majority of the pet population in the country with 62.2 million individuals, followed by ornamental birds with 42.8 million and cats with 30.8 million. Such data indicate that in the municipality, for a long time considered a rural region, there is a growing process of urbanization, a fact exposed by the greater preference in households for the raising of small animals, such as dogs and cats, than large animals, which corroborates with the statistics of the IPB, highlighting the greater population adherence for animals that

Revista ARACÊ
ISSN: 2358-2472

are easy to maintain and simple to handle. The presence of households with animals such as cattle and horses characterizes the rural areas in the municipality, which is probably related to sociocultural or subsistence factors that still influence the behavior of residents.

Socioeconomic and demographic variables, such as per capita income, age group and level of education of the tutors, were directly related to the frequency of participation in vaccination campaigns in terms of the degree of knowledge about the health of their animals and the diseases that can affect them. These factors also influence the understanding of the importance of preventive practices. Rhode and Wagner (2025) highlighted that the higher the education and per capita income of the head of household, and the higher the age group, the greater the chance of animals being vaccinated against rabies. Furthermore, the authors emphasized that there is a need for public policies to expand knowledge about the disease and rabies vaccination for pets in Brazil, especially in population groups with lower income and schooling.

The analysis of the data demonstrates a significant relationship between the socioeconomic condition of the interviewees and the adherence to vaccination of their animals. The high cost was pointed out as the main barrier by 28.9% of the participants, which is directly related to the economic profile observed: 46.8% of the families have a monthly income between 1 and 3 minimum wages and 31% live on up to 1 minimum wage. Similar results were observed by Oliveira et al., (2023), who identified a direct association between socioeconomic conditions and rabies vaccination of dogs and cats in Brazil. In the study, families with higher income were almost twice as likely to keep all animals vaccinated compared to those with lower purchasing power, showing that financial limitations significantly interfere with adherence to the vaccination protocol.

In addition to cost, the difficulty of access to the service was reported by 19.7% of the interviewees, indicating that, in addition to the economic barriers, there are structural challenges related to the availability and location of veterinary services. This situation is similar to that observed by Meneses Júnior et al., (2024), who, when analyzing the epidemiological profile of rabies in the state of Ceará between 2005 and 2023, highlighted that the occurrence of human cases is still higher in urban and peri-urban areas with insufficient vaccination coverage and less access to vaccination centers. The authors pointed out that the difficulty of travel and the lack of information about immunization campaigns contribute to the persistence of outbreaks of the disease, reinforcing the importance of decentralized and continuous prevention actions.

Revista ARACÊ
ISSN: 2358-2472

The results also show a relevant association between the level of education of the participants and the degree of knowledge about rabies and other zoonoses. It was observed that 38.7% had completed high school and 10.6% had not completed higher education, while only 16.9% had completed higher education. This relationship was also described by Oliveira et al., (2023), who found that individuals with 12 or more years of schooling were 2.4 times more likely to vaccinate all animals in the household compared to those with up to 8 years of schooling. In a convergent way, Meneses Júnior et al., (2024) observed that all human cases of rabies recorded in Ceará between 2005 and 2021 occurred in individuals with low education, which demonstrates the influence of knowledge about preventive practices and adherence to vaccination.

The analysis of knowledge about rabies transmission and other zoonoses suggests that, despite the high rate of awareness about the importance of vaccination, there is still a gap in understanding about the transmission mechanisms of these diseases, with 30.3% of respondents unaware of the form of rabies transmission. This data highlights the need to expand educational actions, aiming to remedy misinformation about zoonotic diseases and reinforce the relevance of preventive practices, such as vaccination and animal population control. In a scenario of increasing urbanization and expansion of zoonoses, the implementation of public health strategies that integrate education, accessibility, and equity become crucial for the effective control of these diseases.

The perception of the tutors about the importance of vaccination was high, demonstrating a good awareness of the population about immunization not only for animal protection, but also of their families and the community, since they recognize the relevance of the rabies vaccine. The results obtained from the present study corroborate and expand the findings of Dutra et al., (2024), who evaluated the same municipality during the 2023 campaign. Both show high adherence of owners to vaccination, but also reveal persistent gaps in knowledge about zoonoses and limitations in access to veterinary health information and services. The comparison between the two periods suggests that, although the perception of the importance of the vaccine remains positive, the absence of continued educational strategies prevents significant advances in awareness of other diseases of zoonotic relevance. These findings reinforce the need to incorporate permanent health education actions into vaccination campaigns, promoting dialogic and participatory communication with communities, as recommended by Zinsstag et al., (2011) and updated by Brown et al., (2024) and Xiao-Nong et al., (2025) in the One Health approach.

Revista ARACÊ
ISSN: 2358-2472

The survey showed that 70.1% of the participants vaccinate their animals once a year, a fact that may be related to the public policies of anti-rabies vaccination campaigns developed in the municipality. The Ministry of Health (Brasil, 2024), through the National Rabies Prophylaxis Program (PNPR) created in 1973, carries out mass rabies vaccination of dogs and cats, which corroborates the decrease in cases of urban rabies in the country, which reduced from 1200 cases to 8 in the period from 1999 to 2024. This significant reduction reinforces the impact of continuous campaigns and the population's adherence to immunization. Corroborating this panorama, Rysava et al., (2020) highlighted that mass vaccination of dogs and cats constitutes the central and most effective strategy to eliminate dog-mediated rabies and prevent associated human deaths.

Approximately 45% of the animal owners said they seek veterinary advice prior to vaccination, which contributes to greater guidance on the diseases. However, both Dutra et al., (2024) and the present study indicate that socioeconomic and structural barriers, such as travel difficulty and indirect costs, still limit the reach of campaigns, in line with global observations on the inequities in rabies control described by Swedberg et al., (2024). In this context, it is essential to integrate veterinary and human surveillance actions under the One Health approach, articulating biological, environmental and social dimensions of prevention (Karesh et al., 2012).

In addition, a better socioeconomic condition directly influences the number of animals per household, the presence of semi-domiciled animals, and the practice of castration (Oliveira et al., 2023). In Seropédica-RJ, most of the tutors who participated in the survey have a family income between 1 and 3 minimum wages, which may explain the greater number of animals per household, with 49.3% of the participants having 2 to 4 animals. This socioeconomic profile is also reflected in the adoption of preventive practices, such as vaccination and castration, since high costs and difficulties in accessing veterinary services are significant barriers for many owners.

According to the Ministry of Health (Brasil, 2025), the annual vaccination of dogs and cats is the most effective way to prevent rabies in domestic animals and humans, contributing to the eradication of the urban rabies cycle. In addition, it also contributes to a greater general awareness of the population about the importance that vaccination has in boosting Public Health, since there is a good adherence of tutors to the campaigns year after year. The continuity of local studies, such as those carried out in Seropédica, contributes to the monitoring of temporal trends, the evaluation of municipal public policies and the

Revista ARACÊ
ISSN: 2358-2472

strengthening of university extension as an instrument of education, surveillance and social transformation.

5 CONCLUSION

Rabies vaccination plays an essential role in the promotion of public and animal health, and is widely recognized as a practice of great importance by most of the tutors interviewed. However, socioeconomic factors, such as low income and difficulty in accessing veterinary services, were shown to be determinants for lower adherence to preventive measures, also impacting contact with professional guidance. The results show that, although there is a favorable perception of vaccination, there are still gaps in the knowledge of rabies transmission and other zoonoses, which reinforces the need to expand educational strategies, especially Popular Health Education, which reaches the entire population. In addition, the relationship between schooling and understanding of risks highlights the relevance of integrated programs that associate health education, accessibility, and equity in veterinary care.

The analysis reinforces the importance of public campaigns as the main prevention tool, especially in economically vulnerable regions, and points to the urgency of implementing permanent health education policies, expanding vaccination coverage, and raising awareness about zoonoses. Such actions are essential to reduce economic and structural barriers, consolidate protection against zoonoses, such as rabies, and ensure greater safety for the population and animal welfare, strengthening the concept of one health.

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REFERENCES

Babboni, S. D., & Modolo, J. R. (2011). Raiva: Origem, importância e aspectos históricos. UNOPAR Científica. Ciências Biológicas e da Saúde, 13, 349–356.

Brasil. Ministério da Saúde. (2024, 28 de setembro). Dia Mundial Contra a Raiva: Ministério da Saúde promove vacinação de cães e gatos. https://www.gov.br/saude/pt-

Revista ARACÊ
ISSN: 2358-2472

br/assuntos/noticias/2024/setembro/dia-mundial-contra-a-raiva-ministerio-da-saude-promove-vacinacao-de-caes-e-gatos

Brasil. Ministério da Saúde. (n.d.). Raiva animal. https://www.gov.br/saude/pt-br/assuntos/saude-de-a-a-z/r/raiva/raiva-animal

Brasil. Ministério da Saúde. (2024, 11 de setembro). Raiva humana. https://www.gov.br/saude/pt-br/assuntos/saude-de-a-a-z/r/raiva/raiva-humana

Brasil. Ministério da Saúde. (n.d.). Vacina contra a raiva. https://www.gov.br/saude/pt-br/campanhas-da-saude/2025/vacina-contra-a-raiva

Brown, H. L., Horton, D. L., et al. (2024). One health: A structured review and commentary on trends and themes. One Health Outlook, 6, Article 17. https://doi.org/10.1186/s42522-024-00111-x

Cruz Junior, L. A. M., Santos, A. K. S., Silva, P. O., Cabral, L. A. S., & Silva, K. R. (2024). Raiva humana no Brasil: Epidemiologia, transmissão por morcegos e estratégias de prevenção e controle. Journal of Social Issues and Health Sciences, 1(7).

Dutra, C. S., et al. (2024). Percepção dos tutores sobre vacinação antirrábica e zoonoses em Seropédica, RJ, Brasil. Archives of Veterinary Science, 29(3), 197–210.

Escola Politécnica de Saúde Joaquim Venâncio – EPSJV/Fiocruz. (2018, 28 de julho). Educação popular em saúde: Pedagogia de Paulo Freire foi tema de mesa de educadores populares em saúde durante o Abrascão 2018. EPSJV Portal.

Gamble, A., Olarte-Castillo, X. A., & Whittaker, G. R. (2023). Backyard zoonoses: The roles of companion animals and peri-domestic wildlife. Science Translational Medicine, 15(718), Article eadj0037. https://doi.org/10.1126/scitranslmed.adj0037

Instituto Brasileiro de Geografia e Estatística. (n.d.). Domicílios com algum gato, por situação do domicílio - Tabela 4931. https://sidra.ibge.gov.br/tabela/4931

Instituto Pet Brasil. (2024). Anuário Pet 2024. https://institutopetbrasil.com

Karesh, W. B., Dobson, A., Lloyd-Smith, J. O., et al. (2012). Ecology of zoonoses: Natural and amplified spillover. The Lancet, 380(9857), 1936–1945. https://doi.org/10.1016/S0140-6736(12)61678-4

Meneses Júnior, A. R., Araujo, I. C. A. M., & Barberino, M. L. (2024). Perfil epidemiológico da raiva humana e animal no estado do Ceará, no período de 2005 a 2023. Centro Universitário Dr. Leão Sampaio (UNILEÃO).

Morais, J. B. S., Gonçalves, A. C., & Campos, E. A. D. (2023, 22 de novembro). Educação em saúde voltada à prevenção de zoonoses. Revista FT.

Revista ARACÊ
ISSN: 2358-2472

Munyendo, O., Odongo, P., Wambura, G., Ndungu, A., & Njiru, Z. (2023). Zoonotic diseases: Understanding the risks and mitigating the threats. BMC Veterinary Research, 19(1), 1–12.

Oliveira, F. M., Tavela, A. O., & Wagner, K. J. P. (2023). Associação entre fatores socioeconômicos e demográficos e vacinação antirrábica de cães e gatos domésticos. Cadernos de Saúde Coletiva, 31(2), Article e31020063. https://doi.org/10.1590/1414-462X202331020063

Rhode, L. E., & Wagner, K. J. P. (2025). Vacinação antirrábica de cães e gatos domésticos: Análise da cobertura vacinal e das características dos chefes de domicílios brasileiros que vacinam seus animais. Hygeia, 21. https://doi.org/10.14393/Hygeia2172417

Rysava, K., et al. (2020). Towards the elimination of dog-mediated rabies: Development and application of an evidence-based management tool. BMC Infectious Diseases, 20, Article 778. https://doi.org/10.1186/s12879-020-05457-x

Swedberg, C., Bote, K., Gamble, L., Fénelon, N., King, A., & Wallace, R. M. (2024). Eliminating invisible deaths: The woeful state of global rabies data and its impact on progress towards 2030 sustainable development goals for neglected tropical diseases. Frontiers in Tropical Diseases, 5, Article 1303359. https://doi.org/10.3389/fitd.2024.1303359

World Health Organization. (2020). Zoonoses. https://www.who.int/news-room/fact-sheets/detail/zoonoses

Xiao-Nong, Z., & Zhou, X. N., Tanner, M. (2025). One Health: Enabler of effective prevention, control and elimination of emerging and re-emerging infectious diseases. Infectious Diseases of Poverty, 14, Article 77. https://doi.org/10.1186/s40249-025-01337-1

Zinsstag, J., Schelling, E., Waltner-Toews, D., & Tanner, M. (2011). From “one medicine” to “one health” and systemic approaches to health and well-being. Preventive Veterinary Medicine, 101(3–4), 148–156. https://doi.org/10.1016/j.prevetmed.2010.07.003