

An Epidemiologic Survey on Animal Bite Cases Referred to Health Centers in Mashhad During 2006 to 2009

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ABSTRACT

Despite vast improvements in prevention and treatment of animal bite, its annual prevalence is increasing. The first step in preventing animal bite is to determine environmental and human risk factors. Among the causes, dog has the most important role in disease transmission to humans. According to World Health Organization (WHO) estimates, 40 to 70 thousand people annually die of rabies in endemic countries. The annual cases of animal bite in Iran are 140 people per 100 thousand populations. The highest rate of animal bites belonged to Golestan Province in 2007 with an incidence of 610 cases per 100 thousand populations. Besides population differences in terms of hygiene level and the required awareness, climatic variability emphasizes the need for separate surveys in different parts of the country. In this regard, the present study aimed at identifying the recorded cases of animal bite referred to health centers of Mashhad (No. 1, 2, 3) during 2006-2009. In this descriptive-cross sectional study, all animal bite cases referred to the health centers of Mashhad (No. 1, 2, 3) during 2006-2009 were collected based on the data recorded in notebooks. Then, the information such as number, job and gender of bitten individuals, the species of the responsible biting animal, and the sort of rabies vaccination was filled in questionnaires. The data were analyzed using SPSS-16. Statistical tables and Chi-Square test were used for data description and analysis. A total of 14037 cases of animal bite during 2006-2009 were studied. The animal bite cases in urban areas and men were 61.5% and 81.8%, respectively. The most bitten individuals aged 20-29 years old (24%). Peoples with nongovernmental jobs (24.1%) were in the first place and then students were in the second place (19.1%). The seasonal distribution of animal bites showed that the most of bites occurred in summer (25.7%). Hands and legs were bitten in 44.1% and 43.9% of cases, respectively. In terms of the animal type, the majority of cases were bitten by dogs (77.3%). Only 16.9% of cases were vaccinated against rabies completely and the remainder has not received complete vaccination. The results of the present study showed that animal bite is still one of the most important problems of public health in Mashhad. It is recommended to increase the awareness level of people exposure to animal bite to improve the health condition. Furthermore, it is suggested to eliminate reservoir and carrier animals and immunization of owned animals (pets) on specified time periods.

Key words: Animal bite, Epidemiology, Mashhad.

INTRODUCTION

Nowadays, much information have been obtained on zoonosis diseases which has led to vast progress in regard with the diagnosis and treatment of these diseases. Diseases caused by animal bites are considered as a public health problem in the world including Iran. Despite vast improvements in prevention and treatment of these diseases, the

annual event of animal bite is increasing¹. Population at risk includes children and young people. In the case of young people, the cause is their presence in the workplace, especially in farm. In the case of minors, insects are the most common cause of bite². The first step in prevention of animal bite is to determine the environmental and human risk of the trauma³.

Among the causes of animal bite, dogs have the most important role in disease transmission to humans⁴. In urban areas of Iran, stray dogs and cats are the most cause of animal bite, while in rural areas, pet and sheep dogs are the most cause. Since many pet and sheep dogs in Iran have no certificate and have not been vaccinated against rabies, the bite cases by these animals become very important medically. The increased number of stray dogs, increased cases of animal bite and distribution of rabies in many provinces of Iran emphasize the need for more attention to disease control and research in its various aspects⁵.

According to WHO estimates, 40 to 70 thousand people die annually of rabies in endemic countries. Furthermore, 10 million people are treated following animal bite². Annually, 140 people per 100 thousand population cases of animal bite occur in Iran⁶.

The highest rate belonged to Golestan Province in 2007 and 2008 with an incidence of 610 and 593 cases per hundred thousand population, respectively. During 1996-2003, 8.4 deaths occurred in Iran due to rabies. In 2002, the incidence of rabies were 173 cases per hundred thousand population⁸.

Given the increased public awareness of the dangers of animal bite in recent years and increased referrals to receive required treatments, the data analysis by responsible organizations can be effective in increasing our knowledge on rabies epidemiology. It also can facilitate essential health training programs and reduce the burden of this disease on the healthcare system of the country. Wide geographical spread, climate diversity, the dependence of rabies risk factors on wildlife species, in addition to demographic differences in terms of the level of public health and the required awareness emphasize the need for separate surveys in different parts of Iran. In this regard, the present study aimed to determine the cases of animal bite referred to health centers of Mashhad (No. 1, 2, 3) during 2006-2009.

MATERIALS AND METHODS

In a cross-sectional study, the records related to animal bite in three health centers in

Mashhad during 2006-2009 were evaluated. Variables including age, gender, occupation, bite size, damaged organ, biting animal and the type of treatment were investigated and recorded in a questionnaire. The questionnaire was prepared based on the objectives and available data. The reliability and validity of the questionnaire have been approved. The records with incomplete information were excluded from the study.

The obtained data were classified and entered into SPSS-16. Statistical tables and Chi-Square test were used for data description and analysis.

RESULTS

A total of 14,037 cases of animal bite referred to Mashhad health centers during 2006-2009 were studied. The number of animal bite in urban and rural areas was 61.5% and 38.5%, respectively. The number of male and female patients was 81.8% and 18.2%, respectively. In terms of age groups, the most bitten individuals aged 20-29 years old (24.8%). Table 1 shows the animal bite frequency in different age groups. (Table 1)

In terms of job, those with nongovernmental jobs (24.1%) were in the first place and then students were in the second place (19.1%). The seasonal distribution of animal bite showed that 3616 cases (25.7%) occurred in summer. The number of animal bite cases in summer and winter was 3220 (23%) and 3283 (23.3%) cases, respectively. In terms of bitten organ, in 6197 cases (44.1%), hands were bitten. In 6166 (43.9%), 1197 (8.5%), 427 (3%), and 50 (0.3%) of cases legs, body, head and face and neck were bitten, respectively. No significant differences were observed in terms of season, occupation and bitten organ.

In terms of the animal type, most cases of animal bites were dog and cat bites with 10,848 (77.3%) and 2504 (17.8%) cases, respectively. Table 2 shows the frequency of animals responsible for bites. (Table 2)

In term of owned or stray biting animals, most cases belonged to the urban owned animals

Table 1: The frequency distribution of selected individuals by age in Mashhad during 2006-2009

Age (year)	Number	(%)
< 5	392	8.2
5 - 10	1029	7.3
10 - 20	3331	23.7
20 - 30	3488	24.8
30 - 40	2147	15.3
40 - 50	1496	10.7
50 and > 50	2154	15.4

Table 2: The frequency distribution of individuals bitten by animals in terms of biting animal in Mashhad during 2006-2009

Biting animal	Number	(%)
Dog	10848	77.3
Cat	2504	17.8
Wolf	11	1
Jackal	6	0
Fox	22	2
*Other domestic animals	581	4.1
**Other wild animals	65	5

* Monkeys, rats or mice, rabbits, squirrels, hamsters, horses and donkey

**Animals other than foxes, jackals and wolves

and lowest cases were belonging to the rural stray animals. In terms of vaccination coverage, 11,672 cases (83.1%) received incomplete vaccination and the remainder had received complete vaccination. The number of people who had left anti-rabies vaccination incomplete were statistically significant compared with those who received complete vaccination ($P < 0.001$). In terms of the bite size, 13,576 cases (96.7%) were with superficial bites and 461 cases (3.3%) had suffered deep bites. In this regard, the number of people with limited and superficial bites was statistically significant than those who were injured deeper ($P < 0.001$).

DISCUSSION

The results showed that the most cases of animal bite in Mashhad were dog bites (77.3%) and then cat bites (17.8%). The results of a research on

240 affected children in Bushehr showed that most of cases were bitten by dogs (79.6%) and then cats (10.4%), respectively. This ranking is consistent with the results of the present study⁹. The results of a study in Philadelphia showed that 80-85% of animal bite cases were dog bites and 10% were cat bites¹⁰. Quiles¹¹ and Takayama¹² found that the most biting animals were dogs. The high prevalence of dog bites is due to dog-human coexistence as human friend which does many of his/her daily activities, particularly in agriculture, livestock and guarding herds, houses and farms. In addition, in today's world, especially in industrialized and non-Muslim countries, dog plays an important role as emotional companion of human which results in increased contact of human with dogs. The 4-year incidence of animal bites was determined equal to 113 people per hundred thousand population. This was lower than the highest incidence of animal bite in Iran which was belonged to Golestan province (610 people per 100 thousand populations)⁷.

In the present study, the highest involvement ages were 20-29 years old. In a study conducted by Sakhaei et al in Nishabur, most of the people involved aged 20-29 years¹³. In a study conducted by Vadadi et al in Babolsar, the ages 20-29 years have been reported as the most common involvement ages¹⁴. In a study conducted by Amiri in Shahroud, the mean age of the bitten individuals was 29.5 years and the majority of bitten individuals (53.4%) aged 17-30 years¹⁵. The result of three recent studies is in good agreement with the results of the present study. However, the results are inconsistent with the results of a study conducted in Hamadan in which 15-19 years were the highest involvement ages¹⁶. Furthermore, the results of a study conducted by Bahonar et al in Ilam, showed that 44% of bitten individuals were under 20 years old¹⁷ which is inconsistent with the results of the present study. Moreover, the results of a study conducted in Virginia in 1998 showed that the possibility of biting children under 18 years old is much higher than adults. This result is again inconsistent with the results of the present study¹⁸.

Obviously, the age of bitten individuals by animals will vary depending on the cause of animal bite, so that in accidental cases and at home contacts, the age of patients is lower than

cases where occupational exposures underlying the incidence of animal bite. In the cases where animal are being abused by people, animals will proceed to attack. In such cases, the victims are mostly young people.

In the present study, most of animal bites were in the summer which is consistent with a research conducted by Majidpour in Ardabil Province¹⁹. However, the results of the present study are inconsistent with the results of a study conducted by Bahonar in Ilam in which the most animal bites were in winter and spring¹⁷. The results are also inconsistent with the results of a study conducted in Kalaleh in which the most bites were in the spring¹⁴. In all these studies, despite the apparent differences in the seasonal incidence of animal bites, no statistically significant difference was observed. Certainly, in the springtime where livestock activity is prevalent and in the summer due to schools vacation and the presence of youth in the villages and their more cooperation in defined activities in the rural population and increased recreational activities and so forth, the occurrence of animal bite and human contact with animals may show an increase. On the other hand, a higher number of animal bite cases by guardian dogs can be seen in cold seasons²⁰.

In the present study, in the most cases, bitten individuals were men with 11484 cases (81.8%) which is in good agreement with the results of Shetty et al in Sasson hospital²¹. The results of a study conducted in Puerto Rico showed that the distribution of animal bite in both sexes was equal which is inconsistent with the present study¹¹. Since the gender distribution of the animal bite is a function of several factors, obviously, the cases of dog bites related to occupational activities is more common in men. However, accidental bites, the cases which occur due to animal abuse and animal bite cases that occur in homes by pets can occur in both sexes.

In a study conducted in Spain, the most common site of the bite was hand²² which is consistent with the present study. Furthermore, the results are consistent with a study conducted by Simani et al in Tehran²³. However, a study conducted in India reported lower extremities as the most common sites of injury which is inconsistent with the results of the present study²⁴. Moreover, the

results of this study are inconsistent with the results of studies conducted in Kalaleh, Ilam, Babolsar and Nishabur in which the lower extremities reported as the most common sites of injury^{13, 14, 17, 20}. Obviously, the horizontal position of the biting animal and the vertical position of human who is being attacked have a clear intervention in the emergence of the injury in lower extremities. However, the selection of upper extremities and other body parts is more common at home bites and close contacts of human and animals.

In the present study, most of the bitten individuals had nongovernmental jobs (24.1%), then students were in the second place. However, in the studies conducted respectively by Dadipour, Bahonar and Majidpour in Kalaleh, Ilam and Ardabil, students were in the first place and then were farmers^{17, 19-20}. The reasons for the bitten individuals with everyday activities other than agriculture, livestock and working are the following possibilities: the victims referred to health centers did not express their real jobs with this imagination that their pets will be prosecuted and identified, so they just suffice to say they have free jobs. A number of victims subsequent to animal bites, especially in the villages and areas where located in a more remote position from health centers, did not refer to health centers because of the distance. A number of individuals, especially rural farmers and pastoralists imagined the injuries unimportant following an animal bite and did not refer for treatment.

In a study conducted by Abbasi et al, in Ahar (East Azarbaijan) as well as a study conducted by Bahonar et al, the animal bite cases in rural areas were higher than in urban areas^{25, 17}. However, in the present study, the number of urban population (61.5%) was higher than rural population (38.5%). Perhaps, not referring villagers, for reasons such as the distance to health service providers, the lack of attention to the importance and consequences of animal bite are involved in the formation of these results. Misinformation from rural patients about their location and the lack of recording correct information about the location of patients are other possible causes.

In this study, of 14,037 cases of animal bites, 12,768 cases (91%) were bitten by pets and

remainder (1269 cases (9%)) were bitten by stray animals which is consistent with the results of Dadipour²⁰. Also, the results are in good agreement with the results of a study conducted in Spain²². Animal bites by pets may occur for several reasons. Pets are usually reacting to the entrance of outsiders to the home and often barking. Certainly, in the case of abandoned animals, they may attack alien person and damage him/her. Pets react because of their intrinsic properties and may attempt to bite if make sense danger and persecution.

In the present study, only 16.8% of cases received complete vaccination. However, in the research conducted by Amiri¹⁵ in Shahroud and as well as a study conducted in Bushehr, all patients had received full immunization⁹.

Failure to complete the vaccination of the affected patients is presumably due to this fact that in most cases the biting animal remains alive and well after 10 days and the wound site somewhat improves. The treatment is stopped by the affected person who leads to an incomplete treatment. Work involvements, distance and low health information

and not understanding the importance of the risk worsen the situation.

CONCLUSION

The results of the present study showed that the animal bite is still a major public health problem in Mashhad. Hence, to improve the health status associated with animal bite, it is recommended to increase the public awareness level through public education and activation of notification system to prevent human rabies in Mashhad. Reservoir and carrier animals should be eliminated. Pets should be vaccinated in specified time periods by Veterinary Administration. Measures such as sterilization and registration of these animals should be carried out. The principles of animals' maintenance in homes and buildings should be observed.

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