

# Demographics of rabies exposure in north-west of Iran: 5 years experience

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## Original Article

### Abstract

**BACKGROUND:** Rabies is a neuropathogenic disease, always fatal, which involves domestic and wild animals and attracted global concern for its distribution. This research aimed to demonstrate potential rabies infected animal bites and related risk factors in North-West of Iran in order to evaluate the area's demographics and risk factors.

**METHODS:** A retrospective cross-sectional review was done for patients referred to Rabies Disease Control and Prevention Center placed in Sina Hospital, Tabriz, Iran.

**RESULTS:** A total of 1084 patients, 918 men and 166 women (777 city and 307 rural residential) were enrolled in this study. Median age ranged from 20 to 30 years. Accidents were the highest in January and May. Dogs accounted for 72.4%, cats 20.6%, rats 4.1% and others 3%. 45.8% of the attacks occurred at homes, 41.8% outdoors, and 12.4% at work. 80.4% of them were pet animals, 15.6% were outdoors and 4.1% were wild. 80.4% were under observation, 17.5% escaped, and 2.1% were killed. Superficial bites accounted for 78.7% of all bites, and 21.3% were deeply bitten. Bites conflicted to upper limbs (50.6%), lower limb (43.5%), head (2.4%), neck (0.6%), chest (1.8%), abdomen (0.7%), and genitalia (0.3%). 54.3% of all the bite exposures occurred in covered sites whereas 45.7% affected naked sites. Surprisingly, 98.6% of the animal, mostly pets, had no history of vaccination.

**CONCLUSIONS:** This research admitted lacked attention in vaccination when it would have been appropriate, led to rabies disease which is always fatal. Bite rates were higher among adult males, in cities by dogs. Upper limbs, mostly covered, were bitten commonly superficial.

**KEYWORDS:** Rabies, Demography, Risk factor

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### Introduction

Rabies is a neuropathogenic disease with mortality of 100%, which is the consequence of exposure to any members of the *Lyssavirus* genus.<sup>1</sup> This zoonotic disease involves domestic and wild animals and attracted global concern for its distribution, except Antarctica.<sup>2</sup>

The disease is contagious even before the manifestation of clinical symptoms, through a bite, scratch, or licks of mucous membranes

or broken skin by the saliva of contaminated animals to humans. It can be transmitted through humans in cases of grafts (cornea);<sup>3</sup> A significant cause of morbidity and mortality happen worldwide, especially in Asia, Africa and Latin America, where rabies is endemic. Dog-related injuries are the main route of infection.<sup>1</sup>

Rabies has variable asymptomatic period following inoculation and incubation with the average time of 1 to 3 months, long

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enough to allow passive immunization and vaccination. If the disease presents as encephalitis or a paralytic syndrome, death would always be the result. Prognosis may be difficult in the early stages of the disease.<sup>3</sup> Shorter incubation times are related to intensity of bite incidences to head and neck. Incubation longer than 1 year has rarely been seen.<sup>4</sup> Bite injuries to the head and neck region can result in distressing physical and psychological consequences. School-aged children and males are the most common victims for a known dog (friends, neighbors and family pet) attacks.<sup>5</sup>

Several studies in the other countries are done to show epidemiological features of rabies.<sup>5-9</sup> This research demonstrated potential rabies infected animal bites and risk factors in North-West of Iran in order to evaluate the area's demographics and risk factors.

### Methods

This was a retrospective cross-sectional review in North-West of Iran, (East Azerbaijan Province) Tabriz, from 21 March 2009 to 20 March 2011. All the referrals to Rabies Disease Control and Prevention Center placed in Sina Hospital were the study population.

Data comprised the patients identifications

such as age, gender, residency (city/province), place of exposure, time of exposure (DD/MM), animal type (domestic/wild/stray), anatomic location of bite, either organ was hidden or naked, depth of injury, and vaccination history were studied. Patients with any characteristic defects were excluded.

Descriptive analyses of the data were performed using SPSS for Windows 15.0 (SPSS Inc., Chicago, IL, USA) and Microsoft Excel 2007.

### Results

This study assessed a total of 1084 patients (918 men and 166 women). Residents in urban [777 (71.7%)] areas were more compared to rural residents [307 (28.3%)]. As manifested, males had 5.5 times greater risk factors for bite attacks.

Data mostly ranged in age from 20 to 30 years with modal age of 30 (range 1 to 86 years). Represent highest attack accidents in January and May and the rest are as the figure 1.

In this study, dogs have been recognized as major animal transmitting rabies. 785 cases (72.4%) of all the bites were due to dogs followed by 223 (20.6%) cats, 44(4.1%) rats and 32 (3.0%) other animals.

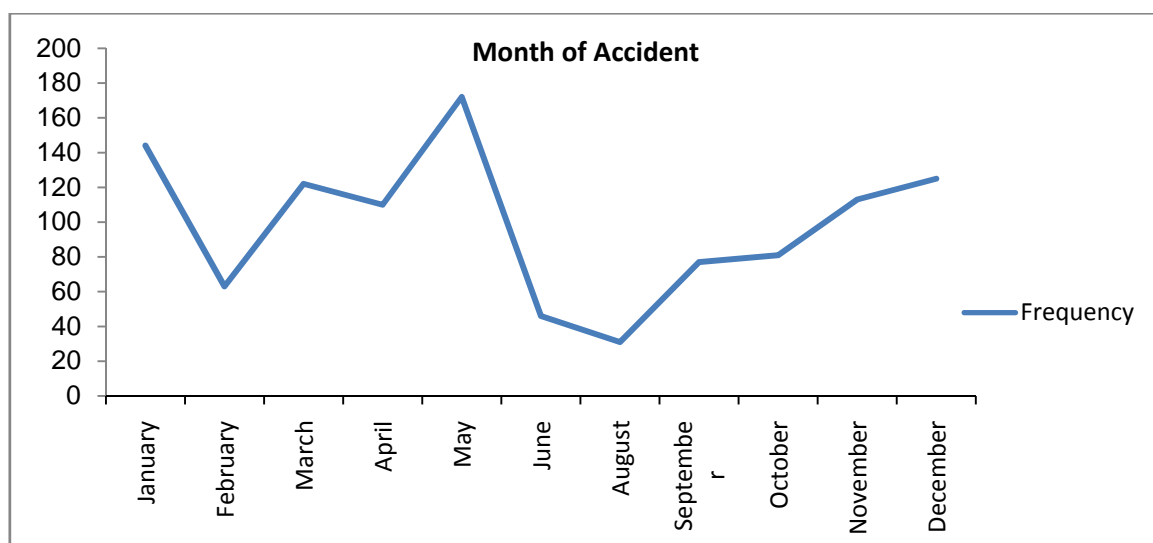


Figure 1. Frequency of attacks by month

Domestic pets [871 (80.4%)] outnumbered outdoor [169 (15.6%)] and wild animals [44 (4.1%)] in attacks. A large proportion of accidents took place at home [497 (45.8%)]; while 453 cases (41.8%) were outdoors and 134 (12.4%) of them were victims of occupational attacks.

Based on our animal bite survey, 871(80.4%) of them were under observation; albeit, 190 (17.5%) of them escaped and 23 were killed (2.1%). Discrepancy was evident in depth of bite with 853 (78.8%) superficial frequency and 231 deep bite injuries and (21.3%) as well as upper extremity injuries than lower extremity followed by other extremities (Table 1).

Table 1. Anatomic locations of bite

Location	Frequency	Percentage
Upper limb	548	50.6
Lower limb	472	43.5
Head	26	2.4
Neck	7	0.6
Chest	20	1.8
Abdomen	8	0.7
Genitalia	3	0.3

Moreover, bites were inflicted more on covered sites (54.3%) compared to naked sites (45.7%). It should be noted that although domestic animals were responsible for most of the cases, they were not vaccinated against rabies. 15 patients were vaccinated while the rest were not.

## Discussion

Some epidemiological cases of the human rabies in Tabriz reflect findings from other reports. Rabies victims in Tabriz were mostly male, similar to China,<sup>8</sup> Indonesia (Bali),<sup>2</sup> the United States (New York),<sup>7</sup> Philippines,<sup>4</sup> the United Kingdom<sup>6</sup> and also Bhutan.<sup>9</sup> In addition, our review showed dog bites accounted for most animal bite visits comprising 72.4% of all, conforming to other emergency department (ED)-based surveillance systems, which have described dog bites visits accounting for between 49.6

to 97.1 percent, followed by cats.<sup>2,4,6-8</sup> The large study sample size permitted assessment of rat bite visits as well.

These data showed relative age distribution to our research,<sup>2,4,6</sup> with diversity in higher rates of attacks in different ages. For instance, Brooke Bregman and Slavinski, Tenzin et al.<sup>7,9</sup> indicated 5-9 years old patients greater in frequency; however, Dimaano et al.<sup>4</sup> suggested adults (accounting > 20 years) and Wijaya et al.<sup>6</sup> reported 20 to 50 years old to be the more common victims. The last two mentioned, are parallel to our study (20-30 year old victims).

We noted distinctly January and May perilous months for accidents, a striking contradiction seasonal predilection toward summer,<sup>7,8</sup> fall<sup>8</sup> and spring (March-May).<sup>9</sup>

According to the results, bites located mostly on patients' upper extremities. Dimaano et al.<sup>4</sup> reported similar findings, contrasting Susilawathi et al.,<sup>2</sup> Wijaya et al.,<sup>6</sup> Tenzin et al.,<sup>9</sup> Hampson et al.,<sup>10</sup> and also Sabouri et al.<sup>11</sup> who reported lower extremities as the most frequent location for bites.

Bites on the head and neck were less frequent whereas bites on the abdomen and neck and genitalia were the least frequent in contrast to China<sup>8</sup> and Tanzania<sup>10</sup> that bites on the head and neck contributed significantly to the number of human rabies cases.

We revealed a significant number of superficial bites (n = 853) with small inclined infliction to covered sites (n = 589). City visiting alone were responsible for 71.7% of all rabies exposure (777 vs. 307) comparing to Susilawathi et al.,<sup>2</sup> and Song et al.<sup>8</sup> who displayed most coming from rural areas.

Our description of high incidence of bite victims in pet-related rabies (80.4%) were more likely to be placed at home (45.8%). A few American data suggested wild animals contamination with 92% proportion of all rabies.<sup>12,13</sup> On the other hand, stray dogs were responsible for transmission of the diseases in 64.5%<sup>4</sup> and 71%<sup>9</sup>, in other studies.

We have to claim that a good number of

the attacking animals were under surveillance. We noted that although the majority of our animal cases were pets, probably owners lacked knowledge, were not vaccinated when expedient.

### Conclusion

Rabies has become a major health problem in Tabriz due to underestimating the importance of vaccination against it. Male adults (at the age of 20-30 years) are thought to be at risk for animal bites, dogs in particular.

January and May were more accidental months. Since pets acted more aggressive in this study, house attacks tend to be greater than occupational-associated and outdoor's. It was understood that superficial bites conflicted to covered sites outnumbered in upper extremities. Cities were discussed to be better places for bite incidents. We have the majority of infected animals under control.

### Conflict of Interests

Authors have no conflict of interest.

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