

Original Article

An Epidemiologic Study of Animal Bites in Ilam Province, Iran

Masoud Sabouri Ghannad PhD¹, Ghodrattollah Roshanaei PhD², Farshad Rostampour MD³, Amin Fallahi DDS⁴

Abstract

Background: In Iran, the number of stray dogs in cities and villages necessitates epidemiologic investigations. This study has undertaken an epidemiologic survey in Ilam, Iran with regard to animal bites during 1999–2009.

Methods: This was a cross-sectional descriptive study. The data due to animal bites was collected from patients and analyzed.

Results: The number of animal bites reported was 4420, which included 3032 men (68.3%) and 398 women (31.7%). Most animal bites were reported in the 10–19 year-old (1172, 26%) age group. The feet were the most commonly attacked body part, which was reported in 3177 cases (71.8%). Most bites were from dogs (3942 cases, 89.15%). Of cases, 3419 (77.3%) resided in rural areas while 1001 (22.7%) were urban residents. The number of patients with incomplete vaccinations was 3596 (81.3%) compared to 824 (18.7%) completely vaccinated patients.

Conclusion: The present study showed a high incidence of animal bites in Ilam, which necessitates the importance of rabies prevention and control. It is recommended that the sanitation authorities provide for and implement measures to determine beneficial ways to avoid and control rabies infection in this part of Iran.

Keywords: Animal bites, epidemiology, incidence, rabies, vaccination

Cite the article as: Sabouri Ghannad M, Roshanaei G, Rostampour F, Fallahi A. An Epidemiologic Study of Animal Bites in Ilam Province, Iran. *Arch Iran Med.* 2012; 15(6): 356–360.

Introduction

Rabies is known as a fatal zoonotic disease with a complex epidemiology. It is caused by the rabies virus (RV) of which the majority belong to the genus *Lyssavirus*, family *Rhabdoviridae*.¹ In Asia, eight countries have been reported as rabies-free: Japan, Malaysia, Hong Kong, Singapore, Taiwan, Qatar, Bahrain, and the United Arab Emirates.¹ Data from other studies indicate that Japan in 1950 became rabies-free, followed by Malaysia in 1967.^{2–4} Apparently, prevention programs have been successful in rabies control and eradication in these countries.

Rabies has two epidemiological characteristics, urban and sylvatic which the principal maintenance host is domestic dog and a wild animal species retrospectively.⁵ Dog bites constitute 80%–85% of all incidents, whereas cats constitute about 10% of reported bites, and other animals such as bats, monkeys, and rabbits comprise 5%–10% of cases.⁶ Rabies is still considered a threat to public health in some animal populations.

In Iran, a broad range of family health services that include case finding, immunization, and follow-up are provided by health workers. There are also additional services such as family planning, health education, and environmental health services for the

population that is covered. Health Houses are supervised by the Rural Health Centers. Each Rural Health Center serves approximately a population of 9000 in Iran. A team of skilled health technicians provide diagnostic and outpatient care services under the supervision of a general practitioner.

In Iran, rabies has been reported in most provinces.⁷ Thus, management of this disease is considered one of the most important priorities of Iranian health authorities. It is quite important to determine the epidemiology of rabies, which partially fulfills the need for local settings for rabies control and for a modeling approach in the society. Since the epidemiological features of rabies in Ilam Province, Iran is not well known, the main aim of this research is to clarify the epidemiological features of rabies in this province. Ilam Province is located in southwest Iran and covers an area of 19,086 square kilometers. The total population during the period of this study was 555,517. The population of Ilam Province is mostly Kurdish. Lurs live predominantly in the southern and eastern parts of the province. This research will help to assess the burden of the expense and sanitation problems in this part of Iran. It is clear that without knowledge of all the risk factors, rabies may not effectively be prevented and eradicated.

Materials and Methods

A cross-sectional descriptive study of rabies-positive patients was performed in health centers located in Ilam Province. We focused on the distribution of animal bites detected in this province from April 1999 to March 2008. These health centers served as referrals for patients. Data obtained from all patients who presented with animal bites in the health centers of Ilam Province, were recorded in questionnaires and analyzed.

Authors' affiliations: ¹Department of Microbiology, Faculty of Medicine, Hamadan University of Medical Sciences, Hamadan, Iran. ²Department of Biostatistics, Faculty of Health, Hamadan University of Medical Sciences, Hamadan, Iran. ³Student Research Committee, Faculty of Medicine, Hamadan University of Medical Sciences, Hamadan, Iran. ⁴School of Dentistry, Shahid Beheshti University of Medical Sciences, Tehran, Iran.

Corresponding author and reprints: Masoud Sabouri Ghannad PhD, Department of Microbiology, Faculty of Medicine, Hamadan University of Medical Sciences, Hamadan 6517838736, Iran. Tel: +98-811-838-0160 ext.347, Telefax: +98-811-838-0208, E-mail: sabouri39@yahoo.com.

Accepted for publication: 15 February 2012

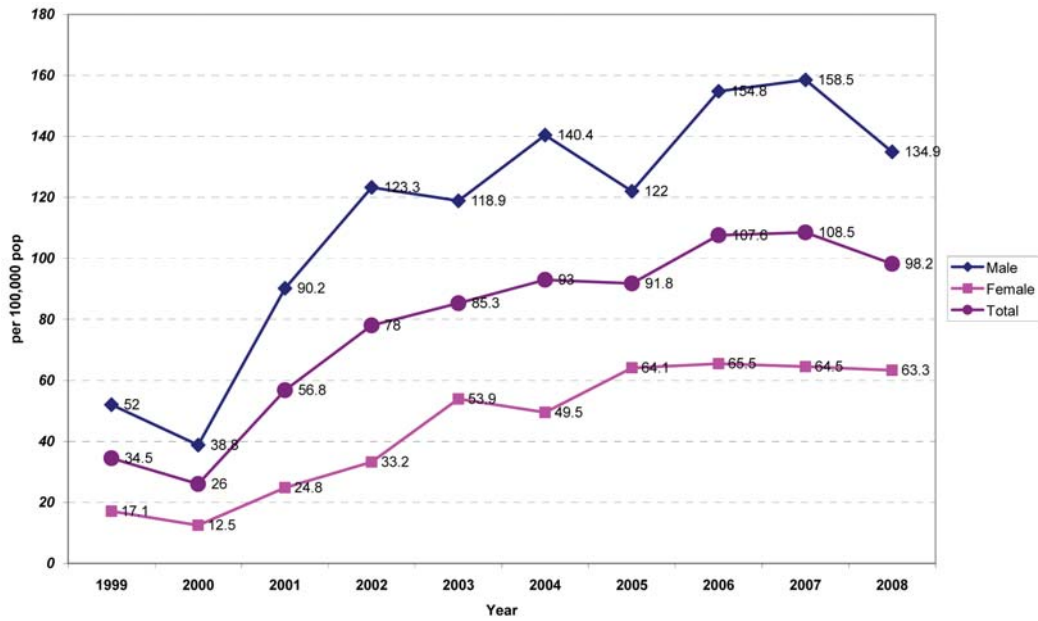


Figure 1. Distribution of the rate of animal bites detected in Ilam Province from April 1999 to March 2008, according to sex and total rate per 100,000 populations.

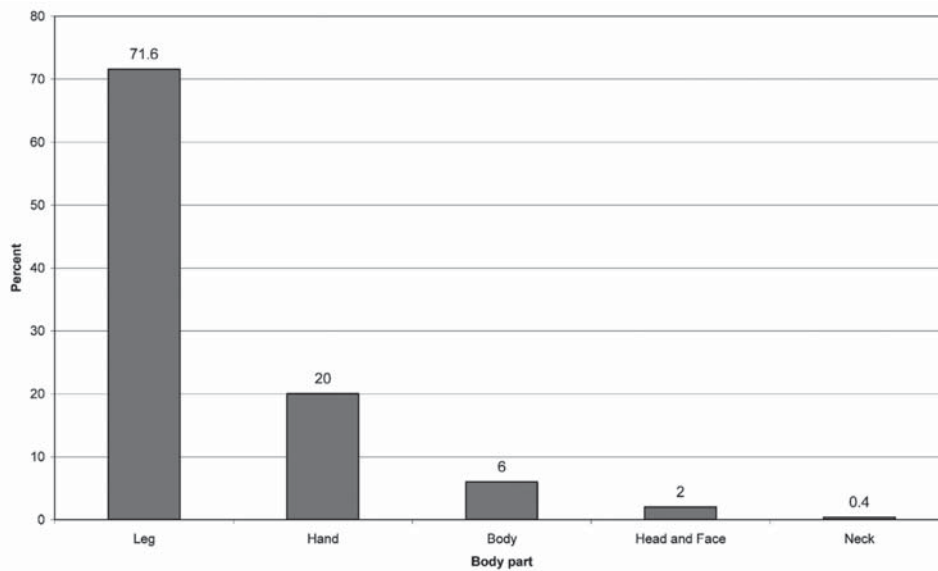


Figure 2. Distribution of animal bites detected in Ilam Province from April 1999 to March 2008 according to location of animal bite.

Results

During the study period (1999 to 2008), we included 4420 exposed persons treated for animal bites in our research. The incidence of animal bites in Ilam increased from 34 per 100,000 in 1999 to 98 per 100,000 in 2008 (Figure 1). Of the patients studied, 3032 (68.3%) were males and 398 (31.7%) were females. As seen in Figure 2, lower extremities were the most common bite locations (71.6%) followed by hands (20%), trunk (6%), head and face (2%), and neck (0.4%). Dog bites were most common (3942 cases, 89.2%), followed by cats (5%), wolves (0.7%), jackals (0.6%),

foxes (0.3%), and other animals (4.2%) (Figure 3). Of injured patients, 77% resided in rural areas, while 23% were urban residents. The majority of animal bites were reported among the 10–19 year-old (143.9 per 10000 population) age group (Figure 4). The number of patients incompletely vaccinated was 3596 (81.3%), those with complete vaccination comprised 824 (18.7%) cases.

Discussion

The collection, evaluation, and processing of epidemiological data is important for rabies control, planning, and organization of

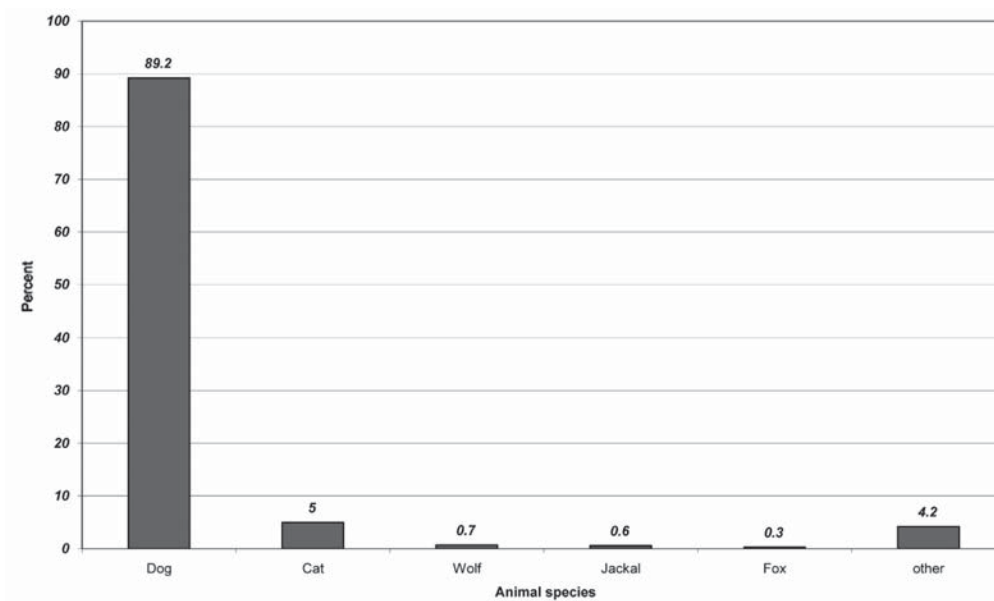


Figure 3. Distribution of animal bites detected in Ilam Province from April 1999 to March 2008 according to animal species.

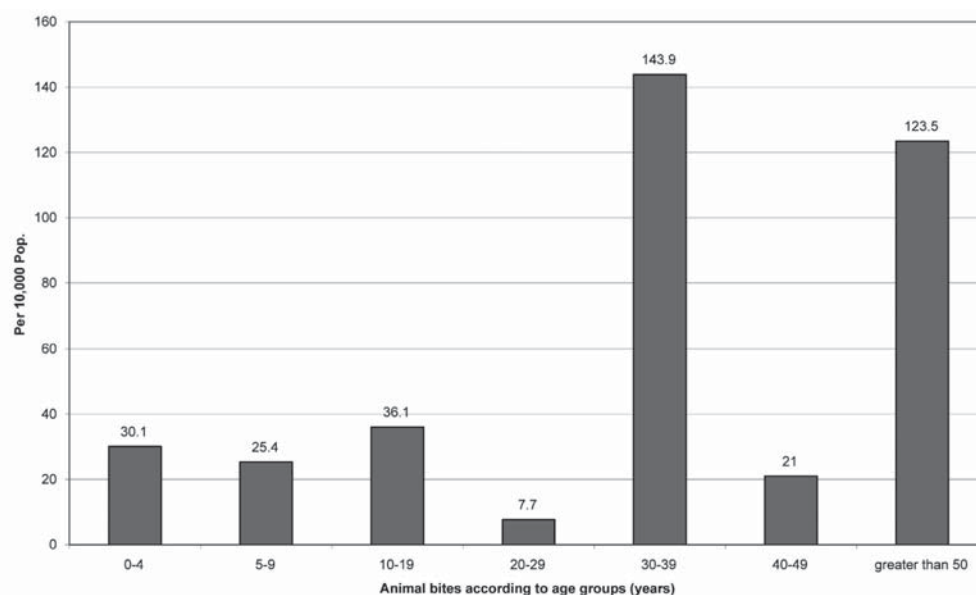


Figure 4. Distribution of animal bites detected in Ilam Province from April 1999 to March 2008 according to age groups.

programs. The current study is a retrospective analysis from April 1999 to March 2008 of all animal bites that have been reported. During the study period 4420 people were bitten, of which 77% resided in rural areas and the remainders (23%) were urban residents. These results approximated the data by Bahonar et al., who have reported that of the animal bites that occurred in Ilam from 1994–2004, 64.5% were in rural residents and 35.5% urban residents.⁸ Thus, the most frequent rate of animal bites have occurred in rural areas which seems logical in view of the epidemiologic patterns of such diseases in Iran.

In the current research, of the patients studied, 3032 (68.3%) were males and 398 (31.7%) were females. This observation was similar to a study performed in Ilam that reported 73.2% animal

bites in men and 26.8% in women.⁸ Also, in a similar Tehran (the capital of Iran) study, there were 8806 bites to humans during a three-year period, of which 79.16% were males and 20.84% were females.⁷ In a study in Kerman Province, there were 21546 animal bites from 1994 to 2003 with ten cases of rabies. Males were more frequently (73.48%) affected than females (26.52%).⁹

In view of the population data, in most parts of Iran males have been attacked more frequently by animals than females. This contradicted a study performed in the US in which women were injured by animals more often than men.¹⁰ Another study performed in Puerto Rico showed that the rate of animal bites was equal in both women and men.¹¹ An explanation for more animal attacks to females in the US might be due to different cultural behaviors in

that society. In Iran, keeping animals such as dogs is not common practice, and it is specific to rural areas. However, it is difficult to find a consensus between these opposing observations and the precise identity of the discrepancy remains controversial.

In the present study, animal bites were most frequently reported among the 10–19 year-old (1172, 26%) age group. Similarly, a study performed in Kerman showed the most common affected age group as 10–19 year olds,⁹ while in Puerto Rico study which revealed that people aged 18 years or older had the highest rate of animal bites.¹¹ Different results may be due to patterns of cultural difference in various countries.

In the current research, lower extremities were the most frequent bite site (71.8%) followed by hands (20%), trunk (6%), head and face (2%), and neck (0.4%). This agreed with previously published data on animal bites in Ilam, which documented 69.7% of animal bites to the feet, followed by 18.8% in the hands, 8.5% in the trunk area, and 3% in the head, face, and neck regions.⁸ In a similar study in Kerman, 47% of animal bites were to the feet, followed by hands (41%), trunk (7%), face (3%), head and neck (2%).⁹ Also, a study in Khuzestan reported that feet (58.1%) and hands (30.6%) were the most frequently affected locations of the body, followed by the face and other areas.¹² Totally, reports in Iran have indicated that lower extremities are more often attacked by animals than other body locations. The results seem logical because the feet are counted as a primary defense when confronting animals.

In the present study, the most frequent bites were from dogs (89.2%), followed by cats (5%), wolves (0.7%), jackals (0.6%), foxes (0.3%), and other animals (4.2%). In comparison, a study performed in Tehran showed that the most frequent bites were from dogs (5804 cases, 65.9%), followed by cats (2241, 25.44%), squirrels (343, 3.98%), monkeys (134, 1.52%), hamsters (125, 1.41%), and other animals (159, 1.84%).⁷ In another study performed in Khuzestan, injuries by dog bites comprised 69% of cases, followed by scorpions (12.5%), mice (8.8%), and snakes (4.4%).¹² In Rafsanjan, 74% of bites occurred by dogs.¹³ In addition, one research showed that most human cases of rabies resulted from dog bites in developing countries while in countries with vaccinated domestic animals, most human cases resulted following contact with wild rabid animals.¹⁴ This result agreed with the current research. Moreover, in the current research the number of patients incompletely vaccinated was 3596 (81.3%); those completely vaccinated were 824 (18.7%).

The evidence seems to indicate that the incidence of animal bites in different parts of Iran has increased from 35.1 per 100,000 in 1987 to 151 per 100,000 in 2001.¹⁵ A report from Khorasan, a north western province of Iran, has shown that the incidence of animal bites increased from 108 per 100,000 in 2002 to 126 per 100,000 in 2004.¹⁸ Another report from Zanjan, Northwest Iran has indicated that the rate of animal bites increased from 56 per 100,000 in 1994 to 194 per 100,000 in 2004.¹⁹ Also in Rafsanjan the estimated rate was 180 per 100,000 in 2003, 195 per 100,000 in 2004, and 241 per 100,000 in 2005.¹⁴ The same results have been reported from Tehran, Kerman, and Gazvin provinces.¹⁵ The following study also showed an increased number of animal bites from 34.5 per 100,000 in 1999 to 98.2 per 100,000 population in 2008, consistent with the data already presented. However, one possibility for this rise is that the referral pattern and coverage by reporting systems may have been changed during this period. In other words, the in-

creased numbers of health centers has enabled an increased rate of patient access to these centers for reporting animal bites. This can be considered as a limitation of this research.

The socioeconomic conditions in a country and the residential area (urban/rural) are influencing factors on the epidemiologic presentation of animal bites. The age distribution of the population and occupation are also considered as important factors involved in epidemiologic patterns of animal bites.¹⁶ Numerous other factors, including disease incidence, religion, geography and attitudes of people may be unnoticed, however, are considered to be as the limitations and the interfering factors of the study in the provision of effective control and prophylactic treatments for rabies in each country. Some countries such as Malaysia and Japan have performed successful rabies control programs whereas other countries such as India, Indonesia, and Thailand still face problems with disease control.⁹

Totally, despite our expectations, it seems that the attention should be focused on potential targets such as public education, prevention strategies, and vaccination of all domestic animals to avoid the danger of rabies. Thus, all dogs and cats in the region should be vaccinated. A report in the US has confirmed that mass vaccination of dogs along with prophylactic treatment decreased the number of human and canine rabies cases by about 80%.¹⁷

International collaboration in the dissemination of diagnostic techniques and vaccines can support the organization of effective control of rabies in this part of Iran and in the region. More work would be required in other areas of Iran to assess the distribution of rabies infection in the country and the ways to overcome this disease.

References

1. Beran GW, Steele JH. Rabies and infections by rabies related virus. In: Beran GW, ed. *Handbook of Zoonoses*. Section B, 2nd ed. Boca Raton, Ann Arbor: CRC Press, Inc.; 1994: 307 – 357.
2. Rahman A, Joseph PG. *Veterinary Viral Diseases, Their Significant in South East Asia and the Western Pacific*. Sydney, Australia: Academic Press; 1985.
3. Shimada, K. The Last rabies Outbreak in Japan. In: Nagano Y, Davenport FM. *Rabies*. Baltimore London Tokyo: University Park Press; 1971.
4. Bisserru B. *Rabies Weather*. Great Britain: Woolnough Ltd; 1972.
5. Páez A, Núñez C, García C, Boshell J. Molecular epidemiology of rabies epizootics in Colombia: evidence for human and dog rabies associated with bats. *JGV*. 2003; **84**: 795 – 802.
6. Brook I. Microbiology and management of human and animal bite wound infections. *Primary Care*. 2003; **30**: 25 – 39.
7. Eslamifar A, Ramezani A, Razzaghi-Abyaneh M, Fallahian V, Mashayekhi P, et al. Animal Bites in Tehran, Iran. *Arch Iran Med*. 2008; **11**: 200 – 202.
8. Bahonar AR, Bokaie S, Khodaveirdi KH, Nikbakht Boroujeni GH, Rad MA. A Study of Rabies and the Frequency of Animal Bites in the Province of Ilam, 1994–2004 [in Persian]. *Iran J Epidemiol*. 2008; **4**: 47 – 51.
9. Rezaeinasab M, Rad I, Bahonar AR, 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. *Iran J Vet res*. 2007; **8**: 343 – 350.
10. Freeman AJ, Senn DR, Arendt DM. Seven hundred seventy- eight bite marks: analysis by anatomic location, victim and biter demographics, type of crime, and legal disposition. *J Forensic Sci*. 2005; **50**: 1436 – 1443.
11. Quiles-Cosme GM, Perez-Cardona CM, Aponte-Ortiz FI. Descriptive study of animal attacks and bites in the municipality of San Juan, Puerto Rico, 1996–1998. *P R Health Sci J*. 2000; **19**: 39 – 47.
12. Alavi SM, Alavi L. Epidemiology of animal bites and stings in Khuzestan, Iran, 1997–2006. *J Infect Public Health*. 2008; **1**: 1 – 55.

13. Sheikholeslami NZ, Rezaeian M, Salem Z. Epidemiology of animal bites in Rafsanjan, southeast of Islamic Republic of Iran, 2003 – 2005. *East Mediterr Health J.* 2009; **15**: 455 – 457.
14. Turner GS. A review of the world epidemiology of rabies. *Trans R Soc Trop Med Hyg.* 1976; **70**: 175 – 178.
15. Akbari M. The epidemiologic study of animal bites in Iran Tehran, Islamic Republic of Iran, Ministry of Health and Ministry of Medical Education, 2003–2005; 2005: 50.
16. Zeynali M, Fayaz A, Nadim A. Animal bites and rabies: situation in Iran. *Arch Iran Med.* 1999; **2**: 120 – 124.
17. Belotto A, Leanes LF, Schneider MC, Tamayo H, Correa E. Overview of rabies in the Americas. *Virus Res.* 2005; **111**: 5 – 12.
18. Jafary J, Yoosefnejad A. The epidemiologic study of animal bites in Khorasan (2002–2004). Paper presented at the 14th Iranian Congress of Infectious Diseases and Tropical Medicine, 17–21, Tehran, Islamic Republic of Iran; 2005.
19. Sadeghi M, Mohamadi H, Taghiloo B. The epidemiologic study of animal bites in Zanjan (1994–2004) Paper presented at the 14th Iranian Congress of Infectious Diseases and Tropical Medicine, Tehran, Islamic Republic of Iran; 2005.



Ozgol, North East of Tehran (Photo by M.H. Azizi MD, 2012)