

Epidemiological characteristics of dog bite registered at Pasteur Institute, Baghdad/ Iraq 2009 – 2012

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ABSTRACT

INTRODUCTION: Animal bite is a worldwide public health problem and annually 10 million people received post exposure anti-rabies vaccination.

OBJECTIVE: Determining the epidemiological characteristics of animal bites by person, time and place. And to define the post exposure anti rabies vaccine status and use of rabies immunoglobulin.

METHODS: A cross section study based on records of dog bite reported to Pasteur Institute in Baghdad through years 2009 - 2012 was conducted from 3 March to 31 July 2013. Data extracted have included age, gender, site and number of bites, season of bite, vaccination status and use of antirabies immunoglobulin.

RESULTS: Through 2009-2012, 7242 victims of dog bite were reported to Pasteur Institute in Baghdad. The year 2010 has shown the highest rate 2655 (36.7 %). Young adults aged 17-49 years 3248 (45.5 %) and males 5911 (81.6 %) are mostly affected. About one third of bitten persons have received the full 5 doses of the vaccine.

CONCLUSION: Dog bites are still high in our community. Males and young adults were mostly affected. Although most of the victims visited Pasteur institute after the bite, only a third of them have completed their doses despite its availability in our health institutions.

Key words: Dog bite, animal bite, rabies, stray dog, Pasture.

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INTRODUCTION

Dogs bite is a worldwide public health problem. Annually 10 million people received post exposure anti-rabies vaccination. About 65000 – 87000 death worldwide occurred a year due to rabies infection from dog bites mostly in developing countries; in Asia 38000- 60000 people died yearly^{1,2} and in Africa 37000 people died per year.^{3,4}

Historical review of animal bite: Horton et al in 2013⁵ pointed that some of the earliest archaeological records of the domestication of dogs originate from the Laws of Eshunna, a Sumerian city in ancient Mesopotamia what is now the Republic of Iraq, and dogs are thought to have had religious significance during that time.⁶ Those Eshunnian laws, written almost 4000 years ago,

warn of fines for owners of uncontrolled 'mad' dogs that bite humans.⁷ The association of disease with infected dogs is consistent with the knowledge that rabies is spread through the saliva of infected animals, and that dogs are the major reservoir for infections of humans in many endemic areas.⁸

Epidemiology: Animal bites pose a major public health problem in children and adults worldwide. The health impacts of animal bites are dependent on the type and health of the animal species, the size and health of the bitten person, and accessibility to appropriate health care. Numerous mammalian species have the potential to bite humans; however, the most important are those arising from, dogs, cats and monkeys.¹



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Table 1: The category of severity of animal bites according the WHO		
Category of severity	Type of contact with wild or domestic animal	Recommended treatment
1	Touching or feeding of animal licks on intact skin	None if reliable case history can be obtained
2	Nibbling of uncover skin, minors scratches or abrasion without bleeding/ licks on broken skin	Administer vaccine
3	Single or multiple transdermal bite or scratches, Contamination of mucous membrane with saliva (i.e. licks)	Administer rabies immunoglobulin and vaccine Immediately

Scope of the problem: There are no global estimates of dog bite incidence, however studies suggest that they account for tens of millions of bites injuries annually. In the United States of America for example the rate of bites, approximately 4.5 million people are bitten by dogs every year Other high-income countries such as Australia, Canada and France have comparable incidence and fatality rates.⁹ Dog bite fatality rates are higher in low- and middle-income countries than in high-income countries due to lack of post-exposure treatment. Garth and Harris¹⁰ found that among estimated 3-6 (4.5) million animal bites per year in the United States, approximately 80-90% are from dogs, 5-15% are from cats, the peak incidence of animal bites occurs among children aged 5-9 years.¹⁰⁻¹² Children under ten years old were significantly more likely than older children to provoke dogs before being bitten and are most at risk of serious injury.¹³ A provoked bite would occur if a person teases a dog or tries to take away the dog's food while dog is eating.¹⁴ the majority of (non-human) mammalian bite wounds encountered in the emergency department (ED)¹⁵ and any animal whose rabies vaccination status is unknown should be captured and quarantined.¹⁶

World Health Organization (WHO) Defines and categories animal bites as a wound caused by the teeth of a dog, the teeth puncture, tear, scratch, bruise, or crush the person's tissue. The injury can damage skin, nerves, bone, muscle, blood vessels, or joint.^{16, 17} Table 1 shows the categorization according to severity.¹⁸ In Iraq, the Section of Zoonotic diseases at the Department of Communicable Disease Control Centre (CDCs) has started a case-based surveillance program of animal bites including dogs' in 2012. Horton et al in 2013⁵ have reported the trends of rabies affecting human in Iraq from 2001-2010. But, no study stated the trend of dog bites in humans as being the main source of rabies. So, this study is aiming at determine the trend and some epidemiological characteristics of dog bites of human registered at Pasteur Institute,

Baghdad/ Iraq from 2009 – 2012. In addition to describe the post exposure immune-prophylaxis status of those bitten.

METHODS

Setting and Study Design: A record based cross sectional study conducted on the registries of dog bites in human reported at Pasteur Institute in Baghdad from 2009-2012. Data collection was made and analysed from 3 March to 31 July 2013. Pasteur Institute usually recording dog bites occur in Baghdad; however, few victims from other provinces might reported to the institute for many reasons like completing the doses of vaccine but they are representing the real scope of the problem in these provinces.

Ethical Consideration: Using the data of the registry at the Pasteur Institute for this study was approved by its administration and the study was conducted according to the regulations of research unit at Ministry of Health in Iraq.

Definition of the cases, inclusion and exclusion criteria: All cases of dog bites registered at Pasteur Institute during the period from 2009-2012 were enrolled in this study.

Sampling procedure and Data collection: All dog bites victims registered in Pasteur institute through 2009—2012 are included in the study. The total number of dog bites recorded was 7242 patients; demographic features and bite characteristics like address, age, gender, sites of bite, number of bites, and the month in which the bite occurred were extracted into pre-made form. Doses of post exposure prophylaxis (PEP) and rabies immunoglobulin (RIG) were searched for to determine the prophylaxis status of the victims.

Analysis plan: Descriptive analysis study has been done using pivot table in Excel sheet, and Statistical Package for Social Science (SPSS). The results have been illustrated as graphs and tables.

Table 2: Frequency distribution of sample by years 2009-2012 Pasteur Institute/ Baghdad.

Year	Frequency	%
2009	1362	18.8
2010	2655	36.7
2011	1932	26.1
2012	1293	17.9

Table 3: the frequency distribution of the total study sample by governorate.

Residence (Iraqi governorate)	N	%
Baghdad	7242	87.63
Babel	461	5.58
Diyala	261	3.16
Wasit	83	1.00
Karbala	73	0.88
Salah ad Din	45	0.54
Al Anbar	26	0.31
Maysan	20	0.24
Al Basrah	16	0.19
Al Muthanna	9	0.11
Ninawa	7	0.08
DhiQar	7	0.08
At Ta'mim	5	0.06
An Najaf	5	0.06
Arbil	2	0.02
Al Qadisiyah	1	0.01
As Sulaymaniyah	1	0.01
Dahuk	0	0.00
Total	8264	100.00

Table 4: Frequency distribution of study sample by age group, gender and number of bites and Vaccination status.

Variable	N	%
Age group (years)		
Preschool (<5)	442	6.1
Children (5-9)	1137	15.9
Teenagers (10-16)	1424	19.9
Young adults (17-49)	3248	45.5
Middle age (50-69)	856	12.0
Elderly (70+)	135	1.9
Gender		
Male	591	81.6
Female	1331	18.4
Number of bites		
Single	5362	74.04
Multiple	1880	25.95
Vaccination status		
Complete schedule	2372	32.75
Incomplete schedule	4870	67.25
Total	7242	100.0

was 7242. The average registry was 1810 per one year; the minimum was 1293 cases reported in 2012 while the maximum was 2655 cases reported in 2010 with an incidence rate of 18.8, 36.7, 26.1 and 17.9 per 100 population respectively. **Table 2** shows frequency distribution by years, while **table 3** shows the frequency distribution of the total study sample by governorate. Baghdad represents 87.6% of subjects recorded at Pasteur institute registry system during the years 2009-2012.

RESULTS

The total number of dog bites registered at Pasteur Institute in Baghdad from 2009-2012

This study reveals that among registered victims, 5911 (81.6 %) were male and 1331 (18.4 %) were female as seen in **table 4**. Distribution

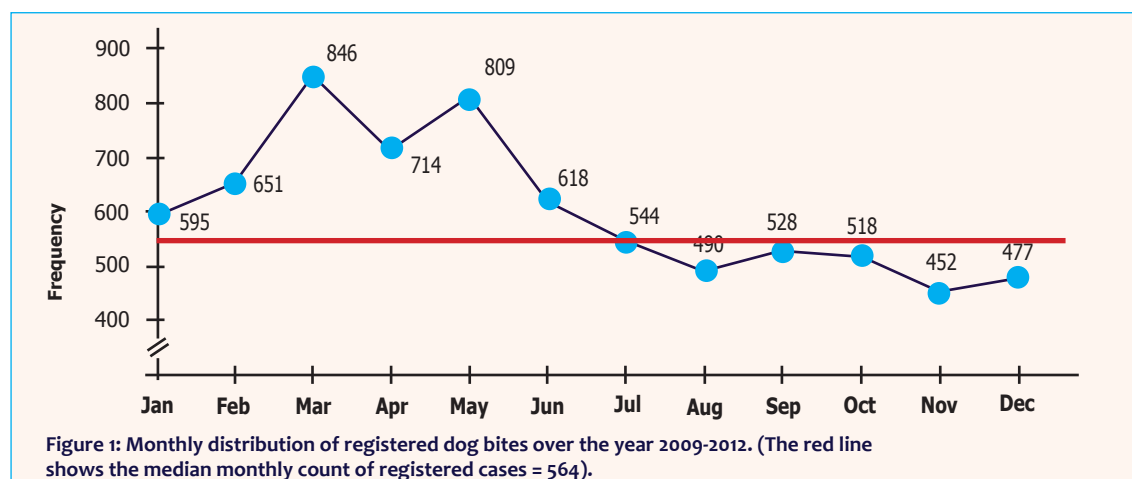


Table 5: The status of completing PEP schedule according to the age of the victims

Age group (years)	Incomplete schedule*		Completed the schedule †		Total	
	N	%	N	%	N	%
Preschool (<5)	283	64.03	159	35.97	442	100
Children (5-9)	745	65.52	392	34.48	1137	100
Teenagers (10-16)	955	67.06	469	32.94	1424	100
Young adults (17-49)	2250	69.27	998	30.73	3248	100
Middle age (50-69)	545	63.67	311	36.33	856	100
Elderly (70+)	96	71.11	39	28.89	135	100
Total	4874		2368		7242	

* Mostly due to lack of awareness about the seriousness of the disease rather than unavailability of vaccine
† Completed the 5 doses as recommended

Table 6: The rate of having RIG by age, gender and site of bite.

	Did not Receive RIG		Received RIG		Total	
	N	%	N	%	N	%
Age group (years)						
Preschool (<5)	265	76.6	81	23.4	346	100.0
Children (5-9)	948	83.4	285	23.1	1233	100.0
Teenagers (10-16)	1233	86.6	191	13.4	1424	100.0
Young adults (17-49)	2955	91.0	293	9.0	3248	100.0
Middle age (50-69)	770	90.0	86	10.0	856	100.0
Elderly (70+)	122	90.4	13	9.6	135	100.0
Total	6293		949		7242	
Gender						
Female	1159	87.1	172	12.9	1331	100.0
Male	5230	88.5	681	11.5	5911	100.0
Total	6389		853		7242	
Type of bites						
Single	5362	88.0	729	12.0	6091	100.0
Multiple	929	88.2	124	11.8	1053	100.0
PEP	7	100.0	0	0.0	7	100.0
Unrecorded	91	100.0	0	0.0	91	100.0
Total	6389		853		7242	
Site of bite						
Head as a site of bite	190	73.5	71	26.5	261	100.0
Trunk as a site of bite	376	84.1	71	15.9	447	100.0
Limbs as a site of bite	5557	88.7	711	11.3	6268	100.0
Unspecified site of bite	52	94.5	3	5.5	55	100.0
Multiple sites bitten	104	98.1	2	1.9	106	100.0
Pre-exposure prophylaxis	7	100.0	0	0.0	7	100.0
Contact (no bite)	98	100.0	0	0.0	98	100.0
Total	6389	88.2	853	11.8	7242	100.0

of victims according to their job has shown that children/students were 3591 (52.9 %), then self employed 1508 (22.6 %). People work in veterinary medicine were the least affected; reported only in 5 persons (0.1 %). **Figure 1** shows that the number of victims where over the monthly av-

erage during late winter and spring while it was below the average during summer and autumn. **Table 5** shows the effect of age on completion of the PEP schedule while **table 6** shows effect of age , gender, types of bites and its site on having RIG or not.

DISCUSSION

This study provides the results of a community-based surveillance to assess the burden, determinants and public services available for dog bites based on registry of Pasteur institute in Baghdad. This study showed that young adult (age 17-49 years) were the most age group affected by dog bites 3248 (45.5 %) followed by children between age 5-16 years 4672 (35.8%). Males were predominantly affected compared to females; 5,911 victims (81.6%) and 1331 (18.4 %) respectively. These figures are explained easily on the bases that teenagers and young adults and males are more exposed to these animals than others with more tendency for provoking the animals. Similar findings were seen in other countries like India in Bangalore city and Ahmedabad,^{19,20} and in Iran.²¹

We seen that the most common site of bites were lower limbs 4270 (68.1%) as it is the most easily approachable part of body for an animal. Upper extremities were the next common inflicted site. Many studies come to a similar results; Agarwal and Reddajah,²¹ Sampath,²² Shetty,²³ Renu Bedi²⁴ and Jairaj Singh Hanspal.²⁵

The majority of our registered cases were bitten on lower extremities alone; a study conducted in Delhi and surrounding areas²⁶ shows a similar results. Although the seasonal variation is not steady in our study, figure 1 shows that the reported cases of dog bites in over the monthly average rate in late winter and spring months. Jairaj Singh Hanspal et al in Delhi²⁵ have reported a higher incidence of dog bites during winter and similarly Agarwal²¹ has come to a similar result. This may be due to the fact that during winter the female dogs are lactating their puppies and in fear of being hurt by humans responding by tendency to bite them.²¹

Victims are required to have RIG 853 (11,9%) as a total site of bites distributed as depicted in **Table 6**, where the majority is in head 71 (26.5%) then the trunk in 71 (15.9), while the least is multiple sites of bites in 2(1.9%). Still the majority 6,293 victims (88,1%) did not receive RIG. Rabies post exposure prophylaxis is available in Iraq, Victims completed the schedule of vaccination 2,314 (32,5%) and those with uncompleted doses 4,810 (67,5). Comparing to a Study performed in Iraq in year 2009-2010 The five-dose (Essen) regime is most frequently followed, and although

a large proportion of dog bite victims receive the first vaccination (75%) a much lower number complete full course (7%) but the study didn't reveal the use of RIG.⁵

CONCLUSION

Dog bites are still high in our community and males and young adults were mostly affected. The outcome of the victims was not known. Although most of the victims visited Pasteur institute on the next day of bite to have their first dose of PEP, only a third of them have completed their doses despite its availability in our health institutions.

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Abbreviation list: Communicable Disease Control Centre (CDCs), Emergency department (ED), post exposure prophylaxis (PEP), rabies immunoglobulin (RIG), Statistical Package for the Social Sciences (SPSS), World Health Organization (WHO)

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