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ORIGINAL ARTICLE

Animal bites and rabies in northern Iran; 2001–2005

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ABSTRACT

Background: Animal bites are potentially harmful for people. The prophylaxis approach is effective and safe, however, it is expensive and sometimes may be used without clear indication. Prophylaxis programs depend on local epidemiology. The aim of this study was to survey the animal bites and rabies epidemiology in northern Iran.

Patients and methods: We performed a descriptive study on all animal bites and rabies in the Mazandaran Province during 2001 to 2005. Initial data including age, sex, site of bite, incidence, type of animal, geographical distribution, number of vaccinations and death by rabies were gathered and analyzed by SPSS soft ware.

Results: Annual frequency of animal bites was between 3,174 and 4,670 in the Mazandaran Province. One hundred sixty bites per 100,000 persons occur annually, with a cost of approximately US $0.5 million in health care expenditures and loss of income. Twenty thousand animal bites occurred during the year of 2001 to 2005. Behshar, with 302.88 cases per 100,000 persons was the most prevalent city. We found that the majority of bites are from dogs (84.87%), especially stray dogs. Men are frequently bitten by dogs (79.62%), while adolescence is the most frequent victims of dog bites, especially in rural areas. Dog bites resulted in 2 deaths, both of which had bites on their faces.

Conclusion: Exposure to dogs, especially stray dogs in Mazandaran Province, reported the majority of cases of human bites and post-exposure prophylaxis.

Keywords: *Animal Bite, Rabies, Dog*.
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INTRODUCTION

Rabies is perpetually lethal acute encephalitis, which affects all mammals, and is caused by viruses within the genus *lyssavirus*, in the Rhaboviridae family .Rabies is found in mammals in all regions of the world, except for Antarctica. In developed countries, control of stray dogs and obligatory immunization of owners dogs, have resulted in the successful elimination of rabies in these areas including most of North America, therefore, a dog bite leads to a noticeably reduced risk of rabies exposure, however, dog rabies remains largely uncontrolled in most of Asia and Africa (1). In addition to rabies in dogs, different rabies variants occur among other mammalian hosts including, multiple bat species, coyotes, jackals, foxes, skunks, raccoon, wolves, and other wild canines in different regions of the world (1-5).

In developing countries, where canine rabies is still endemic, most cases of human rabies are attributed to dog bites, with an estimated incidence of 200 to 800 per 100,000 persons (6). Rates of human rabies are highest in Asia, more than 3 cases

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of rabies per 100,000 persons per year, were reported in India and Sri Lanka in the 1970 (6).

In Iran approximately 130,000 people receive post-exposure prophylaxis annually (7). Both forms of rabies have been reported in Iran, urban rabies which propagated chiefly by unimmunized domestic dogs and has been observed in rural areas, and the sylvatic rabies which is propagated by foxes, wolves, and jackal, were witnessed in urban areas (7-9). Mazandaran is one of the provinces which has rabies virus as a natural reservoir in wild and domestic animals (7). Therefore this study was conducted to assess the burden of exposure to rabies risk factors in this particular province.

PATIENTS and METHODS

This descriptive study was performed on all animal bites in Mazandaran during the year 2001 to 2005.

Mazandaran Province is located in northern Iran with an approximate population of 3,000,000 in 2005. Data were gathered from case reports of animal bites submitted to the public health center by local health authorities. Patient's questionnaire were reviewed for age, gender, exposure date, contact type (bite or scratch), site of bite, aggressor animals, geographical distribution, date of contact, date of starting prophylaxis, type of prophylaxis (vaccine or specific serum immunoglobulin prophylaxis), compliance with prophylactic measures, number of vaccination and human mortality due to rabies. Finally, data were analyzed by SPSS soft ware (version 12.0, SPSS Inc., Chicago, 2003).

RESULTS

The total population of Mazandaran Province (based on the 2005 General Population and Housing Census) was 3,000,000 persons. Overall, the incidence of animal bites and rabies exposure was (32,079/3,000,000) 160 per 100,000 people, with descending order of frequency in different regions of the province including, Behshahr (302.88 cases per 100,000 person), Ramsar (283.94), Neka (241.79), Juybar (188.22), Nur (175.52), Chalus (171.51), Sari (171.32), Babolsar (154.35), Savadkuh (143.94), Qaemshahr (139.66), Mahmudabad (138.48), Amol (134.97), and Tonekabon (115.77 cases per 100,000 person). During the period of 2001 to 2005, two cases of human rabies were diagnosed (in 2003, another case in 2001), both had scratch on their faces and unfortunately didn't referred to health centers for anti rabies prophylaxis. One of them was a 55 years old woman and the second one was a 6 years old boy. They died in hospital after 3 to 5 days of symptoms onset. Thus, they did not receive any post-exposure treatment.

The demographic characteristics of the exposed population studied include: 18,445 (79.6%) males and 4,723 (20.4%) females. The age distribution was 0-4 years, 466 (2.01%); 5-9 years, 1,822 (7.86%); 10-19 years, 6,605 (28.50%); 20-29 years, 5,064 (21.85%); 30-39 years, 3,387 (14.61%); 40-49 years, 2,816(12.15%); and >50 years, 3,008 (12.98%). Of these, 20282 subjects (63.22%) lived in rural areas. All the cases were bitten by animals; except the two which died of rabies after two months secondary to scratches on their faces.

The most common sites of bite were the lower extremities (52.93%), followed by upper extremities, trunk, face and neck in 39.5%, 5.74%, 1.8 % and 0.37% of the patients, respectively. None of the patients had pre-exposure prophylaxis against rabies. The necessity of post-exposure prophylaxis (PEP) for each patient was evaluated by a general practitioner. The prescribed schedule of immune prophylaxis followed the recommendation of the National Health Authorities, accordingly to WHO recommendations (10-12). All patients who were recommended for immune globulin prophylaxis were also recommended for vaccination. Rabies

immune prophylaxis, either immune globulin prophylaxis or vaccine, was indicated in all cases, however, only 16.4% (n = 5263) received both immune globulin (HRIG) and vaccine. Totally, 83.6% (n=26816) received only vaccine.

The estimated annual cost was approximately US $0.5 million. Surveillance of rabid animals and similar conditions in wild and domestic species is most likely to be reservoirs of disease (13). In this study, 271 brain specimens from suspicious dogs were submitted for laboratory diagnosis in Pasteur Institute of Tehran, when human exposure occurred and positive results were determined for 143 animals.

DISCUSSION

Rabies in Iran and Mazandaran remain feared. In Mazandaran, domestic rabies was largely under control up to present. In this province, due to the frequent opportunities for interaction through shared urban and rural areas, 20,000 animal bites were recorded during 2001 to 2005. We found the incidence rate of human rabies to be at 0.7 per million per year. Nevertheless, 10 deaths from rabies occur each year in Iran (8,9).

General practitioners in Public Health Center evaluated the necessity of PEP which included the use of HRIG and vaccine. The PEP guidelines are in accordance with WHO guidelines and local recommendations.

HRIG has provided in cases with bites to head, face, neck, multiple injuries and deep wounds. PEP administration was documented in 160 cases, per 100,000 people each year in Mazandaran.

Not unexpectedly, exposure was seen predominantly in adolescent and young adults, with over 28.50% of exposures occurring between 10 to 19 years of age. In comparison to females, males were more exposed to a bite by a rabid animal. Most exposures occurred in young adults and major victims of rabies were children, perhaps as they are bitten by a stray dog.

Analysis of 192 case records of rabies cases from India revealed that dog bites caused maximum mortality (96.9%). Nearly 40% were children below 15 years of age and 78.6% were males indicating that it is an exposure related disease (14).

When attacked by dogs, the lesions were often on the child's head and neck. Thus, not surprisingly, this lesion site was associated with the highest risk for developing rabies (15,16).

In our study, the 2 diagnosed human rabies in Mazandaran Province, did not seek medical service prior to encephalitis or did not receive any PEP.

Surveying rabies trend in china (15), of 244 human rabies cases in Guangdong Province, 67.2% did not seek medical services or did not receive any PEP. Up to 62.5% of their patients did not receive proper treatment of the wounds, 92.5% did not receive adequate post-exposure vaccination and 91.25% did not receive any anti-rabies immunoglobulin (15).

In a study by Simani et al (8), during 1995 to 1999, 44 cases of human rabies were diagnosed in Iran. Most cases were observed in the young, with over 63% of human rabies below 20 years of age. In rabies endemic areas, since many of these exposures are never reported, it is likely that there are a high proportion of young children dying from un-diagnosed rabies (17). These results suggest that population may not be aware of the risks of rabies transmission.

We found that approximately 52% of brain specimens were positive for rabies, hence, we had a poor effective strategies for rabies control in dogs in our region.

Finally, a mass animal (dog) vaccination campaign for the control and elimination of rabies is vital. At this time, Iran has not implemented enforced immunization for dogs and rabies vaccine was provided at the cost of the owners, however, the cost is quite high. It appears that the increase in canine rabies, an increase in the dog population and decrease in the vaccine coverage of dogs, may have

contributed to the apparent upwards trend in human rabies.

In conclusion, exposure to dogs, especially stray dogs in Mazandaran Province, which has a greater potential than other regions of Iran for this occurrence, reported the majority of cases of human bites, post- exposure prophylaxis and loss of income. We recommend dog licensing, muzzling, vaccination of dogs, removal of stray dogs and also, educating school children and the general public, particularly in rural regions, regarding the dangers of stray animals, with a heightened awareness of dogs, which is crucial for effective rabies control in humans, as well as animals in Iran.

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