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Epidemiological patterns of animal bites in the Babol County, North of Iran

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ABSTRACT

Objective: To describe the current situation of animal bites in the Babol County, North of Iran.

Methods: This was a cross-sectional study based on recently collected data of 3 798 victims bitten (656 females and 3 142 males) from 2010 to 2014 in the Health Center of Babol, Iran. The interest variables in the study included demographic variables, characteristics of animal, some of the time patterns, and some clinical patterns provided to victims.

Results: The average age of victims was (33.68 ± 17.23) years. The age group with the max proportion (for males, 32.1%; for females, 26.2%) of bites occurred in 18–30 years old group for males and 30–45 years for females. The ratio of male victims to female ones was 4.78. In terms of place of incident, 2 502 (65.9%) cases of animal bites occurred in rural areas. Dogs and cats were the most dominant biters with 3 340 (87.9%) and 395 (10.4%) bites, respectively. For the kinds of biters, 3 643 (95.9%) were pets, 133 (3.5%) were strays and 22 (0.6%) were wild animals. Most of the lesions were on shoulder as well as upper organs (46.9%) and lower organs (41.0%), respectively.

Conclusions: Since the average age of the subjects with injuries on the head and upper organs was lower than that of victims with other organs injured and since that pet dogs were the major biter, structured monitoring programs that focus on specified target groups in collaboration with other organizations are essential to control the animal bites.

1. Introduction

Animal bites are the most common sources of rabies virus infection[1]. Millions of people are vaccinated against rabies virus all around the world every year. Due to the lack of the disease control in pets and wild animals in Iran, the risk of rabies is notable[2,3]. Animal bites have serious medical consequences including trauma, wound infection, exposure to rabies virus and social costs for the bitten individuals, and lead to thousands of deaths and injuries[4].

More than ten million people every year in different regions of the world are treated due to animal bites to prevent rabies[5]. So that, 96.5% of the economic losses caused by the rabies treatments have occurred in low- and middle-income countries which include approximately 560 million dollars[6]. Due to the lack of advanced care system for rabies, the actual number of victims is probably higher than reported number[7]. According to the World Health Organization, more than 2.5 billion people are at risk of the disease, and the disease has been reported in more than 100 countries[8].

The incidence rate of animal bites has increased in Iran in recent years[9]. In terms of animal bites epidemiology in Iran, like other regions, dogs are responsible for the majority of injuries[3].

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Taking care of animal bite-related injuries can provide useful information for planning and evaluation of public health interventions[10]. Providing broad and detailed information about the epidemiological patterns, transmission dynamics of the disease in humans and animals is essential to the success of any control program in order to control animal bites by implementing modern modeling methods and strategies appropriate to each region. The aim of this study was to describe the epidemiology aspects of animal bites in the Babol County and then to suggest preventive and control actions.

2. Materials and methods

2.1. Methodology

This cross-sectional study was conducted from April 2010 to March 2014 in a health center of Babol County. Babol County is located in the Mazandaran Province with a humid climate covered by abundant forests and pastures.

The data were based on available records of animal bites at the health centers, so all bitten victims during the study period referred to health centers for the prevention, treatment and follow-up measures were extracted.

Bitten person is a person who, due to animal bite and their fear of rabies infection, was admitted to the rabies units.

The interest variables included demographic characteristics (age, gender, occupation), specifications of the living place of victims (urban or rural) and location characteristics when injuries occurred (urban or rural), animal types, species of animals (pet, stray and wild) and the animal's situation (dead or alive) after the bite, information relating to the organ of the body injury, wound extension, wound type, and the bites with/without protection of cloth, time patterns of injuries (hour, day, month, season, year), patterns of health cares provided to the patients, number of vaccination, vaccination status of tetanus vaccine, infusion of rabies serum, time length of lag (in days), and a previous history of animal bites.

The data in this study were analyzed by SPSS software, version 19. Descriptive characteristics were presented with mean value and SD, and in case of lack of normality, the median and interquartile range were used. The frequency (%) was used for qualitative variables. Furthermore, the age of the victims was categorized into five age groups: less than 7 years, 7–18 years, 18–40 years, 40–60 years and over 60 years.

2.2. Statistic analysis

The *Chi*-square test was used to assess a probable statistically significant difference between qualitative variables and Fisher's exact test was applied for limitations on the observed frequency. Independent-samples *t*-test was used to compare the equality of two mean values in qualitative variables and default equality of variances, and One-way ANOVA test was used to test the equality comparison of the averages among the ranks of qualitative variables. *P*-value less than 0.05 was considered as the significance level. The protocol for the present study was reviewed and approved by the Ethical Committee of Babol University of Medical Sciences.

3. Results

A total of 3 798 cases of animal bite occurred during the study period. The mean age of the victims was (33.68 ± 17.23) years, and the age of victims ranged from 2 to 90 years. There was a significant difference between the mean age of males [(33.01 ± 16.73) years] and females [(36.91 ± 19.14) years] ($P < 0.001$). The most common age groups involved in the bites for males and females were 18–30 years and 30–45 years, respectively (Table 1).

Table 1
Distribution of age groups in terms of gender of bitten victims referred to health centers of Babol County, Iran (2010-2014). *n*(%).

Age groups (years)	Male	Female	*P*
< 7	141 (4.5)	43 (6.6)	0.001
7–18	457 (14.5)	81 (12.3)	
18–30	1 009 (32.1)	132 (20.1)	
30–45	815 (25.9)	172 (26.2)	
45–60	514 (16.4)	161 (24.5)	
> 60	206 (6.6)	67 (10.2)	
Total	3 142	656	

Males comprised 3 142 (82.7%) cases of all victims; ratio of male to female was 4.78. In terms of the occupational distribution of victims, the most frequency belonged to the self-employed ones with number of 1 253 (33.0%), followed by students 546 (14.4%), housewives 484 (12.7%), and farmers 464 (12.2%), respectively.

In terms of living place, 1 358 (35.8%) cases were found from urban areas and 2 440 (64.2%) from rural areas. About bite location, 1 296 (34.1%) cases happened in urban areas and 2 502 (65.9%) in rural areas. In addition, 5.0% of urban residents were bitten in rural areas, while 0.2% of rural residents were bitten in urban areas.

The highest frequency of animal bites during the days of the week (according to Iranian week) was in Saturday (641, 16.9%) and lowest was in Friday (502, 13.2%). In terms of the distribution of animal bites over the years, the most animal bites happened in September (345, 9.1%), followed by April (339, 8.9%) and the least frequency was in March (262, 6.9%). The majority of bites happened between 6 a.m. to 12 a.m. and 12 a.m. to 6 p.m. (Figure 1). There was a significant relationship between the time of injury and animal activity, and more animal bites were coincided with daily activities of mankind ($P = 0.01$).

According to the distribution of site of body injury, the greatest frequency belonged to the shoulder and upper organs with 1 783 cases (46.9%), followed by lower extremity with 1 556 cases (41.0%) and the lowest proportion pertained to the head and neck with 76 cases (2.0%) and abdominal organs with 78 cases (2.1%).

A significant correlation was observed between age groups and the site of the body injury ($P < 0.001$). Based on the results of One-way ANOVA test, the average age of victims with head and neck injuries (25.72, SD = 21.02) was lower compared to that of the victims with injuries to lower extremities (33.79, SD = 16.45) and victims with injury to two or more organs (37.83, SD = 17.88) ($P < 0.001$) (Figure 2).