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Animal bite incidence in the County of Shush, Iran

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ABSTRACT

Objective: To determine the epidemiology of animal bites during a five-year period (2004–2008) in Shush County, Khuzestan province, southwestern Iran. **Methods:** In a descriptive cross sectional study, all cases of animal bites referred to the health centers in Shush County were investigated during 2004–2008. The necessary data were recorded on the special questionnaire that contains questions about bite animal, age, sex, occupation, treatment, the bite site on the body and so forth. **Results:** Out of a total of 2 283 cases that underwent the animal bites during the mentioned five years, 1 771 people (77.6%) were male and 511 (22.4%) were female. Most cases were related to age groups 10–20 (33.4%) and 20–30 (22%) years. The average incidence rate of animal bite during these years was determined as 2.82 cases per 1 000 people. The highest incidence rate was related to the year 2007 with 3 cases per 1 000 people. Animal bites in the winter (29.3%) and fall (29%) were more common. Almost 86.5% and 13.5% of the cases occurred in rural areas and urban areas, respectively. Nearly 30% and 20.4% of cases were students and farmers, respectively. A total of 2 155 (94.4%) and 86 (3.8%) bites occurred by the dog and cat, respectively. The greatest bite place on the body was in the feet (81.4%) and in the hands (13%). During the study period, 2 162 cases (94.7%) were treated with an incomplete regimen, and 120 cases (5.3%) were treated with a complete regimen. **Conclusions:** Because the cost of prevention after biting for the health system is high, so, preventive programs must be concentrated on public health instruction, particularly in villagers, students, farmers and the owners of the domestic animals.

1. Introduction

Rabies is one of the very dangerous viral zoonoses and all mammals can be infected to the disease. Cause of the rabies is a neurotrop virus belonging to the class Mononegavirales, the family Rhabdoviridae, and the genus Lyssavirus[1]. More than 2.5 billion people in more than 100 countries are at risk of the disease. About 10 million people yearly are receiving treatment after biting for the prevention of catching rabies. About 50 000–60 000 deaths caused by rabies are reported in the world.

The disease mainly is transferable through biting and sometimes through mucous tissues, respiration, placenta, contaminated instruments and plantation of organs. More cases of rabies can be observed in developing countries[2].

This disease in tropical areas is endemic. Almost 99.9% of mortalities caused by human rabies as well as 98.5% of animal bite cases are related to these areas[3].

Historically, there has been rabies in Iran. In more than 90% of the cases, dogs and cats are the main source of infection to humans. An effective barrier can be created by vaccination at least 70% of dogs and cats to prevent the transmission of rabies to humans[4]. Rabies disease in most of the provinces and Counties of Iran is common in two domestic and wild forms[5].

Rabies among wildlife of Iran is endemic and infection frequently occurs in domestic animals[6–8]. In the north of the Iran, dogs, foxes and jackals are the most important vectors of the rabies disease and in the west and northwest, the wolves are the main vectors. In Iran, the highest cases of animal rabies have been observed in the regions of the north, northeast and northwest, as well as Fars and Kerman provinces[9].

In a study conducted in the provinces on the sidelines of the Caspian Sea during the years 1996–2006, six cases of

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human rabies have been observed. During this period, 175 843 cases of animal bites were reported that the uptrend was evident in the incidence rate. As well as invasive animals at 83% and 17% of cases were dog and fox, respectively^[10]. A ten-year study (1998–2007) of rabies in the northern provinces of Iran indicated that of 1 059 animal rabies cases, the most positive rabies cases were observed respectively in the cow, dog, fox, jackal and wolf. Moreover, out of 235 767 cases of animal bite, ten people died due to rabies. Most animal bites were caused by dog (as pets) as well as respectively by fox, jackal and wolf (as wild animals)^[11].

A study in Sri Lanka reported that 95% of cases of animal bites were caused by dog^[12]. In the World Health Organization's reports, most cases of human rabies have been in children under 15 years and 40% of cases of rabies have been in the ages of 5–14 years^[13]. A study conducted by Pasteur Institute of Iran on 136 deaths caused by rabies, showed that the highest percentage of death have been in the age group of 10–19 years (30%) and among male persons (77%) and the inhabitants of the villages (83%)^[14].

An increase in the trend of animal bites causes to spend a lot of money to purchase the vaccine and anti-rabies serum annually. Also, the rabies fatality rate is high, so that once clinical symptoms appear (in humans or animal), rabies cannot be cured and the patient will die^[15,16]. In general, several factors must be considered in the programs of the fight against rabies and control it, which the first act includes surveillance, epidemiological investigation and gathering data. One of the principal problems related to the disease prevention and control, is a lack of a regular monitoring and reporting system.

This shortcoming has led to a lack of sufficient, correct, and timely data in this respect; therefore, it should be the people's cooperation and participation opportunity. Due to increased public awareness of the dangers of animal bites and many visits to receive the required treatments, separate surveys in different regions are necessary. Given the high rate of rural population in the Shush County and keeping a dog at home, this epidemiological study was conducted to reduce the economic – health burden on the health – medical care system.

2. Materials and methods

This study was done on cases with animal bite recouring to antirabies center in the Shush County, Iran, from 2004–2008. In this descriptive cross-sectional research, data were collected via a questionnaire including questions about the specifications of the bitten individuals including job, gender, age, bite animal, bite site on the body, residence place (rural or urban), treatment and so on. Data analysis using SPSS and Excel softwares was performed.

3. Results

During the research period (2004–2008), 2 282 exposed individuals treated for animal bites were included in this study. The average incidence rate of animal biting in the Shush County during the above five years was approximately 2.82 per one thousand populations. There was almost an increased incidence rate for animal biting over the five years with 1.47, 1.43, 2.66, 3 and 2.84 per one thousand people, respectively. Figure 1 shows the trend of animal bites cases during the study period.

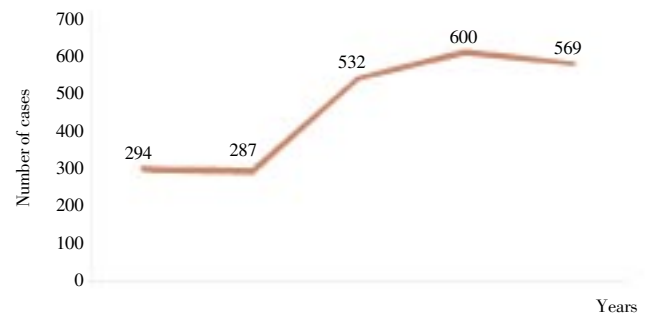


Figure 1. Trend of animal bites frequency in Shush County, Khuzestan province, southwestern Iran (2004–2008).

Bites were most frequent among the 10–20 years age group (33.4%), followed by 20–30 (22%) and 5–10 (12.8%) years age groups (Figure 2). According to month, animal bites in November (11.6%) were higher than other months, however the lowest rates were recorded in September (6.2%) (Table 1). Regarding the season, animal bites cases were documented in winter (29.3%), autumn (29%), spring (21.7%) and summer (20%), respectively.

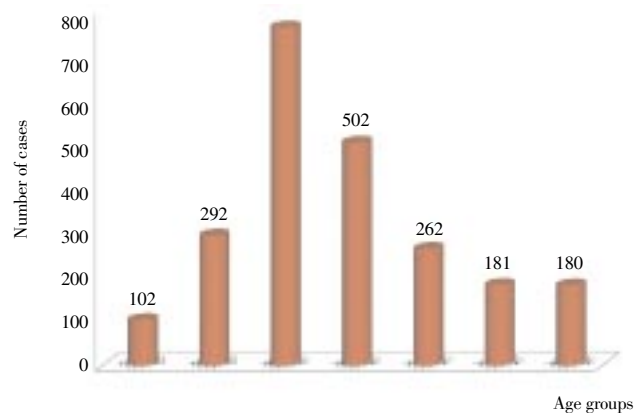


Figure 2. Age distribution of the animal bites cases in Shush County, Khuzestan province, southwestern Iran (2004–2008).

Males were more frequently (77.6%) affected than females (22.4%). The findings from this study indicated that the animal bites cases during all months of 2004–2008 were higher in males than in females. According to extracted results from the Table 1, the animal bites rates in males were approximately documented 3.5 times more than the females.

Totally 86.5% (1 974 cases) of animal bite incidents were in the rural areas and 13.5% (308) had experienced it in the city, which were 6.4 times more than urban areas.

Table 1

Prevalence of animal bites cases by month and sex in Shush County, Khuzestan province, Southwestern Iran (2004–2008).

Sex month	No. (%)	Female No. (%)	Male No. (%)
April	166(7.3)	23(13.9)	143(86.1)
May	177(7.8)	47(26.6)	130(73.4)
June	152(6.7)	30(19.7)	122(80.3)
July	154(6.8)	36(23.4)	118(76.6)
August	160(7.0)	44(27.5)	116(72.5)
September	142(6.2)	38(26.8)	104(73.2)
October	151(6.6)	35(23.2)	116(76.8)
November	265(11.6)	51(19.3)	214(80.7)
December	247(10.8)	56(22.7)	191(77.3)
January	219(9.6)	42(19.2)	177(80.8)
February	245(10.7)	59(23.8)	186(76.2)
March	204(8.9)	50(24.5)	154(75.5)
Total	2282(100)	511(22.4)	1771(77.6)

Upper extremities were the most frequent bite site (81.4%) followed by lower extremities, trunk and head–face, respectively (Figure 3). Most bites had occurred for 684 students (30%) and 466 (20.4%) for farmers (Figure 4). Moreover, 2 162 cases (94.7%) had complete vaccination while 120 (5.3%) had incomplete. The cases were mostly related to dog bites (94.4%) and cat bites (3.8%) (Table 2). During this period, 536 stray dogs in rural areas and 705 in urban areas were hunted.

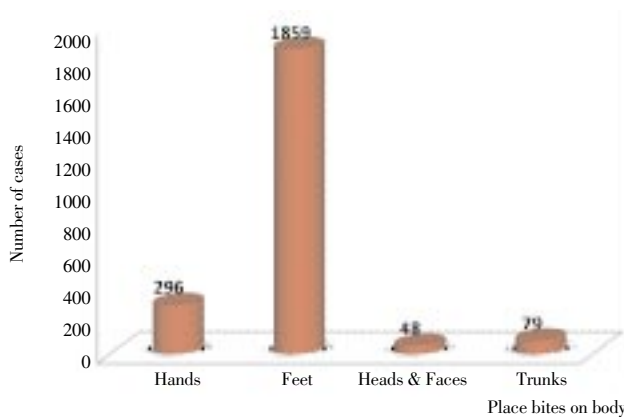


Figure 3. Frequency of distribution of animal bites cases by bite sites on the body (feet, hands, trunks, heads–faces and necks) in Shush County, Khuzestan province, Southwestern Iran (2004–2008).

Table 2

Frequency distribution of animal bites cases by biter animals in Shush County, Khuzestan province, Southwestern Iran (2004–2008).

Biting animals years	Dog No. (%)	Cat No. (%)	Wolf No. (%)	Jackal No. (%)	Fox No. (%)
2004	286(97.3)	6(2.0)	0(0.0)	2(0.7)	0(0.0)
2005	271(94.4)	10(3.5)	4(1.4)	2(0.7)	0(0.0)
2006	499(93.8)	16(3.0)	2(0.4)	9(1.7)	6(1.1)
2007	562(93.7)	31(5.2)	2(0.3)	3(0.5)	2(0.3)
2008	537(94.4)	23(4.0)	3(0.5)	2(0.4)	4(0.7)
Total	2 155(94.4)	86(3.8)	11(0.5)	18(0.8)	12(0.5)

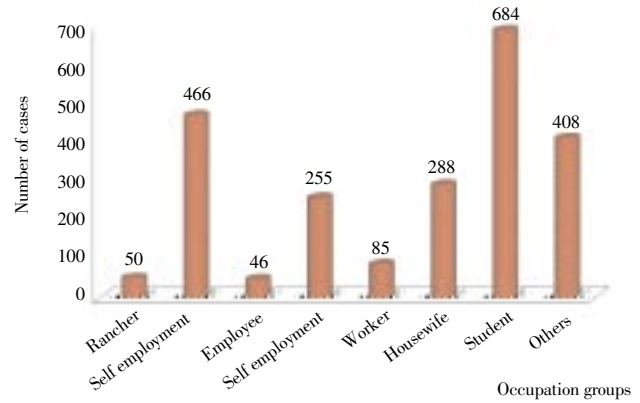


Figure 4. Frequency distribution of animal bites cases by titer animals in Shush County, Khuzestan provincem, Southwestern Iran (2004–2008).

4. Discussion

In the present study, animal bite cases during 2004–2008 were 294, 287, 533, 600 and 569, respectively. Also, the incidence rates per 1 000 people were respectively 1.47, 1.43, 2.66, 3 and 2.84. A study conducted in Kalaleh County, reported the incidence rate of animal bites during the years 2003, 2004 and 2005 respectively 745, 787 and 788 per 100 000 people and the average incidence rate as 773 cases per 100 000 people[17]. A study in Switzerland in 1998, reported the incidence rate of animal bites as 325 cases per 100 000 people[18].

In many studies of animal bites in different climates of Iran, the same results have been reported that are consistent with the results of the present study. The results of this study showed that most people who have been bitten by animals (33.4%) were in the age group 10–20 years. Overall, 50.7% of patients were under 20 years of age. Higher rate of biting in the age group 10–20 years are largely due to play with the biting animal, annoy and approach it. What is important in relation to this finding is being possible training of this age group, and paying attention to the key role for schools to learn about rabies. In Dadypour’s study in Kalaleh County, most cases of bites were in the age group 10–19 years (29.4%) [17]. A study in 1998 in Virginia, considered the possibility of bite for people under the age of 18 much more than adults[19]. In Majidpour’s study in Ardabil Province, most victims (44.13%) were in the age group 10–29 years[20]. In Zeinali’s

study, half of the victims were belonged to the age group 10–29 years^[21]. In Tepsumethanon's study in Thailand, 42.3% of patients were in the age group of 10–14 years and 39.7% in the age group of 5–9 years^[22]. In Singh's study in India, the most amounts of animal bites were reported in the age group 5–14 years^[23]. In Pancharoen's study in Thailand, the mean age of children less than 14 years bitten by an animal, has been reported as 6.7 years^[24]. Findings of America Pennsylvania study were different with other studies' results, so that greatest amount of animal bites was reported in children less than five years^[25].

In the present study, the feet were the most major site of the animal bites on the body. Out of 2 282 victims of animal bites, 1 859 cases (81.4%) had been attacked from the feet region. The feet are the most common site of the animal bites (67%) in Kalaleh County^[17].

In a study in Tabas County, most cases of the animal bites were related to upper extremity (55.6%)^[2]. In Majidpour's study, out of 4 331 cases of the animal bites in the province of Ardabil, 3 078 cases (71.79%) had been attacked from the feet region^[20]. Bahonar's study in Ilam province, reported 69.7% of bites in the feet^[26]. In the Tepsumethanon's study, feet (56.6%) were the most common place of damage to the body of children in Thailand^[22]. In Oginni's study of Nigerian children^[27] and in Pandey's study of tourists and foreign residents of Nepal^[28], injury to the face had higher rate. In Sadeghi's study in Western Azerbaijan Province, out of 3 867 cases of the animal bites, 2 580 cases (66.7%) have been bitten in the lower extremity^[29]. It can be claimed that the bites on the lower extremities are more because of the escape of the aggressive animal, but the bites on the upper extremities are more caused by annoying animals and playing with them.

In the present study, 1 771 cases of the animal bites (77.6%) were in the male sex and 511 cases (22.4%) were in the female sex. The amount of animal bite in the male sex was about 3.5 times higher than the female sex. In other studies men more than women have been exposed to animal bite that their results are consistent with the results of this study^[21,23,25]. In a study conducted on 2 431 cases of animal bite in Ilam County, animal bite in men (73.2%) was significantly higher than in women (26.8%)^[26]. Reported results can be interpreted such that more occurrence of animal bite in men is because of more contact with animals, their conscious risk-taking and spending more time outside the home. Perhaps it can be said that being more number of employed men than women as well as more caution by women when working or leaving the house reduces the dramatic events in women. In Pandey's study conducted on tourists and foreign residents in Nepal, women (61%) more than men (39%) were bitten by rabid animals^[28]. Perhaps this increased prevalence is caused by the increased presence of women in the outdoors and an increase in the social activities.

In this study, most cases of animal bite (86.5%) occurred

in the residents of the villages. This is the reason that the majority of the population in Shush County is resident in rural areas, as well as the rural households have domestic dog. Sarani in a study in the Iranshahr County showed that 54.4% and 54.6% of the cases happened in the cities, and in the villages, respectively^[30]. Also, in Gharehchahi's study in Fars Province, 40.1% and 59.8% of the bites had taken place in the cities and villages, respectively^[31]. In Bahonar's study in Ilam Province^[26] and Dadypour in Kalaleh County^[17], most of the bites in rural areas had taken place respectively 64.5% and 54.4%.

In this study, 2 155 cases (94.4%) were bitten by dogs; its results are consistent with other studies^[20,21]. This issue could be due to the presence of the dog in the most rural households. Therefore, the appropriate behavioral skills training in dealing with these animals in groups at risk is important. In a survey in Sri Lanka, 95%–97% of patients diagnosed with rabies were infectious by dogs. This issue shows double necessity to control the stray dogs^[12].

In this study, the amount of animal bite in spring, summer, autumn and winter was determined as 21.7%, 20%, 29% and 29.3%, respectively. Higher prevalence of biting in winter may be justified by more mobility of animals to find food. In Dadypour's study, the highest percentage of bites (29.8%) was related to the spring^[17]. Being more bites in this season may be related to an increase in travelling people in rural and agricultural areas. In Majidpour's study, animal bite was more in the summer and seasonal distribution on animal bites happened 28.3%, 29.6%, 20.8%, and 21.2% in spring, summer, autumn and winter, respectively^[20].

In the present study, the highest cases of animal bite were in November (11.6%), December (10.8%) and February (10.7%) and the lowest items were in the months of September (6.2%), October (6.6%) and July (6.7%). In a study of animal bite in the year 2000 in Ardabil Province, the highest cases were reported in the months of August, September, October, and December^[20]. In the present research, higher rates of the animal bites were in students and farmers, which it was consistent with findings of Majidpour, Bahonar and Dadypour^[17,20,26].

Given the bites by animals occurred more at ages 10–30 years, appropriate training for this group in conjunction with the use of appropriate coverage when contact with animals, changing traditional behavior with animals and complete and immediate vaccinations of people bitten by animals can prevent deaths caused by it. Also, due to most bites occurred by dogs, it is necessary to consider vaccination of domestic dogs and domestic dogs should have a collar during the day. Furthermore, because most bites occurred in villages; so, in addition to towns, the program to kill stray dogs must be done in villages as well.

Because most of the bites in Shush County were done by dogs, so, public training programs should be implemented by health authorities to prevent this problem in order to reduce the amount of dog bites.

Conflict of interest statement

The authors declare that there are no conflicts of interest.

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