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Prevalence rate and epidemiological determinants of animal bite in Ahvaz County, Khuzestan Province, Southwestern Iran

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ABSTRACT

Objective: To investigate the prevalence rate and epidemiological aspects of animal bite in Ahvaz County (western part), Khuzestan Province, Southwestern Iran during the 2nd half 2003–2007. **Methods:** In this descriptive cross-sectional investigation a questionnaire was completed for each victim. The questionnaire included questions like, occupation, gender, age group, attacker animal, vaccination type (complete or non-complete), bite place on the body, type of dog bite (stray or domestic dog), residential area (urban or rural). Data analysis was done by SPSS software using descriptive statistics. **Results:** The total number of 4 186 cases had been found. The highest number of bitten persons were in 2007 (1 079 cases) and 2005 (1 032 cases). The maximum prevalence rate belonged to 2005 (2.04/1 000 population). Also, Most of the victims were males (80%). Eighty percent of the bites were from urban regions. The majority of cases were related to 10–19 years age group (32.8%). The highest frequencies of bites were students (28.9%). Upper extremities were the most common bite place (61.4%). About 91.3% of cases were injured by dogs. Furthermore, around 83.7% of animal bites treated by incomplete rabies prophylaxis regimen. No cases of human rabies were observed in our study. **Conclusions:** The dogs were the major attacker animal, affecting mostly the age group 10–19 years old and men. Therefore, we should pay more attention about controlling this problem.

1. Introduction

Rabies is one of the very important viral zoonoses. Cause of this disease is a neurotropic virus belonging to the genus *Lyssavirus*[1]. Rabies mainly is transmissible through biting of animals. Majority of rabies cases are found in developing countries[2]. Nearly 99.9% of fatalities caused by human rabies and 98.5% of animal bite cases are happened in tropical areas[3].

In more than 90% of the cases, dogs and cats are the major source of infection to humans. An impressive obstacle can be made through vaccination minimum 70% of dogs and cats

to prevent the transmission of rabies to humans[4]. Rabies in most of regions of Iran is prevalent in two domestic and wild forms[5]. Rabies disease among wildlife of Iran is endemic and infection mostly happens in domestic animals[6–8]. In the northern Iran, dogs, foxes and jackals are the most significant vectors of the rabies and in the western and northwestern Iran, the wolves are the major vectors[9].

In an investigation directed in the littoral provinces of the Caspian Sea during the years 1996–2006, six human rabies cases and 175 843 animal bites were observed. Meanwhile, aggressive animals at 83% and 17% of cases were dog and fox, respectively[10]. A ten-year research (1998–2007) of rabies in the northern Iran showed that of 1059 cases of animal rabies, the most positive cases were reported respectively in the cow, dog, fox, jackal and wolf. Also, out of 235 767 of animal bites, ten persons died because of rabies. The majority of bites were caused by dog[11].

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An investigation in Sri Lanka reported that 95% of bites were caused by dog^[12]. According to WHO's reports, most human rabies cases have been in children under 15 years old^[13]. A research directed by Pasteur Institute of Iran on 136 deaths caused by rabies, displayed that the most percentage of dying have been in the age group of 10–19 years (30%) and in males (77%) and in rural areas(83%)^[14].

An excess in the trend of bites causes to expend lots of money to buy the rabies serum and vaccine, annually^[15,16]. Totally, some invoices should be noticed in the schedules of rabies control, which the first function comprises collecting information and epidemiological study. Based on the great amount of animal bite in the Ahvaz County, this epidemiological investigation was done to reduce the financial – sanitation burden of animal biting.

2. Materials and methods

This descriptive cross-sectional study was performed on patients with animal bite referring to western Ahvaz health centers and Razi hospital, Ahvaz County, Khuzestan Province, southwestern Iran, from the second half 2003 through 2007. Data collection tool was the questionnaire that was filled out for each case of animal bite. The questionnaire consisted queries on epidemiological determinants like, residency site, occupation, gender, age, attacker animal, rabies prophylaxis treatment (complete or non-complete), site of bite and etc. This information were arranged and analyzed pursuant to the objectives of this project. Collected data were analyzed by descriptive statistics (percentage, mean and frequency distribution).

3. Results

During the studied period, 4186 cases had been recorded. The total number of animal bite cases has increased from 868 in 2004 to 1 032 in 2005 and 1 079 in 2007. The average prevalence rate of animal bite was 1.5/1 000 people. The highest prevalence rate was 2.04/1 000 people in 2005 (Table 1). Of the cases studied, 80% were males and 20% were females (Table 2). Also, 80% and 20% were living in urban and rural regions, respectively (Table 3). Animal bite cases were common among the age groups of 10–19 years (32.8%) and 20–29 years (23.2%). Those aged 40–49 years (7.4%) and >50 years (8.4%) had the lowest frequency of animal bite (Table 4). Based on the results of table 5, the highest and the lowest of the victims were students (28.9%) and ranchers (0.8%).

Furthermore, feet were the most frequent bite place (61.4%) followed by hands (30%), trunk (5.7%) and head-neck (2.9%) (Table 6). About 91.3% and 5.6% of all mentioned patients were injured by dogs and cats, respectively (Table 7). Out of 3824 dog bites, 3 419 cases (89.4%) were bitten by domestic dogs and 405 cases (10.6%) were attacked by stray dogs. In the 2nd half 2003, 2004, 2005 2006 and 2007, 86.2%, 90.2%, 91.3%, 93% and 85.6% of dog bites were bitten by domestic dogs, respectively. Table 8 shows the kind of vaccination regimen against rabies. Around 83.7% received non-completed rabies prophylaxis treatment regimen and 16.3% treated by completed rabies prophylaxis regimen. In 2004, the highest frequencies of animal bites were in the spring (28.8%), winter (25.5%), summer (24.1%) and autumn (21.6%), respectively. In the above year, the majority of bites were in April (10.3%), June (9.4%), July (9.4%), January (9.2%), and May (9%), respectively. No cases of human rabies were observed in our study.

Table 1

Frequency distribution and prevalence rate of animal bite cases in Ahvaz County, Khuzestan Provincem, Southwestern Iran (The 2nd half 2003–2007).

Years	Frequency No. (%)	Prevalence/1000
2 nd Half 2003	490(11.7)	1.01
2004	868(20.7)	1.77
2005	1 032(24.7)	2.04
2006	717(17.1)	1.24
2007	1 079(25.8)	1.80
Total	4 186(100)	–

Table 2

Frequency distribution of animal bite cases by sex in Ahvaz County, Khuzestan Province, Southwestern Iran (The 2nd half 2003–2007).

Sexes Years	Male No. (%)	Female No. (%)	Total No. (%)
2 nd Half 2003	397(81.0)	93(19.0)	490(100)
2004	707(81.4)	161(18.6)	868(100)
2005	822(79.6)	210(20.4)	1 032(100)
2006	574(80.1)	143(19.9)	717(10.0)
2007	847(78.5)	232(21.5)	1 079(100)
Total	3 347(80.0)	839(20.0)	4 186(100)

Table 3

Frequency distribution of animal bite cases by residential areas in Ahvaz County, Khuzestan Province, Southwestern Iran (The 2nd half 2003–2007).

Residential areas years	Urban No. (%)	Rural No. (%)	Total No. (%)
2 nd Half 2003	172(35.1)	318(64.9)	490(100)
2004	465(53.6)	403(46.4)	868(100)
2005	822(79.7)	210(20.3)	1 032(100)
2006	312(43.5)	405(56.5)	717(10.0)
2007	505(46.8)	574(53.2)	1 079(100)
Total	2 276(80.0)	1 910(20.0)	4 186(100)

Table 4

Frequency distribution of animal bite cases by age groups in Ahvaz County, Khuzestan Province, Southwestern Iran (The 2nd Half 2003–2007).

Years age groups	2nd Half 2003 No. (%)	2004 No. (%)	2005 No. (%)	2006 No. (%)	2007 No. (%)	Total No. (%)
0–9	83(16.9)	148(17.0)	175(17.0)	108(15.1)	173(16.0)	687(16.4)
10–19	191(39.0)	295(34.0)	372(36.0)	222(31.1)	291(27.0)	1 371(32.8)
20–29	127(25.9)	182(21.0)	206(20.0)	187(26.0)	270(25.0)	972(23.2)
30–39	30(6.2)	113(13.0)	103(10.0)	86(12.0)	162(15.0)	494(11.8)
40–49	25(5.1)	61(7.0)	83(8.0)	57(7.9)	86(8.0)	312(7.4)
>50	34(6.9)	69(8.0)	93(9.0)	57(7.9)	97(9.0)	350(8.4)
Total	490(100)	868(100)	1032(100)	717(100)	1 079(100)	4 186(100)

Table 5.

Frequency distribution of animal bite cases by occupation in Ahvaz County, Khuzestan Province, Southwestern Iran (The 2nd half 2003–2007).

Years job group	2nd Half 2003 No. (%)	2004 No. (%)	2005 No. (%)	2006 No. (%)	2007 No. (%)	Total No. (%)
Ranch	5(1.0)	9(1.1)	3(0.3)	7(1.0)	11(1.0)	35(0.8)
Farmer	39(7.9)	61(7.0)	69(6.7)	72(10.0)	108(10.0)	349(8.3)
Employee	15(3.1)	35(4.0)	62(6.0)	29(4.0)	43(4.0)	184(4.4)
Self employment	73(14.9)	156(18.0)	165(16.0)	143(19.9)	194(18.0)	731(17.5)
Worker	59(12.0)	78(9.0)	72(7.0)	43(6.0)	65(6.0)	317(7.6)
Housewife	64(13.1)	95(10.9)	145(14.0)	93(13.0)	151(14.0)	548(13.1)
Student	132(27.0)	252(29.00)	351(34.0)	194(27.11)	280(26.0)	1 209(28.9)
Others	103(21.0)	182(21.0)	165(16.0)	136(19.0)	227(21.00)	813(19.4)
Total	490(100.0)	868(100.0)	1 032(100.0)	717(100.0)	1 079(100.0)	4 186(100.0)

Table 6.

Frequency distribution of animal bites cases by bite site in Ahvaz County, Khuzestan Province, Southwestern Iran (The 2nd half 2003 – 2007).

Years bite sites	2nd Half 2003 No. (%)	2004 No. (%)	2005 No. (%)	2006 No. (%)	2007 No. (%)	Total No. (%)
Hands	137 (28.0)	286 (33.0)	320 (31.0)	201 (28.0)	313 (29.0)	1 257 (30.0)
Feet	323 (65.9)	495 (57.0)	619 (60.0)	452 (63.1)	680 (63.0)	2 569 (61.4)
Heads & necks	10 (2.0)	26 (3.0)	31 (3.0)	21 (2.9)	32 (3.0)	120 (2.9)
Trunks	20 (4.1)	61 (7.0)	62 (6.0)	43 (6.0)	54 (5.0)	240 (5.7)
Total	490 (100.0)	868 (100.0)	1 032 (100.0)	717 (100.0)	1 079 (100.0)	4 186 (100.0)

Table 7Frequency distribution of animal bites cases by attacker animal in Ahvaz County, Khuzestan Province, Southwestern Iran (The 2nd half 2003–2007).

Bithing animals years	Dog No. (%)	Cat No. (%)	Others No. (%)	Total No. (%)
2 nd Half 2003	464(94.7)	21(4.3)	5(1.0)	490(100.0)
2004	801(92.3)	41(4.7)	26(3.0)	868(100.0)
2005	921(89.2)	72(7.0)	39(3.8)	1 032(100.0)
2006	645(90.0)	36(5.0)	36(5.0)	717(100.0)
2007	993(92.0)	65(6.0)	21(2.0)	1 079(100.0)
Total	3 824(91.3)	235(5.6)	127(3.1)	4 186(100.0)

Table 8.

Frequency distribution of animal bites cases by type of vaccination regimen in Ahvaz County, Khuzestan province, Southwestern Iran (The 2nd half 2003–2007).

Years	Treatment type		
	Complete No. (%)	Incomplete No. (%)	Total No. (%)
2 nd Half 2003	93 (19.0)	397 (90.0)	490 (100)
2004	174 (20.0)	694 (80.0)	868 (100)
2005	172 (16.7)	860 (83.3)	1 032 (100)
2006	115 (16.0)	602 (84.0)	717 (10.0)
2007	129 (12.0)	950 (88.0)	1 079 (100)
Total	683 (16.3)	3 503 (83.7)	4 186 (100)

4. Discussion

The finding of this investigation showed that the victims of animal bite referred to western Ahvaz health centers and Razi hospital, Ahvaz County, southwestern Iran, from the 2nd half 2003 to 2007 were 4 184 persons. The mean prevalence rate of animal bite was 1.5/1 000 people. A survey done by Dadypour and et al's in Kalaleh County, reported the incidence rate of bites during 2003, 2004 and 2005 respectively were 745, 787 and 788 /100 000

population and the average incidence rate as 773 cases/100 000 population^[17]. A research in Switzerland in 1998, reported the incidence rate of bites as 325 cases/100 000 population^[18].

In the present investigation, the most of bites (32.8%) were in the age group of 10–19 years. In a study in Kalaleh County, the most amounts bite cases were belonged to the age group 10–19 years (29.4%)^[17]. A research in 1998 in Virginia, noticed the probability of bite for persons below the age of 18 much more than adults^[19]. In a research in Ardabil Province, majority cases (44.13%) were belonged to the age group 10–29 years^[20]. In Zeinali's investigation, half of the bite cases were pertained to the age group 10–29 years^[21]. In Tepsumethanon's investigation in Thailand, 42.3% of cases were in the age group of 10–14 years and 39.7% in the age group of 5–9 years^[22]. In a study in India, the majority of patients were belonged to the age group 5–14 years^[23].

In this investigation, the important bite site of the body was the lower extremities. Of 4 186 patients of animal bites, in 2 569 cases (61.4%) the lower extremities were the most significant bitten sites. In a study in Ilam Province, reported 69.7% of animal bites in the feet^[24]. In an investigation in Nigerian children^[25] and in Pandey's study of tourists and foreign residents of Nepal^[26], hurt to the face had greater rate. In a research in Western Azerbaijan Province, out of 3 867 victims of the bites, 2 580 patients (66.7%) have been bitten in the feet^[27]. It can be argued that the bites on the feet are higher due to the scam of the aggressive animal, but the bites on the hands are more caused by stimulating animals and disporting with them.

During these 4.5 years (the 2nd half 2003–2007), 3 347 (80%) and 839 (20%) cases of animal bites were occurred in males and females, respectively. The animal bites rate in male gender was four times further that of the female gender. In a research managed on 2 431 victims in Ilam County, animal bite in males (73.2%) was significantly more than in females (26.8%)^[24]. Reported findings can be construed such that more incidence of animal bite in males is due to higher contact with animals, their informed risk-taking and expending more time beyond the home. In Pandey's research done on tourists and foreign residents in Nepal, females (61%) more than males (39%) were injured by aggressive animals^[26]. Probably, this enhanced prevalence is due to the increased presence of women in the outdoors and an increase in the social functions.

In this study, the majority of animal bites cases (80%) occurred in urban inhabitants. In a research in the Iranshahr County displayed that 54.4% and 54.6% of the victims occurred in the urban and rural areas, respectively^[28]. Also,

in Gharehchahi's investigation in Fars Province, 40.1% and 59.8% of the animal bites had happened in the urban and rural regions, respectively^[29].

In the present investigation, dogs were responsible for 3 824 (91.3%) bites, which was comply with the findings acquired from other investigations^[20,21]. The suitable behavioral skills teaching faced with these animals in categories at risk are significant.

In the present study, in 2004, rate of animal bites in spring, winter, summer and autumn were 28.8%, 25.5%, 24.1% and 21.6%, respectively. In Dadypour's research, the most percentage of animal bites (29.8%) was with the spring^[17]. Being higher bites in spring may be related to an enhance in travelling individuals in villages and agricultural regions. In Majidpour's investigation, animal bite was greater in the summer and seasonal distribution on animal bites occurred 28.3%, 29.6%, 20.8%, and 21.2% in spring, summer, autumn and winter, respectively^[20]. In the present study, in 2004, the most animal bites happened, in order, during April (10.3%), June (9.4%), July (9.4%), January (9.2%) and May (9%). In a research of animal bite in the year 2000 in Ardabil Province, the most patients were found in the months of August, September, October, and December^[20].

The present study showed that in terms of the occupation, the students (28.9%) had higher rate of animal bite injuries, which it was consistent with results of Majidpour, Bahonar and Dadypour^[17,20,26].

Given the bites by animals occurred more at ages 10–30 years, appropriate training is very important for this group. Furthermore, due to most bites occurred by dogs, it is necessary to consider vaccination of domestic dogs. Also, the program to kill stray dogs is recommended in rural and urban regions.

The role of dogs in the epidemiology of rabies in the Province of Khuzestan seems very important. The mostly of animal bites were caused by dogs with more rate by stray dogs. In order to decrease the problem of dog bite, the different aspects of issue should be highlighted in public sanitation education activities.

Conflict of interest statement

The authors declare that there are no conflicts of interest.

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