Chapter 95

Dog bite and its interconnection with one health

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ABSTRACT
The present review aims to analyze articles that deal with dog bite accidents in Brazil and their interconnection with unique health. Public health is a challenge for public managers. One of these challenges involves dog and cat bites on humans. In these events, medical care is needed, including the emotional aspect that can burden the budget of municipalities in the health area. Knowledge about dog and cat bites is important for the development of strategies aimed at unique health with the implementation of educational measures. Animal bites (domestic and wild) are common in Brazil and are important in emergency medical care. Through bites, humans can be infected with infections of bacterial, viral, fungal, and parasitic origin. The complexity of bites is related to the degree of contamination and its polymicrobial nature, being the most serious complication related to infection. Psychological sequelae, physical disabilities and, more rarely, the death of victims can occur. In Brazil, aggression by animals is most often caused by dog bites and most victims are males of different age groups.

Keywords: accident, aggression, canine, public health.

1 INTRODUCTION

Public health is an important area in any administrative management. However, there are several challenges to be faced by managers in promoting and guaranteeing the right to quality health for the population. One of these challenges is to institute public policies that involve preventive and control measures about accidents involving dog bites in humans since these can cause the transmission of diseases and infections.

Accidents due to canine aggression, such as bites, are common in Brazil (HADDAD JÚNIOR et al., 2013) and can be fatal, consisting of a worldwide public health problem, with the biggest victims being children, who often need to be hospitalized for surgical debridement of wounds or intravenous antibiotic therapy (MORGAN; PALMER, 2007). In addition to polymicrobial, viral, and fungal infections (ABARCA et al., 2011), these accidents can generate important lacerations, and fractures (MORGAN; PALMER, 2007; HADDAD JUNIOR et al., 2013; SANTOS et al. 2020), and even psychological consequences for aesthetic deformities generated after attacks (PARANHOS et al., 2013; ALENCAR et al., 2015).

The main regions targeted by attacks in children are the neck and face (RAMGOPA; MACY, 2021), and blood loss after carotid trauma is the leading cause of death in children (MORGAN; PALMER, 2007).

The main reasons for attacks are because the animals feel threatened in their territory, disturbed while feeding, or even jealous of the attention given to other family members (MORGAN; PALMER, 2007).

In addition to the medical care necessary for acute complications such as bleeding and large lacerations (HADDAD JUNIOR et al., 2013) it is not possible to disregard the emotional impact caused to the victims, hospitalizations, possible aesthetic sequelae and reconstructive procedures that reflect burdening the budget of municipalities in the health area.

This aggravation of notification can also cause disabilities in the victims, abstentions from work, deaths, and expenses with observation and control of the animals (PARANHOS et al, 2013). Secondary complications such as bacterial infections can amplify the problems especially when the victim does not seek emergency care and does not use appropriate treatment (SANTOS et al. 2020).

Thus, the knowledge of the number of victims per dog bite in Brazil can provide important information for the elaboration of strategies aimed at single health with the implementation of educational measures, especially on responsible custody of animals to reduce such accidents.

This review aims to analyze articles that deal with accidents due to dog bites and their interconnection with unique health. For this study, searches were performed in the Google Scholar and Pubmed databases to identify articles on the occurrence and management of dog bites, using the keywords (in Portuguese and English) "dog bites", "dog epidemiology" and "dog public health".

2 DEVELOPMENT

The relationship between humans and animals is millennial, with the dog being the first species to be domesticated about 15,000 years ago, while cats are only 5,000 years old (MACPHERSON, 2005). The interaction between man-dog was established by the evolutionary effects of the relationship between the two species and by cultural aspects that influenced coexistence (CABRAL; SAVALLI, 2020), since changes in social and cultural habits have strengthened this relationship, and sometimes animals are considered members of the family group (RODRIGUES et al., 2017). This effective relationship and conviviality with pets bring numerous benefits to people, such as the reduction of diseases associated with stress (WILSON, 1991).

Brazil ranks second in the world in the number of dogs and the market for dogs and cats, even with the crisis, is one of the fastest-growing sectors in the Brazilian market, at about 11% per year (ABINPET, 2014; IBGE, 2013).

Regarding the presence of dogs and cats in households in Brazil, there is a lack of updated data. However, the National Health Survey applied in 2013 estimated the proportion of households with dogs and cats in Brazil, and 44.3% of households in Brazil had at least one dog, equivalent to 28.9 million household units. The South Region presented the highest proportion (58.6%), and the Northeast Region, the lowest (36.4%). In the rural area, the proportion of households with a dog (65%) was higher than that observed in the urban area (41%). Thus, the population of dogs in Brazilian households was estimated at 52.2 million, indicating an average of 1.8 dogs/per household. Regarding the presence of cats, 17.7% of households in Brazil had at least one, equivalent to 11.5 million household units. The North and Northeast regions presented the highest proportions (22.7% and 23.6%, respectively), while the Southeast and Midwest regions had the lowest (13.5% and 14.3%, respectively). Considering the situation of the household, the urban area (14.2%) presented a lower proportion than that observed in the rural area (39.4%). The population of cats in Brazilian households was estimated at 22.1 million, which represents approximately 1.9 cats/households (IBGE, 2015).

Despite the benefits posed by companion animals, humans can be affected by infections of various kinds through bites, scratches, licks, and other forms of direct contact. These infections that can be transmitted can be of bacterial, viral, fungal, and parasitic origin (ABARCA et al., 2011).

Animal bites (domestic and wild) are common in Brazil and represent an important percentage of emergency medical care. In addition to acute complications such as bleeding and large lacerations, serious infections by common and unusual species of bacteria can occur (HADDAD JÚNIOR et al., 2013).

Infectious diseases such as rabies, pasteurellosis, tetanus, and secondary infections can be transmitted in aggression by dogs. Psychological sequelae, physical disabilities, and more rarely the death of victims may occur. The costs involved in victim care should also be considered, including medical and psychological treatments, abstention from work, and observation and control of animals (PARANHOS et al., 2013). Another aspect to be considered by animal bites is the high risk of secondary infection in

wounds, especially when treated with appropriate medication is not used (HURT; MADAY, 2018).

Studies show that in the U.S., there are approximately 4.5 million accidents due to dog bites in humans. Of these, nearly 885,000 involve medical care; 30,000 are subjected to reconstructive procedures; between 3% and 18% develop infections and occur between 10 and 20 deaths (WHO, 2018). In Australia, Canada, and France, incidence and mortality rates are comparable. In middle- and low-income countries, dogs are responsible for 76% to 94% of animal bites (WHO, 2018).

Concise data on animal attacks in Brazil, especially dogs, are scarce. There are epidemiological data, however, with the absence of more descriptive information on the episodes, making it difficult to characterize and analyze the attacks, in addition to the therapeutic conduct after the episodes (ESTIMA et al., 2022; EVANGELISTA et al., 2022).   However, studies reveal that aggressions by animals are also more frequently caused by dog bites (Table 1) (ABREU; CRIZÓSTOMO, 2014; CORREA et al., 2014; MASCARENHAS et al., 2012; RODRIGUES et al., 2013).

Epidemiological data collected in 17 articles on animal bites, obtained in several Brazilian municipalities (Table 1), from 1994 (CARDOSO et al., 2018) to 2019 (BENEDETTI et al., 2020) demonstrate that the canine species is the most involved in the notifications (Table 1). Probably one of the reasons for this is the preference for dogs as pets in Brazil (CATAPAN et al., 2015; CARDOSO et al., 2016; MAGALHÃES et al., 2016; DE PAULA et al., 2018), making the species more frequent in households and on the streets. This preference can be explained due to the etiological characteristics of the canine species, which is seen as more affectionate, vivacious, spontaneous, and present when compared to domestic cats (FUCK et al., 2006; CATAPAN et al., 2015).

Regarding the sex of bite victims, males were the most involved in most studies (Table 1). Only one study showed females as the hardest hit. However, in this study, men were the most involved in dog accidents and women in cat accidents. It is important to highlight that the article addresses the anti-rabies prophylaxis that was performed both in accidents with dogs and cats (AZEVEDO et al., 2018).

Analyzing the articles on the age of the victims, it is observed that the mairoia of the accidents occurred involving children (Table 1). However, in many articles, the age of the victims is not informed. This lack of information in the articles may be related to the gaps in the completion of notifications, which is common in Brazil. Such conduct impairs the approach to animal-transmitted diseases, especially rabies, and causes economic and social damage, affecting the community in the single health aspect (ESTIMA et al., 2022; EVANGELISTA et al., 2022).

Children and adolescents aged one to 15 years are subject to high rates of predictable accidents, including animal bites, whose prevention can be better performed when the various factors involved in the genesis of this type of accident are known. This is due to the greater freedom, movement, and social space occupied by these children, who use as leisure areas the backyard of their homes, streets, squares, and other public places (DEL CIAMPO et al., 2000).

Table 1. Publications on accidents due to animal attacks on humans, according to authorship, year of publication, location, study period, number of animal attacks on humans, the predominance of sex, and age group of victims in Brazil.

Authors/Year of publication	State Municipalities	Study period	Number of animal attacks	Number of attacks by dogs	Predominance of the sex of the victims (%)	Hardest hit age group of victims (%)
ABREU; CRIZÓSTOMO, 2014	Teresina (PI)	2012	483	80% (386)	Not informed	Not informed
ANGELO et al., 2010	Muzambinho (MG)	2005-2009	345	100%	Males (51.88%)	Adults (58.5%)
AZEVEDO et al., 2018	Cuité (PB)	2006-2013	184	66,1% (121)	Female (53.3%)	20 - 59 years (39.1%)
AZEVEDO et al., 2021	Jataí (GO	2014	563	77,79% (438),	Not informed	Not informed
BARROSO et al., 2018	Santa Teresa (ES)	2011-2015	275	80% (220)	Male (50,55%)	Children (18.91%)
BENEDETTI et al., 2020	Roraima	2007 - 2019	34.515	86,80 % (29.959)	Males (58.8%)	5 to 9 years (14.5%)
CAVALCANTE et al., 2019	Ceara	2007 - 2015	231.694	70,02% (162.243)	Msculino (53.4%)	20 to 59 years (45%)
CARDOSO et al., 2018	Indaial (SC)	1994-2016	1.910	86,29% (1.838)	Males (51.17%)	0-14 years
OAK; Smith, 2007	São Luís (MA)	January - June 2002	189	100%	male	8-14 years
FORTES et al., 2007	Pinhais (PR)	2002 - 2005	2.163	95,9% (2.074)	male (57.3%),	over twelve years of age (61.4%),
NEGREIROS et al., 2108	Southern Cross (AC)	2007-2015	1.047	100%	Male (61%)	Not informed
OLIVEIRA et al., 2012	Minas Gerais	1999 - 2004	339.012	100%	Male	< 14 years old
PARANHOS et al., 2013	São Paulo (SP)	2008 - 2009	594	594	Males (53.4%)	5 to 14 years (28.1%)
PINTO et al., 2017	Ponta Grossa (PR)	January 2010 to August 2016	7.023	100%	Not informed	Not informed
RODRIGUES et al., 2013	Campinas (SP)	2009	2.581	2.281(87%)	Males (52.9%)	> 18 years (72.4%) Mean 36 years
SILVA Et al., 2013	Garanhuns (PE)	2007 - 2010	1.428	964	Not informed	Not informed

Another unique health aspect to be considered in patients involving animals and humans is the characteristics of the lesions. Wounds resulting from injuries caused by animal bites are characterized as blunt and elongated cuts and may involve lacerations, avulsion, and crushing of the tissue. In addition to penetration into various tissue planes occurs the involvement of a variety of bacteria, resulting from this contract, only dental marks until the breakdown in the block of tissues (PORTO; CAVALCANTE, 2016).

The possibility of infection of the wound by a dog bite is relevant as a result of the interaction between the victim's skin microbiota and the normal anaerobic microbiota of the mouth of the offending animal. There is a higher risk of wounds that occur on the hands and those caused by bites produced by dogs are less susceptible to infection when compared to bites caused by cats (PALACIO et al., 2005). In addition, the local and systemic infectious condition can be aggravated by the often complex injury of deep structures (PORTO; CAVALCANTE, 2016). Thus, the complexity of bites is related to the degree

of contamination and its polymicrobial nature, being the most serious complication related to infection. Sequelae of these injuries can compromise the social behavior of the victim (ALENCAR et al., 2015).

The oral cavity of dogs has a diverse microbiota. In a study of the oral cavity of 100 healthy dogs, performed by conventional microbial culture techniques, large-scale genetic sequencing (microbiome), and mass spectrometry, as well as the in vitro sensitivity/resistance profile of the isolates, 213 microorganisms of bacterial origin and 20 of fungal origin were identified (PORTILHO, 2020). They were also identified in samples of the gingival mucosa of 80 dogs, apparently healthy, without defined race and sex and with ages ranging between three and six years, Gram-positive bacterial species, of the genera Staphylococcus, Streptococcus, Micrococcus, Lactobacillus, Enterococcus, Propionibacterium, Bacillus and Clostridium; Gram negatives of the genus Escherichia, Pseudomonas, Proteus, Klebsiella and Neisseria. Yeast-like fungi Candida and Malassezia were also isolated. The knowledge of the oral microbiota of dogs is very important, allowing them to choose the best treatment in a situation of contamination when the occurrence of accidents with canine bites or licks (FRIAS et al., 2018).

3 CONCLUSION

Through the analysis of articles reporting cases of bites in Brazil, it was concluded that most bite accidents involve the canine species. The age range of victims is varied, but the highest percentage of cases include male victims. However, few articles address the topic. Thus, there is still no national panorama, and more studies on the subject are needed.

REFERENCES

ABARCA, V.K. et al. Tenencia y estado de salud de mascotas de niños inmunocomprometidos, con énfasis en enfermedades zoonoticas. Revista Chilena de Infectologia, v. 28, n. 3, p. 205-10, 2011.

ABINPET, Associação Brasileira da Indústria de Produtos para Animais de Estimação. Setor Pet cresce 10% sobre 2013 e atingiu um faturamento de R$ 16,7 bilhões no Brasil. 2014. Disponível em:<goo.gl/umQZvQ>.

ABREU, N.A.C.; CRIZÓSTOMO, C.D. Perfil epidemiológico do cliente no atendimento antirrábico em Teresina – PI. Revista Interdisciplinar, v.7, n.2, p.103-111, 2014.

ALENCAR, M.G.M. et al. Reconstrução de lesão em lábio superior por mordedura animal em criança. Revista de cirurgia e traumatologia buco-maxilo- facial, v. 15, n. 4, p. 53-58, 2015.

ÂNGELO, S.T et al. Caracterização das agressões caninas a humanos para controle da raiva urbana em Muzambinho, MG. 2004–2009. Enciclopédia biosfera. v. 6, n. 10, p. 1-7, 2010.

AZEVEDO, J.P. et al. Avaliação dos atendimentos da profilaxia antirrábica humana em um município da Paraíba. Cadernos Saúde Coletiva, v. 26, n.1, p. 7-14, 2018. DOI: https://doi.org/10.1590/1414-462X201800010261.

AZEVEDO, D.A. et al. Characterization of human anti-rabies treatment in Jataí, Goiás, in 2014. Research, Society, and Development, v. 10, n. 2, p. e13710212392, 2021. DOI: 10.33448/rsd-v10i2.12392.

BARROSO, R.M.V. et al. Georreferenciamento e caracteristica das agressões de animais a humanos no município de Santa Teresa-ES entre julho de 2011 a julho de 2015. REDVET v. 19, n.1, 2018. Disponível em: http://www.veterinaria.org/revistas/redvet/n010118/011807.pdf

BENEDETTI, M.S.G. et al. Perfil epidemiológico dos atendimentos antirrábicos humanos no Estado de Roraima, Brasil. Brazilian Journal of Health Review, v. 3, n. 5, p. 14017-14035, 2020. DOI: https://doi.org/10.34119/bjhrv3n5-211

CABRAL, F.G.S.; SAVALLI, K. Sobre a relação humano-cão. Psicologia USP, v. 31, p. e190109, 2020. DOI: https://doi.org/10.1590/0103-6564e190109

CARDOSO, E. et al. Características epidemiológicas de acidentes por mordeduras de animais no município de Indaial–SC. Revista de Ciência Veterinária e Saúde Pública, v. 5, n. 2, p. 148-164, 2018. DOI: https://doi.org/10.4025/revcivet.v5i2.41966.

CARVALHO, C.C.; SILVA, B.T.F. Características epidemiológicas de acidentes por mordedura de cão atendidos em unidade básica de saúde no nordeste do Brasil. Revista Brasileira em Promoção da Saúde, v. 20, n. 1, p. 17-21, 2007.

CATAPAN, D.C. et al. Percepção e atitudes do ser humano sobre guarda responsável, zoonoses, controle populacional e cães em vias públicas. Revista brasileira de Ciência Veterinária, v. 22, n. 2, p. 92-98, 2015.

CAVALCANTE, K.K.S.; FLORÊNCIO, C.M.G.D.; ALENCAR, C.H. Atendimentos antirrábicos humanos pós-exposição: tendência temporal de sua prevalência no Ceará, de 2007 a 2015. Cadernos Saúde Coletiva, v. 27, n.2, p. 182-194, 2019. DOI: 10.1590/1414-462X201900020289

CORREA, M.A. et al. Caracterização dos casos de atendimentos antirrábicos humanos na cidade de Maringá, PR. Sigmae, v.2, n.3, p. 16-24. 2014.

DEL CIAMPO, L.A. et al. Acidentes de mordeduras de cães na infância. Revista de Saúde Pública. v. 34, n. 4, p. 411-412, 2000.

DE PAULA, J.M. et al. Perfil populacional de cães e gatos e bem-estar animal em Chapecó, SC. Revista Brasileira de Higiene e Sanidade Animal, v. 12, n. 4, p. 437-449, 2018.

ESTIMA, N.M. et al. Descrição das notificações de atendimento antirrábico humano para profilaxia pós-exposição no Brasil, 2014-2019. Epidemiologia e Serviços de Saúde, v. 31, n.2, p. e2021627, 2022. DOI: https://doi.org/10.1590/S2237-96222022000200002

EVANGELISTA A, F. et al. Profilaxia antirrábica humana: um diagnóstico de riscos e desperdícios em fortaleza, Ceará, 2009 a 2019. Veterinária e Zootecnia, v. 29, p.1-11, 2022. Disponível em: https://rvz.emnuvens.com.br/rvz/article/view/892.

FORTES, F.S. et al. Acidentes por mordeduras de cães e gatos no município de Pinhais, Brasil de 2002 a 2005. Archives of Veterinary Science. Curitiba. v. 12, n.2, p. 16-24, 2007.

FRIAS, D.F.R.; KOZUSNY-ANDREANI, D.I.; PRINA, R.M. Identificação da microbiota gengival de cães aparentemente hígidos. Nucleus. v.15, n.1, p. 129- 136, 2018.

HADDAD JÚNIOR, V.; CAMPOS NETO, M. F.; MENDES, A. L. Mordeduras de animais (selvagens e domésticos) e humanas. Revista de Patologia Tropical, v. 42, n.1, p.13-19, 2013.

HURT, J.B.; MADAY, K.R. Management and treatment of animal bites. Journal of the Academy of Physician Assistants. v. 31, n. 4, p. 27-31, 2018.

IBGE, 2013. Instituto Brasileiro de Geografia e Estatística. População de animais de estimação no Brasil. Disponível em: <goo.gl/VVhdma>

IBGE, 2015. Instituto Brasileiro de Geografia e Estatística. Pesquisa Nacional de Saúde de 2013: Acesso e utilização dos serviços de saúde, acidentes e violências: Brasil, grandes regiões e unidades da federação. Rio de Janeiro, 2015. 100 p.

MACPHERSON, C.N. Human behavior and the epidemiology of parasitic zoonoses. International Journal for Parasitology, v. 35, p.1319–1331, 2005. DOI: https://doi.org/10.1016/j.ijpara.2005.06.004

MAGALHÃES, C.S. et al. Conhecimento de tutores de cães sobre tumor de mama em cadelas. Acta veterinária brasílica, v 10, n.2, p.186-189, 2016.

MASCARENHAS, M.T.V.L. et al. Análise espacial dos dados do programa de profilaxia da raiva no município de Lauro de Freitas, Bahia, Brasil, no período de 1999-2004. Revista Baiana de Saúde Pública, v.36, n.1, p.207-224, 2012.

MORGAN, M.; PALMER, J. Dog bites. British Medical Journal, v. 334, p. 413, 2007. DOI: https://doi.org/10.1136/bmj.39105.659919.BE.

NEGREIROS, J.S. et al. Perfil epidemiológico das agressões caninas notificadas no município de Cruzeiro do Sul, Acre, durante o período de 2007 a 2015. Arquivos de Ciencias da Saúde UNIPAR, v. 22, n. 2, p, 81-86, 2018.

OLIVEIRA, V.M.R. et al. Mordedura canina e atendimento antirrábico humano em Minas Gerais. Arquivo Brasileiro de Medicina Veterinária e Zootecnia, v. 64, n.4, p. 891-898, 2012. DOI: https://doi.org/10.1590/S0102-09352012000400016

PALACIO, J.; LÉON, M.; GARCÍA-BELENGUER, S. Aspectos epidemiologicos de las mordeduras caninas. Gaceta Sanitária, v. 19, n. 1, p. 50-58, 2005.

PARANHOS, N.T. et al. Estudo das agressões por cães, segundo tipo de interação entre cão e vítima, e das circunstâncias motivadoras dos acidentes, município de São Paulo, 2008 a 2009. Arquivo Brasileiro de Medicina Veterinária e Zootecnia, v.65, n.4, p.1033- 1040, 2013.

PINTO, M.C. et al. Caracterização epidemiológica de mordeduras de cães em humanos no município de Ponta Grossa, estado do Paraná, Brasil. Revista de Educação Continuada em Medicina Veterinária e Zootecnia do CRMV-SP, v. 15, n. 3, p. 90-91, 2017.

PORTILHO, F. V. R. Resistência in vitro aos antimicrobianos e microbiota bucal decães diagnosticada por microbioma e espectrometria de massas. Botucatu, 2020. 60p.Dissertação (Mestrado) – Faculdade de Medicina Veterinária e Zootecnia, Campus de Botucatu, Universidade Estadual Paulista - UNESP.

PORTO, D.E.; CAVALCANTE, J.R. Tratamento de lesões faciais por mordedura de animal: relato de casos. Revista de Cirurgia e Traumatologia Buco-Maxilo-Facial, v.16, n.1, p. 63-67. 2016.

RAMGOPAL, S; MACY, M.L. Pediatric patients with dog bites presenting to US children's hospitals. Injury epidemiology, v. 8, n. 1, p. 1-10, 2021. DOI: https://doi.org/10.1186/s40621-021-00349-3.

RODRIGUES, R.C.A. et al. Caracterização de casos de agressão canina em Campinas, São Paulo, Brasil. Brazilian Journal of Veterinary Research and Animal Science, v. 50, n. 3, p. 233-237, 2013.

RODRIGUES, I. M. A.; CUNHA, G. N.; LUIZ, D. P. Princípios da guarda responsável: perfil do conhecimento de tutores de cães e gatos no município de Patos de Minas–MG. Ars Veterinaria, v. 33, n. 2, p. 64-70, 2017.

SANTOS, D. A.; CAROTTA, N. V. S. B.; FONSECA, M. E. B.; ALONSO, I. A.; SOARES, G. Estudo do perfil epidemiológico das agressões de cães aos humanos nos municípios de Barra do Piraí, Paraíba do Sul e Paracambi/RJ. Research, Society and Development, v. 9, n. 12, p. e4419129920, 2020. DOI: 10.33448/rsd-v9i12.9920.

SILVA, G.M. et al. Notificações de atendimento antirrábico humano na população do município de Garanhuns, Estado de Pernambuco, Brasil, no período de 2007 a 2010. Epidemiologia e serviços de saúde: Revista do Sistema Único de Saúde do Brasil, v. 22, n.1, p. 95-102, 2013.

WHO. World Health Organization. Animal bites. 2018. Disponível em: <https://www.who.int/en/news-room/fact-sheets/detail/animal-bites>

WILSON, C. C. The pet as an anxiolytic intervention. The Journal of nervous and mental disease, v.1979, n.8, p.482-489, 1991.