Original article

EPIDEMIOLOGY OF ANIMAL BITE CASES ATTENDING MUNICIPAL TERTIARY CARE CENTRES IN SURAT CITY: A CROSS-SECTIONAL STUDY

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ABSTRACT

Context: Animal bite, especially dog bite is an important public health problem in urban India. Socio-cultural practices and myths consider as major problem for post-exposure prophylaxis of animal bites.

Objectives: To study the epidemiological characteristics and determinants of post-exposure prophylaxis of animal bite victims.

Methodology: It was a cross-sectional study conducted among new cases of animal bites registered at Tertiary Care Centres of Surat city.

Results: Out of total 382 cases of animal bites majority (58%) belongs to 15-45 years of age-group and 83 % were male. Stray dogs were involved in 94% animal bite cases. Majority (81%) of bites were unprovoked. Category II bites were seen in 204(54 %) of cases. In 81.4% cases lower extremities were affected. Only two hundred ninety two cases had attended the ARV clinic within 24 hours of bite. Only 75 % of cases had done the wound washing.

Conclusion: Local wound treatment immediate after an animal bite is an important basic step in the management of any animal bite case and this was lacking in most of the subjects. Efforts to eliminate the stray dogs are required.

Keywords: Animal bites, rabies, epidemiological, health seeking behaviour, Surat

INTRODUCTION

Large numbers of human morbidities and mortalities, including rabies are attributed to animal bite, which is defined as claw wound or bite from an animal.[1] Dog is responsible for about 96% of animal bite cases in urban areas. Transmission of rabies virus occurs through saliva from animal to human beings or animal to other animal by means of bites, scratches, licks on broken skin and mucous membrane.[2] 99 % of all human rabies victims attributed to canine rabies which is continues to terrify 87 countries or territories of the world.[3] According to WHO report, worldwide human deaths from endemic canine rabies were estimated 55000 deaths in a year[4] with 56% share from South East Asia Region.[5] 20,000 Deaths and 17.4 million animal bite cases were reported in India alone every year.[5] Rabies is reported in India throughout the year from all states except Lakshadweep and the Andaman & Nicobar Islands.[6] More than 99% of all human rabies deaths occur in the developing

world[7] and reliable data regarding rabies is not available due to lack of organized surveillance system.[8] Even though available control measures both economic and effective, due to presence of multiple religious & socio-cultural practices & beliefs associated with rabies, economic and political factors and lack of accurate data; the disease has not been brought under control.[2,8] Community knowledge and concern about animal bite injuries play an important role in countering this problem.[9]

This study was carried out with the objectives of to explore epidemiological factors associated with animal bites including dog bite cases reporting at Urban Health Centres (UHCs) of Surat city and also elucidating the factors influencing the post-exposure treatment.

MATERIAL & METHODS

The present cross-sectional study was conducted at Surat Municipal Institute of Medical Education & Research (SMIMER), Surat (Gujarat) by the Department of Community Medicine, over a period of four months, June-September 2012 after taking approval from institutional ethical committee. Surat Municipal Corporation was providing tertiary care facility through 2 centres- SMIMER and Maskati Charitable Hospital & C. F. Parekh dispensary. All new cases of animal bite visiting at both tertiary care centres during the study period were included in the study. Personnel interview of patient and clinical examination was done for each case after taking informed written consent. A pre tested semi structured questionnaire was used to record data pertaining to the epidemiology as well as determinants of post exposure prophylaxis. The collected data were analyzed using Epi info software.

Categorization of exposures was done as per guidelines given by World Health Organization (WHO)[10]. Bite resulted from subject initiating interaction with the dog such as playing with the dog or annoying the dog during his meal was considered as provoked.

RESULTS

Total 382 cases were reported during the study period, 280 (70%) were at Surat Municipal Institute of Medical Education & Research (SMIMER) and 112 (30%) at Maskati Charitable Hospital & C. F. Parekh dispensary. Male constituted 317 (83%) cases with male female ratio was 4.87:1. Majority of the victims 223 (58.4%) were in the age group of 15-45 years.

Table 1: Age-group and gender wise distribution

Age-group	Female (%)	Male (%)	Total (%)
0 to 5	14 (3.7)	20 (5.2)	34 (8.0)
6 to 14	8 (2.1)	62 (16.2)	70 (18.3)
15 to 45	28 (7.3)	195 (51.1)	223 (58.4)
46 to 60	11 (2.9)	29 (7.6)	40 (10.5)
> 60	4 (1.0)	11 (2.9)	15 (3.9)
Total	65 (17.0)	317 (83.0)	382 (100)

Table 2: Occupational category of animal bite cases based on travel history (n=358[#])

Occupational category	Frequency
Occupation with extensive or some travel[##]	217 (60.6%)
Occupation with least or no travel	141 (39.4%)

[#] 15 cases were below 5 years of age and history not given by 9 cases; [##] Salesman, driver, vendor, beggar , workers in diamond, textile, machine industry, labourer etc.

217(61%) cases had given history of occupation involving extensive or minimal travel.

Dog was involved as biting animal in 371(97.1%) cases. Stray animals were involved in 362 (94.7%) cases while pets and wild animals in 19(5 %) and 1(0.3%) cases respectively. The municipal licensing and ARV coverage of pet dogs were found unsatisfactorily, 1 (5.2%) and 5 (26%) cases respectively.

Table-3: Distribution of cases according to age group and category of exposure.

Age-Group	Exposure Category based on WHO guidelines[10] (%)			
	Cat 1	Cat 2	Cat 3	Total
0 to 5	0 (0.0)	18 (4.7)	16 (4.2)	34 (8.9)
6 to 14	0 (0.0)	46 (12.0)	24 (6.3)	70 (18.3)
15 to 45	7 (1.8)	118 (30.9)	98 (25.7)	223 (58.4)
46 to 60	1 (0.3)	17 (4.5)	22 (5.8)	40 (10.5)
> 60	2 (0.5)	5 (1.3)	8 (2.1)	15 (3.9)
Total	10(2.6)	204(53.4)	168(44)	382(100)

Bites were unprovoked in 310 (81.2 %) cases. Bites were occurred within city in 380 (99.5%) cases. Lower limb was the most common site of bite (81.7 %) among all age group. In 5 cases multiple site bites had been noted. Morning (4 to

11 am) was found most common time of bite in 143(37.4%) cases.

Majority, 204 (53.4 %) cases had class II exposure according to WHO guidelines. In all age group class II exposure was highest except 46-60 years and more than 60 years of age-groups where class III exposure was highest.

Table 4: Duration between bite & wound cleaning with running water or water with soap (n=219)

Duration between bite and wound cleaning	Frequency (%)
< 1 hour	102 (46.5)
1 to 6 hours	65 (29.7)
7 to 24 hours	49 (22.4)
> 24 hours	3 (1.4)

Biting animal was alive in 337 (83.2%) cases till the time of seeking treatment. Fate of 39 (10.2%) animals was unknown while 5 (1.3%) animals were dead or killed by people.

Wound was not cleaned by any means in 94(24.6%) cases. Out of 288, 237 (82.3 %) cases had history of wound cleaning with running water or water with soap. Only 102 (46.5 %) victims had wound cleaning history within 1 hour.

Table 5: Educational status and duration between bite & first dose of ARV (n=350*)

Education Status	Duration between bite & first dose of ARV (%)	
	Within 24 hours	> 24 hours
Illiterate	32 (9.1)	10 (2.8)
Just literate	9 (2.6)	5 (1.5)
Primary (up to 5th)	59 (16.9)	21 (5.9)
Middle (up to 8th)	48 (13.7)	18 (5.1)
Secondary (up to 10th)	60 (17.1)	19 (5.5)
Higher-secondary (up to 12th)	36 (10.3)	8 (2.3)
Graduation & above	20 (5.7)	5 (1.5)
Total	264 (75.4)	86 (24.6)

*Education status was missing in 30 cases while duration history was missing in 2 cases while both educational status and duration history was missing in 2 cases. Total cases coming after 24 hours were 90 but education status of 4 cases were missing.

241 (76 %) cases had received first dose of ARV within 24 hours after exposure while 15 cases had taken their first dose of ARV after 7 days period. Formal literate & Illiterate and even shockingly graduate people had not taken first dose of ARV within 24 hours in 36 %, 24 % & 25% cases respectively. Table-5 show details of educational status and duration between bite and visit to ARC.

Ignorance regarding prognosis of rabies and availability of health facility were major reasons for coming late (after 24 hours of animal bite).Various reasons for coming late was given in table-6.

Table 6: Reason for coming late (after 24 hours) for first dose of ARV (n=89*)

Reason for coming late (after 24 hrs)	Frequency(%)
Ignorance regarding rabies prognosis	39 (43.8)
Staying away from treatment facility	17 (19.1)
No knowledge about the availability of health facility	10 (11.2)
Ignorance regarding rabies	9 (10.1)
Lack of time	4 (4.5)
Outside city	3 (3.4)
Not inform parents about bite	3 (3.4)
Others**	4 (4.5)

*one case had not given any reason; **Others include lack of money, no accompanied person and didn't confirm about dog bite.

Pre-treatment was taken by 259 (68%) animal bite cases which includes 180(69.5%) of home treatment alone, 23 (8.8%) treatment from medical practitioner either qualified or unqualified and 56(21.7%) had both home and medical practitioner. Out of 236 home treatment cases, 83 (35%) had applied indigenous products over wound.

Table 7: Categories of home treatment (n=236) (multiple answers)

Category of home treatment	Frequency (%)
Soap & water	110 (46.6)
Only water	76 (32.2)
Chili powder	27 (11.4)
Lime and salt	24 (10.2)
Local antiseptics	21 (8.9)
Turmeric	11 (4.7)
Snuff	4 (1.7)
Herbs	2 (0.8)
Bitter leaves	2 (0.8)
Others$	13 (5.5)

$Others include kerosene, jaggery, baba's bhabhuti, bandage, rai oil, sindur, ghee etc.

Wound was not washed with soap & water or running water/saline in 93.7% cases attended by

medical practitioner while TT injection was not given in 20 (25.3%) cases.

At tertiary care facility, out of 168, only 55 cases of class III exposures were given ARS while in 313 (82 %) cases wound dressing was not done. In 1 case occlusive dressing was done. In majority cases ARV was given through intradermal route.

Out of 59 cases with previous history of animal bite only 32 (55 %) had completed post exposure immunization which was given through different routes (ID, IM, SC). No history regarding vaccine reaction had been noted.

DISCUSSION

Animal bites, especially dog bites still poses public health problem in urban area of our country.

Epidemiological profile of animal bite cases of surat city revealed that men were affected more than women, due to occupational travelling of man as compared with women, as found in our study where male to female ratio was 4.87:1 quite similar to previous studies.[9,11,13-17] Predominantly of cases belongs to 15-45 years of age group (58 %) similar to Behera et al (2006).[15] Different studies evolves different age-group as predominance Jyoti et al[14] (below 15 years), Behera et al(2004)[16](below 10 years),Venu shah et al[13] (below 25 years) and Icchapujani et al(2001)[11] (2-18 years). And these findings were in contrast to our studies were we found only 27 % cases which involved children of age group of 0-14 years.

Biting animal includes dogs, rats, cats, monkey. In majority (97.1%) of cases the biting animal was dog similar to other studies [9,11,13-17]. Stray animals were attributed to majority (94.7%) cases while pets(5%) and wild animals(0.3%) attributed to small proportion which were similar to findings of Behera et al[15] and Icchapujani et al(2001)[11]. The municipal licensing and ARV coverage of pet dogs were not satisfactorily (5.2% and 26 % respectively) similar to study by Sudarshan M.K (2003)[17].

Bites were unprovoked (81.2%) in majority cases which was match with the study by Behera et al (2006)[14] and Icchapujani et al(2001)[11] in which they found unprovoked bites in 56.6% & 64.3 % cases respectively. In majority (96.1%) of cases bites were occurred within city. Lower limb was the most common site (81.7 %) similar to other studies studies[9,11,13-17] and found among all age-group exposed to animal bite. In 5 cases multiple site bites had been noted. Bites over trunk and head & neck were seen more in age group of 6-14 years and 0-5 years respectively while upper limb bite and multiple bites were more commonly seen in 15-45 years of age group. Majority (37.4 %) bites occur between 4 and 11 am in the morning in contrast to study by Venu shah et al (2011)[12] in which she described 38.8% of bites between 4 and 8 pm.

Majority (53.4 %) cases had class II exposure according to WHO guidelines in contrast to other studies where class III was most common[9,11,13,15]. In all age group class II exposure was highest except 46-60 years and more than 60 years of age-groups where class III exposure was highest. Upper limb, head & neck and multiple bite bites found more commonly in category III exposure while trunk bites found more in category II exposure. In majority (88.2 %) cases biting animal was alive till the time of seeking treatment.

Only 62.0 % cases had history of wound cleaning with running water or water with soap which was major issue of concern which include only 46.5 % victims with history of wound cleaning within 1 hour. On the contrary 3 cases had no history of wound cleaning by any means.

According to availability of health facility and residence of animal bite cases, mean duration to reach health facility is 23.5 minutes, even though only 76 % cases had received first dose of ARV within 24 hours after exposure, which is in accordance with other studies.[13] Ignorance regarding prognosis of rabies and availability of health facility were major reasons for late coming (after 24 hours) to the health facility.

Majority (68%) of animal bite victims had taken pre-treatment either home or medical practitioner. Indigenous products were applied over the wound by 35% of home treatment cases which was also found in other studies.[9,11,13,15-17]

At concern health facilities, wound dressing was not done at in most (82%) cases, ARS not given in majority (67%) category III exposure victims while occlusive dressing was done in one case. All these were matters of great concern.

Seventy six percent of victims with previous history of bite had taken home treatment for current exposure which was also the matter of great concern.

CONCLUSIONS

The incidence of dog bite cases in Surat city is difficult to estimate as many dog bites are under reported. The stray dogs are main biting animal, affecting mostly the adult and children. Vaccination and municipal licensing of pet dogs are not satisfactorily. The majority bite victims had occupation involving more or less travel. Majority bites are attributed to stray dogs and unprovoked, occurred during morning and involve lower limb as most common site and victimized adults and children most. CAT II exposure was most common. Bite victims did not do proper wound care. Home treatment-indigenous treatment was quite prevalent even amongst educated people, even though availability of nearby health facility and major reason for that was ignorance regarding prognosis of rabies. Treatment seeking behaviour was quite poor amongst victim of previous bite history. At medical practitising clinics and even at tertiary care center quality of primary wound management (washing) and post exposure prophylaxis was compromised which requires much attention.

RECOMMENDATIONS

Only effective I.E.C. activities can encounter not only false beliefs about the disease but also widespread misconceptions about treatment, which should be carried out regularly at health facilities under Surat Municipal Corporation. Since young children more prone to provoke dog resulting a bite, they should be target of anticipatory guidance by parents and teachers. Vaccination and municipal licensing of pet dogs must be enforced. Precious human lives can be saved by proper reporting and adequate treatment of cases within 24 hours. The need of the hour is effective knowledge, which has to be communicated to the public using mass media and other measures like health education.

REFERENCES

1. Eslamifar A, Ramezani A, Razzaghi- Abyaneh M, Fallahian V, Mashayekhi P, Hazrati M et al. Animal Bites in Tehran, Iran. Arch Iranian Med 2008;11(2):200-2.
2. Operational guidelines for rabies prophylaxis and intra-dermal rabies vaccination in kerala, 2009.Available at http://rabies.org.in/rabies/wp-content /uploads/2009/11 / Operational-Guidelines-for-Rabies-Prophylaxis-and-Intra-Dermal-Rabies-Vaccination-in-Kerala.pdf .Accessed on Oct 23rd, 2012
3. Gadekar Rambhau D. and Dhekale Dilip N. Profile of Animal Bite Cases in Nanded District of Maharashtra State, India. Indian Journal of Fundamental and Applied Life Sciences 2011. 1(3), 188-193.
4. World Health Organization. WHO technical report series 931: WHO expert consultation on rabies; first report.Geneva Switzerland: WHO; 2005. p13
5. World Health Organization, Regional Office for South East Asia. Prevention and control of rabies in South-East Asia Region 2004, New Delhi. SEA-Rabies; 2004.
6. APCRI guidelines for rabies prophylaxis. Available at http://rabies.org.in/rabies/wp-content/uploads/ 2009/11/ APCRI-Guidelines-for-Rabies-Prophylaxis.pdf. Accessed on November 22nd, 2012.
7. WHO Expert Consultation on Rabies: first report (2004). Available at http://whqlibdoc. who.int/trs/ WHO _TRS_931_eng.pdf .Accessed on November 22nd, 2012.
8. Ichhpujani. R.L et al: Rabies in humans in India. 4th International Symposium on rabies control in Asia. Symposium proceedings Merieux Foundation & WHO. Ed. Betty Dodet & F. X. Meslin, 2001, Hanoi, Vietnam. John Libbey, Eurotext, London.
9. Anita Khokhar, G.S. Meena, Malti Mehra. Profile of dog bite cases attending m.c.d. dispensary at Alipur, Delhi 2003. Indian Journal of Community Medicine Vol. XXVIII, No.4: 157-60.
10. WHO guide for post exposure prophylaxis. Available at http://www.who.int/rabies/ human/postexp/en/ accessed on 21st February 2013.
11. Ichhpujani RL et al. Epidemiology of Animal Bites and Rabies cases in India. A Multicentric study. J Commun. Dis. 40 (1) 2008: 27-36
12. Menezes R. Public health: Rabies in India. *CMAJ* 2008 Feb 26; 178(5): 564–6
13. Venu Shah, D V Bala, Jatin Thakker, Arohi Dalal, Urvin Shah, Sandip Chauhan, Kapil Govani. Epidemiological determinants of animal bite cases attending the anti-rabies clinic at V S General Hospital, Ahmedabad. Healthline. 2012; 3(1).
14. Jyoti, Goel Manish Kumar, Vashisht BM, Khanna Pardeep. Pattern and Burden of Animal Bite Cases in A Tertiary Care Hospital In Haryana. J.Commun. Dis. 42(3) 2010: 215-218
15. TR Behera, D M Satapathy, RM Tripathy, A Sahu. Profile of animal bite cases attending the ARC of M.K.C.G. Medical College, Berhampur (Orissa).APCRI journal. 2008; 9(2).
16. TR Behera, D M Satapathy, A Sahu. A study of attitude of cases towards animal bite treatment.APCRI journal, Volume IX, Issue:1, July-2007 available at rabies.org.in/rabies-journal/rabies-09-1/OrgArticle2.htm accessed on 19/10/2012.
17. MK Sudarshan, BJ Mahendra, SN Madhusudana, DH Aswath Narayana, Abdul Raheman, NSN Rao, FX Meslin, Derek Lobo, K.Ravikumar, Gangaboraiah. Epidemiology of Animal Bites cases in India: Results of WHO sponsored National Multi-Centric Rabies study. J. Commun. Dis. 38 (1) 2006: 32-39.