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Original Article

Incidence and Clinical Management of Animal Bites in Yazd, Iran (2019–2023)

Running Title: Animal bites in Yazd

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Abstract

Background: Bites from animals pose a pronounced threat to people's health because they can cause the fatal disease of rabies. Rabies in Iran remains one of the significant health and economic problems.

Objectives: The present study aimed to assess the prevalence of animal bite cases in Yazd, Iran.

Methods: In this cross-sectional study, the statistical population includes animal bite cases referred to health centers in Yazd (2019-2023). The collected data were analyzed by SPSS software (version 21).

Results: A total of 12122 cases were included in the study. Cats and Dogs caused almost 97% of all bites. 98.2% of the invasive animals were domestic, and 55.3% of them were strays. Most of the bites occurred during the summer season, which accounted for 29.13% of all bites. The most bitten parts were the hands. The most affected age group was individuals aged 21-40 years, which accounted for 39% of the cases.

Conclusion: In the present study, most cases of bites were related to dogs and cats in Yazd city and the importance of the resulting complications in terms of health and economy, the authorities should plan to reduce cases by increasing the level of awareness through training and combating stray dogs and cats, as well as providing the necessary equipment to treat and follow up on people who have been bitten.

Keywords: Prevalence, Rabies, Animal bite, Yazd

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Introduction

Some diseases and disorders that animals cause are referred to as zoonotic diseases, which are common to both humans and animals. To date, more than 700 types of diseases have been identified worldwide in this regard. Approximately 65% of infectious diseases are transmitted from animals to humans, and 75% of emerging diseases are zoonotic, meaning they are common to both humans and animals. Animal bites are a serious threat to human life because some infections following animal bites, such as rabies, are fatal (1-3). Rabies is a deadly viral disease that can be transmitted from animals to humans (4). The causative agent of rabies is a neurotropic virus that belongs to the Rhabdoviridae family and is classified within the Lyssavirus genus. The virus is transmitted through contact with saliva, via biting or scratching, and occasionally through the placenta, mucous membranes, and organ transplants (5, 6). Animals that transmit the rabies virus can spread it through bites in two primary groups: the urban type, primarily caused by dogs and occasionally cats, and the wild type, whose reservoirs include foxes, wolves, minks, and raccoons (7). There is no global estimate of the number of animal bites. However, according to a World Health Organization report, more than 5.2 billion people are at risk of rabies, and approximately 10 million people (excluding India) receive rabies prevention treatment after animal bites each year (8, 9). About 50,000 to 60,000 deaths due to rabies are reported in the world every year, of which 31,000 are in Asia (10).

In Iran, the occurrences of animal bites have risen over the past 30 years from 18,305 cases (representing 35 cases per hundred thousand people) in 1987 to 168,511 cases (equating to 177 cases per hundred thousand people) in 2016; with prompt actions taken, the proportion of human rabies cases to animal bites has decreased (11). For example, the results of the southern study in Iran indicated that the rate of animal bites in that region rose notably from 109.92 to 189.33 per 100,000 cases between 2015 and 2019 (12).

Every year, a significant amount of money is spent in the country to prevent rabies, and few infectious diseases in the country are as heavily funded as rabies (13).

Considering the increase in people's awareness of the dangers of animal bites in recent years and the growing number of referrals for necessary treatments, analyzing data in responsible organizations, especially at the regional level, can enhance knowledge of authorities of the epidemiology of rabies.

Objectives

The present study was designed to determine and investigate the prevalence of animal bites in Yazd city, to identify those at risk, and to examine the seasonal and temporal patterns of animal bites.

Methods

The current study was cross-sectional, examining the prevalence of animal bite cases in Yazd City from 2019 to 2023 at the health center in Yazd City. This study was conducted after obtaining the code of ethics from the Ethics Committee of the Faculty of Medicine (IR.SSU.MEDICINE.REC.1402.013. The

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data of this study are confidential and used only for research purposes.

The inclusion criteria in this study included people who came to Yazd health center with animal bite complaints (2019-2023). Complete records registered in the healthcare system were also an inclusion criterion. The exclusion criterion was also the incompleteness of the information on animal bite victims (including date of bite, type of animal, and location of bite in particular, in Tables 1 and 2, there was some missing data due to some records defects related to some patients.). Also, duplicate cases and cases outside the geographical and temporal scope of the study were among the exclusion criteria. Diagnostic criteria for rabies were based on clinical diagnosis and definitive confirmation through the detection of virus RNA by quantitative reverse transcription polymerase chain reaction (qRT-PCR).

The sampling method in this study was a census. A total of 12122 people were investigated. The study variables included age, sex, occupation, place of occurrence, injured limb, type of treatment, type of attacking animal, time of bite occurrence, and mortality rate after bite occurrence due to bite-related diseases. Confounding factors were controlled by limiting key variables, such as geographic and temporal limitations, through appropriate classification and sampling.

The present study was conducted by referring to the files of the animal bite victims located in the rabies center of Yazd city. The study data were analyzed using SPSS software (version 21) and descriptive statistical tests, including standard deviation, median, and mean.

Results

In the current study, more cases -8425 (69.1%) - were men. The mean age of the participants in this study was 29.18 ± 17.99 years. 496 (4.1%) cases of bites occurred in the peripheral areas of the city.

A total of 10423 (85.5%) bites occurred in urban areas. Three cases (0.01%) were also reported in ambulant areas. Ten cases (0.1%) of bites also occurred in other areas.

Most of the affected people were self-employed, comprising 3,280 individuals (26.9%). Secondly, 2,762 (22.6%) of the participants were students. Additionally, housewives accounted for 1,186 (9.7%) of the affected individuals.

The most bitten area was the hand area (from the fingertips to the wrist), which accounted for 6532 cases (63.99%) of the bites. Two thousand ninety-eight cases (20.55%) of the bites were in the buttocks and lower limbs. Also, there were no reports of bites in the genital or anal mucosa **Table 1.**

Table 1: Frequency and percentage of affected areas

Bite Area	Count	%Percentage
Hand (fingertips to wrist)	6532	63.99
Lower limb - buttocks	2098	20.55
Forearm, arm, shoulder	1109	10.86
Chest, abdomen, back	257	2.51
Mucous of eyelid, eye, nose, and mouth	92	0.9
Head, face, neck	101	0.98
Genital area	18	0.17
Genital or anal mucosa	0	0
Total	10207	100

The most cases (90.4%) visited the rabies center within 48 hours after bitting and were vaccinated.

The highest number of animal bites was reported for cats, with 6541 cases (53.96%), and dogs, with 5282 cases (43.57%) **Table 2**.

Table 2: Number and percentage of animal bites based on animal type

Animal Type	Number of Bites	%Percentage
Cat	6541	53.96
Dog	5282	43.57
Horse	80	0.66
Monkey	76	0.62
Sheep	40	0.33
Fox	20	0.16
Camel	12	0.1
Field Mouse	12	0.1
Wolf	14	0.1
Guinea Pig	4	0.02
Cow	19	0.02
Jackal	3	0.01
Donkey	2	0.01
Wild Boar	1	0.01
Bat	3	0.01
Weasel	5	0.01
Rat, Ferret	3	0.01
Stoat	2	0.01
Goat	2	0.01
Total	12121	100

The highest number of bites happened in 2023 (3320 bites). The lowest bite rate was observed in 2020 (1,629 cases). In 2019, the number of bite cases was 2274. Also, the summer and fall seasons accounted for the most bites (3532 and 3139 cases, respectively) **Table 3.**

Table 3: Animal bite frequency based on season

Season	Number	%Percentage
Summer	3532	29.13
Autumn	3139	25.89
Spring	2962	24.43
Winter	2489	20.53
Total	12122	100

The highest number of bites occurred in the 21-40 years age group with 4754 cases (39%).

Discussion

In the present study, 69.1% were men, indicating an increased incidence of animal bites and an increased risk of rabies among men. The highest number of animal bites was related to cats. 22.6% of all bites occurred among students, highlighting the need for education about rabies in schools. The most bitten area was the hand.

The upper limb (43.1%) was the most frequently bitten in the study by Ghavi et al. (14). This study, like the present study, primarily involved the upper limbs.

In a study, the majority of animal bites occurred in men and were inflicted by dogs. Generally, in more studies, dogs and cats were responsible for bites (15).

In Shush study, the most common seasons for animal bites were winter and fall (16). However, in the present study, the highest number of bites occurred in

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summer and autumn. In Borujerd, dog bites were more common. The leg was also the most common bite site in the current cases (17).

Also, in another study in Khuzestan, the feet and hands were the most commonly affected body parts, followed by the face and other parts (18).

In Kerman, Iran, the feet and hands were the most commonly affected body parts by animal bites (19).

During a study in Babol, Iran, an investigation into the condition of animal bites showed that dogs and cats were the most common biting animals. Most of the injuries were associated with the shoulder (20). In the present study, the hand was the most commonly involved organ, because this part of the body is most commonly used to protect against animals in an accident.

In Texas, an investigation revealed that dog, cat, and snake bites were the most common types of bite cases. This study also showed that most bites were related to the hand (21). This study was similar to the current study because cats and dogs were the most commonly associated with biting.

A study in Nigeria showed that dogs were the agents of more biting cases. Most occurrences happened in February (22). In the present study, the highest rate of bites occurred in summer. This may be because of geographical location (Iran and Nigeria).

The difference between this study and other studies can be attributed to several factors, including regional characteristics such as climate, animal activities in different seasons, and human activities like agricultural functions.

Conclusion

Domestic dogs and cats—especially strays—are responsible for the overwhelming majority of animal bites, with peak incidence in summer and adult young adults (21–40 years) sustaining hand injuries most frequently.

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Conflict of interest: The authors state that they have no conflicts of interest.

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Authors' contribution: J.A and S.H.SH designed study, M.DM performed first draft, T.F. analyzed data and S.A.M revised manuscript. All of authors read and approved final version.

References

1. Weber DJ, Hansen AR. Infections resulting from animal bites. Infect Dis Clin North Am. 1991; 5 (3): 663-80.
2. Abedi M, Doosti-Irani A, Jahanbakhsh F, Sahebkar A. Epidemiology of animal bite in Iran during a 20-year period (1993–2013): a meta-analysis. Trop Med Health. 2019; 47:1-13.
3. Venkatesan M. An epidemiological study of animal bites and envenomings in a rural district of Tamilnadu, India. Online Journal of Health and Allied Sciences. 2014; 13 (4).
4. Bano I, Sajjad H, Shah A, Leghari A, Mirbahar K, Shams S, et al. A review of rabies disease, its transmission and treatment. J Anim Health Prod. 2017; 4 (4):140-4.
5. Bastos V, Pacheco V, Rodrigues ÉD, Moraes CN, Nóbile AL, Fonseca DLM, et al. Neuroimmunology of rabies: New insights into an ancient disease. J Med Virol. 2023; 95 (10): e29042.
6. Basirat SN, Bashar R, Pourhossain B, Niknam N, Rafsanjani MS, Shirzadi MR, et al. Acute and critical care for rabies bitten patients and the different outcomes in a Family: A Post Exposure Prophylaxis (PEP) Failure report. Journal of Cellular & Molecular Anesthesia. 2019; 4(4).
7. Fisher CR, Streicker DG, Schnell MJ. The spread and evolution of rabies virus: conquering new frontiers. Nature Reviews Microbiology. 2018; 16(4): 241-55.

8. Yale G, Lopes M, Isloor S, Head JR, Mazeri S, Gamble L, et al. Review of oral rabies vaccination of dogs and its application in India. Viruses. 2022; 14(1): 155.
9. Gill GS, Singh BB, Dhand NK, Aulakh RS, Sandhu BS, Ward MP, et al. Estimation of the incidence of animal rabies in Punjab, India. PLoS One. 2019; 14(9): e0222198.
10. Ahmed K, Phommachanh P, Vorachith P, Matsumoto T, Lamaningao P, Mori D, et al. Molecular epidemiology of rabies viruses circulating in two rabies endemic provinces of Laos, 2011–2012: regional diversity in Southeast Asia. PLoS Negl Trop Dis. 2015; 9(3): e0003645.
11. Bay V, Shirzadi MR, Asl IM. Animal bites management in Northern Iran: Challenges and solutions. Heliyon. 2023; 9 (8).
12. Delam H, Eidi A, Keshtkaran Z, Soufi O, Rezaei B, Bazrafshan M-R. Incidence rate of animal bites in southern Iran during 2015-2019 using Cochrane-Armitage trend test. Journal of Acute Disease. 2023; 12(1): 29-34.
13. Regea G. Review on economic importance's of rabies in developing countries and its controls. Archives of preventive medicine. 2017; 2(1): 015-21.
14. Ghavi S, Borna H, Davari A, Dehghani AS, Derakhshan S. Investigation of animal bite prevalence in Qaenat city during the years 2017-2021. medical journal of mashhad university of medical sciences. 2023; 65(6): 2245-55.
15. Eslamifar A, Ramezani A, RAZAGHI AM, Falahian V, Mashayekhi P, Hazrati M, et al. Animal bites in Tehran, Iran. 2008.
16. Kassiri H, Kassiri A, Lotfi M, Shahkarami B, Hosseini S-S. Animal bite incidence in the County of Shush, Iran. Journal of Acute Disease. 2014; 3(1): 26-30.
17. Ghannad MS, Roshanaei G, Alikhani MY, Alijani P, Sardari MG. Animal bites in Borujerd: an overview of animal bites in Iran. Avicenna Journal of Clinical Microbiology and Infection. 2014; 1(1): 19568-.
18. Alavi SM, Alavi L. Epidemiology of animal bites and stings in Khuzestan, Iran, 1997–2006. Journal of infection and public health. 2008; 1(1): 51-5.
19. Rezaeinasab M, Rad I, Bahonar A, Rashidi H, Fayaz A, Simani S, et al. The prevalence of rabies and animal bites during 1994 to 2003 in Kerman province, southeast of Iran. 2007.
20. Ghaffari-Fam S, Hosseini SR, Daemi A, Heydari H, Malekzade R, Ayubi E, et al. Epidemiological patterns of animal bites in the Babol County, North of Iran. Journal of Acute Disease. 2016; 5(2): 126-30.
21. Warner GS. Increased incidence of domestic animal bites following a disaster due to natural hazards. Prehosp Disaster Med. 2010; 25(2): 187-90.
22. Haruna E, Nzelu I, Madaki P, Jolayemi K, Udechukwu C. Incidences of animal bite and risk for rabies in Kaduna State, Nigeria-a public health implication. Journal of Sustainable Veterinary & Allied Sciences. 2024; 6(2).

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