Original Research Article

DOI: http://dx.doi.org/10.18203/2394-6040.ijcmph20194022

Profile of dog bite cases reporting to ARV OPD of a tertiary care hospital

Saurabha Urmi Subramanya*, Ravindra S. Kembhavi

Department of Community Medicine, Seth G. S. Medical College and KEM Hospital, Mumbai, Maharashtra, India

Received: 04 July 2019 Accepted: 13 August 2019

*Correspondence:

Dr. Saurabha Urmi Subramanya, E-mail: us.saurabha@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: Animal bites pose a major public health problem in children and adults worldwide. Rabies is a viral zoonosis caused by bite of a rabid dog that occurs in >100 countries and territories. India accounts for 60% of all the world burden of rabies related deaths. The objective of the present study is to analyse the profile of dog bite victims reporting to ARV OPD of a tertiary care hospital.

Methods: This was a cross-sectional study conducted in the ARV OPD of a tertiary care hospital. A total of 228 victims of dog bite were interviewed. They were selected using systematic random sampling technique. Analysis of data obtained was done using SPSS.

Results: Majority of the participants belonged to the age group 20-30 years. The proportion of male was higher than female. Most of the victims had suffered category II type of dog bite (66.2%). A statistically significant association was seen between age group and nature of dog bite, sex of victim and type of dog, type of dog and category of dog bite and the category of bite and history of dog biting other individuals.

Conclusions: The burden of dog bite seems to be borne by the economically productive age group. All individuals need to be educated on how to behave around animals so that they can avoid animal bite.

Keywords: Animal bite, Zoonosis, Dog bite

INTRODUCTION

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 animal species, the size and health of the bitten person and accessibility to appropriate health care. Numerous animal species have the potential to bite human; however the most important are those arising from snakes, dogs, cats and monkeys. ¹

Rabies is a viral zoonosis caused by bite of a rabid dog that occurs in >100 countries and territories. There are no global estimates of dog bite incidence; however studies

suggest that dog bites account for tens of millions of injuries annually. Low and middle income countries account for 76-94% of animal bite injuries. In India annual incidence of dog bite is 1.9%. Globally the incidence of human rabies is very low and virtually Europe, North America and Australia are declared to be free of human rabies. Rabies is endemic in Asia Pacific region. In a number of countries, human deaths from rabies are likely to be grossly underreported, particularly in the youngest age groups. The vast majority of the estimated 55,000 deaths caused by rabies each year occur in rural areas of Africa and Asia. In India alone 20000 deaths are estimated to occur annually. India alone accounts for 60% of all the world burden of rabies related deaths.^{2,3}

People are infected following bite, scratch, lick or broken skin and on intact mucus membrane the virus enters the body and multiplies. Transmission also occurs when infectious material usually saliva comes into direct contact with human mucosa or fresh skin wounds. The disease is 100% fatal.^{4,5}

It is therefore important to understand the socio demographic profile and various epidemiological determinants of dog bite in man so that appropriate preventive and control measures can be planned.

METHODS

Study setting

The study was conducted in ARV OPD of Seth G. S. Medical College and KEM Hospital, a teaching medical college in a metropolitan city. The ARV OPD caters to all animal bite victims; it is functional on all working days in the afternoon.

Study duration

The study was conducted for 24 months (January 2016 to December 2017). This includes planning of the study, setting up of protocol, getting necessary approvals, data collection, analysis of data and data interpretation.

Study design

A descriptive cross sectional observational study.

Study subjects

Patients attending the ARV OPD for vaccination following dog bite.

Sample size

Using the formula for calculation of sample size for a cross-sectional study with infinite population

$$n = \frac{4pqN}{e^2(N-1) + 4pq},$$

where N was the cases reported to ARV OPD annually, p-proportion of stray dog bites, 63% taken from a study done previously. e was taken as 10% of p. On final calculation, the sample size was estimated to be 228.4

Sampling technique

A systematic random sampling. All dog bite cases reporting to the ARV OPD and coming in contact with the interviewer for the first time were included in the study. All cases present on a particular day were arbitrarily numbered. Every alternative case was considered for this study. The first case was decided based on lottery method.

Inclusion criteria

All individuals attending the ARV OPD following dog bite and coming in contact with the interviewer for the first time.

Exclusion criteria

Individuals coming for subsequent doses of ARV and cases of animal bites other than dog bite.

Study procedure

Data was collected at the ARV OPD, participants were included in study based on inclusion criteria; interview schedule was used for data collection; purpose of the study was explained using informed consent document and it was used for obtaining written consent from the participants.

Data analysis

Data obtained was entered in Microsoft Excel and was analysed using SPSS version 22.0. Descriptive and analytical test like mean, median, mode and proportion were used.

RESULTS

A total of 228 dog bite victims attending the ARV OPD of a Medical College were included in the study.

Table 1: Age group and sex wise distribution of study subjects (n=228).

A see sween	Sex		Total
Age group	Male	Female	Total
(in years)	N (%)	N (%)	N (%)
0-10	16 (69.6)	7 (30.4)	23 (10.1)
10-20	35 (87.5)	5 (12.5)	40 (17.5)
20-30	62 (91.2)	6 (8.8)	68 (29.8)
30-40	21 (75.0)	7 (25.0)	28 (12.3)
40-50	29 (82.9)	6 (17.1)	35 (15.4)
>50	27 (79.4)	7 (20.6)	34 (14.9)
Total	190 (83.3)	38 (16.7)	228 (100.0)

Of the 228 participants most of them belonged to the age group 20-30 years (29.8%) and least number of dog bites was seen in the age group 0-10 years (10.1%). The mean age of the participants in the study group was 30.29 years; the age of the participants ranged from 2-71 years. In the age group and sex wise distribution of cases it was observed that 83.3% of the study participants were men. Majority of the participants had completed their high school education (40.4%). Nearly 40% of the participants were involved in indoor jobs, 28% were students and the remaining was engaged in jobs with outdoor activities. On analysing the data collected for interpreting the socioeconomic status, it was understood that majority 36%

belonged to lower middle class of socio economic status as per modified Kuppuswamy scale. The proportion of participants belonging to lower socio economic status was the least.

Table 2: Particulars of dog bite.

Variable	N	%			
Ownership status of biting dog (n=228)					
Pet	55	24.1			
Stray	173	75.9			
Breed of biting dog in case of	of pet dog (n	=55)			
Pomeranian	23	41.8			
Labrador	8	14.5			
Pug	6	10.9			
Doberman	4	7.3			
Unknown	14	25.5			
Vaccination status of biting	Vaccination status of biting dog (n=228)				
Unknown	3	1.3			
Vaccinated	38	16.7			
Not vaccinated	187	82.0			
Nature of dog bite (n=228)					
Provoked	105	46.1			
Unprovoked	123	53.9			
Site of dog bite (n=228)					
Lower limb	173	75.9			
Upper limb	40	17.5			
Torso	10	4.4			
Head/face	2	0.9			
Multiple	3	1.3			
Category of bite (n=228)					
Category I	44	19.3			
Category II	151	66.2			
Category III	33	14.5			

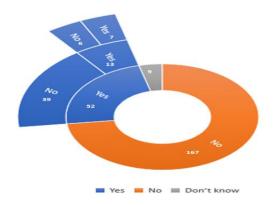


Figure 1: Graph of participants responding affirmatively for dog biting others, reporting of incident to concerned authority and having knowledge of action taken following the report.

The enquiry into the ownership status of the dog it was gathered that stray dog was the biting animal in 75.9% of the cases and the remaining was by pet dog. For most of the participants the breed of the biting pet dog was Pomeranian (41.8%), nearly 25% of the participants

reported they were not aware of the breed biting dog, the other breeds that were commonly reported as biting were Labrador, Pug And Doberman. In 82% of the cases the participants claimed the dog was unvaccinated, only 16% of the cases reported the biting dog was vaccinated and remaining reported they were not aware of the vaccination status of the dog. It was comprehended that about 46% of the dog bite was provoked. The most common site where the bite occurred was lower limb (76%). In our study 19.3% had category I bites, 66.2% of the cases had category II bites and the remaining was category III bites. A history of dog biting others after biting the participant positive in 22.8% of the participants, 3.9% responded 'don't know' and negative in the rest of the participants. The 22.8% of the participants who responded positively were further questioned if they reported this event to the concerned authority, 25% of them had reported it to the authority and in response to the complaint some action was taken by the concerned authority in more than half of the cases. In 25% of the cases it was also seen that they had a previous history of animal bite, in 94.7% of cases the biting animal was dog (Table 2 and Figure 1).

Table 3: Age group and nature of dog bite.

Ago	Nature of do	Total N	
Age group	Provoked N (%)	Unprovoked N (%)	Total N (%)
Child	30 (73.2)	11 (26.8)	41 (18.0)
Adult	75 (40.1)	112 (59.9)	187 (82.0)
Total	105 (46.1)	123 (53.9)	228 (100.0)

Chi-square=14.797; df=1; p value <0.001.

Table 4: Sex and type of dog.

Sex	Type of dog	NI (0/)		
Sex	Pet N (%)	Stray N (%)	N (%)	
Male	40 (21.1)	150 (78.9)	190 (83.4)	
Female	15 (39.5)	23 (60.5)	38 (16.6)	
Total	55 (24.1)	173 (75.9)	228 (100.0)	

Chi-square=5.871; df=1; p value=0.015.

A statistically significant relation was observed between the age group and nature of dog bite, children were more prone to be victims of a provoked bite than adults (Table 3). The sex of the victim and type of dog were compared and it was observed that men were more often bitten by stray dog compared to women (Table 4). A statistically significant association was found between type of dog and vaccination status, the pet dogs were found to have received the vaccination than stray dogs (Table 5). The category of dog bite and history of dog biting other individuals after biting them was analysed for any statistical significance, it was concluded that a statistically significant relation was seen between the two; the history of dog biting others was more often positive in individuals who had severe bite wound (Table 6).

Table 5: Type of dog and vaccination status of the dog

Type of dog	Vaccination status	Total N (%)		
	Unknown N (%)	Vaccinated N (%)	Not vaccinated N (%)	
Pet	3 (5.5)	38 (69.1)	14 (25.5)	55 (24.1)
Stray	0 (0.0)	0 (0)	173 (100.0)	173 (75.9)
Total	3 (1.3)	38 (16.7)	187 (82.0)	228 (100.0)

Chi-square=157.239; df=2; p value<0.001.

Table 6: Category of bite and history of dog biting others.

Category of bite	History of dog biting others			Total N (0/)
	Not known N (%)	Yes N (%)	No N (%)	Total N (%)
Cat I	0 (0)	7 (15.9)	37 (84.1)	44 (19.3)
Cat II	8 (5.3)	31 (20.5)	112 (74.2)	151 (66.3)
Cat III	1 (3.0)	14 (42.4)	18 (54.5)	33 (14.4)
Total	190 (83.3)	38 (16.7)	167 (73.2)	228 (100.0)

Chi-square=11.634; df=4; p value=0.020.

DISCUSSION

The present study was conducted on dog bite victims attending the ARV OPD of a tertiary care hospital, 228 participants were enrolled in the study.

The age group wise distribution of the study participants it was seen that 29.8% of the study subjects belonged to the age group 20-30 years. The mean, median and modal age of the study subjects was computed to be 30.29 years, 26 years and 23 years respectively. Sartore et al in their study the average age of study participant was 35.4 years.6 Tenzin et al conducted a hospital based survey in which the mean age was 21.2 years and nearly two thirds of the bite cases were reported in people 25 years of age. Vijayan et al conducted a retrospective study to assess the burden of human dog bite cases reported that 35.50%, 28.61%, 24.00% and 11.89% of cases belonged to middle age, old age, children and teenagers, respectively.8 The findings of these studies are nearly similar to the current study. In our study the age group and gender wise distribution of study subjects it is clear that men (83.3%) outnumber the women (16.7%). Across all the age groups it was observed that men are more prone to dog bite than women. Khokhar et al conducted a study in Delhi which reported 69.9% of the total victims of dog bite enrolled in the study were men and 30.1% were women. 9 Agarwal et al conducted a community based survey in rural India this study too reports that the dog bite rate is more for male than for females.¹⁰ Sudarshan et al conducted a WHO sponsored national multi-centric rabies survey in Bangalore which showed that males were more affected than females. These findings are consistent with our study.4 In our study 40.4% had completed or were pursuing their high school education and it was also observed that 2.2% of the victims had completed their professional education. The occupation type of study participants it was seen 40.8% were engaged in work

which involved no outdoor activity and 31.1% were engaged in activities involving outdoor activities and 28.1% were students. Sartore et al conducted an exploratory cross sectional study where it is described that occupational bites occurred to individuals community health workers, bites to mail delivery employees, bites to individuals leaving brochures through gates of dog household, bites to employees from a company guard dog.⁶ These occupations in our study have been described as outdoor jobs. Tenzin et al conducted a hospital based survey which reported school children were the most common (45%) victims of dog bite whereas in our study only 28.1% of the victims reporting were students. Majority of the participants (36.8%) of our study belonged to lower middle class of socio-economic class this was followed by 64 (28.1%) belonged to upper lower socio-economic status. A study conducted by Gogtay et al in a hospital also gives results similar to our study findings, where in most participants belonged to lower middle and upper lower socioeconomic class.11

The ownership status of the biting dog was stray dog in 75.9% and pet dog in 24.1%. Shah et al conducted a cross sectional study reported 96% of the cases were bitten by stray dog. 12 Sudarshan et al conducted a WHO sponsored national multi-centric rabies survey reported the biting animal were predominantly dogs and were mostly stray dog; these studies report results similar to our study.⁴ Mshelbwala et al conducted a ten year retrospective study of dog bite cases 81.8% of the persons were bitten by pet dog and 18.2% were bitten by stray dog which is different from our study. 13 The most common breed of biting dog of in case of pet dog was Pomeranian in 41.8% and in 25.5% of the cases they were not aware of the breed of the biting dog. A study conducted by Hemagiri et al in Bellary, Karnataka in 2011 to know the patterns of dog bites in children where majority (57%) of the dogs were of the mixed breed, the pure breeds encountered in the study were Pomeranians (3%), German shepherds (0.7%) and Great Dane (1.5%). This is nearly consistent to our study findings. The study participants reported that 82.0% of the biting dogs were not vaccinated, it was also noted that the vaccination status of few pet dogs was not known were pet dogs. Sartore et al conducted an exploratory cross sectional study which reported 56% of the dogs were vaccinated 20.2% of the 136 dogs unvaccinated and 23.8% of whose vaccination status was unknown. These statistics differ from the current study, could be due the difference in study setting. The setting the statistics of the study setting.

Of the 228 study participants 46.1% had provoked bites and 53.9% of them unprovoked bites. Tenzin et al conducted a hospital based survey which reports 81% of the study subjects reported their bites to be unprovoked and 19% reported provoked bites. More proportion of unprovoked bites is seen in our study as well as the reference study.7 Anita et al conducted a study in Delhi which reported that 25.24% of the bites were provoked. The provoked bites were slightly more in our study compared to the other studies; this could be due to difference in population density of the cities under study. 9 The most common site of bite wound among our study participants was over their extremities, 75.9% of whom on their lower limbs and 17.5% of whom on their upper limb. 3 of the study participants complained of bite wound over multiple sites. Vijayan et al conducted a retrospective study which reported 86.5% of the people were bitten on their legs followed by 13% bitten on hands and 0.5% other body parts.8 Tondare et al conducted a prospective study in Karnataka which also reports majority of bites occurring in extremities. These studies have reported results similar to our study. 15 In our study participants majority (66.2%) had category 2 type of dog bite wounds. Agarwal et al conducted a community based survey which reports nearly 80% of the bites were class II or class III. 10 Shah et al conducted a cross sectional study which reports 67.8% were category 3 bites. 12 Sajna et al conducted a cross sectional study which reports majority of the bite was category 3. These studies differ from our study.16

A total of 52 study participants gave history of dog biting others, out of which 13 reported the incident to concerned authority and of these 7 participants knew that an action was taken after they reported the incident. A study conducted by Anita et al in Delhi in which all study participants were enquired if they reported the incident to concerned authority showed, out of a total of 144 study subjects who were more than 15 years of age only 2 mentioned that they had reported to the concerned authority that stray dog had bitten them. It can be seen that the reporting of incident is slightly better in our study. In the present study those giving history of animal bite majority were bitten by dog even previously. Anita et al reports in their study 24.6% of the study participants gave history of dog bite. Dixon et al conducted a crosssectional survey this study suggested that some experiential factors which one might assume would have

an effect on dog bite prevention knowledge, the survey reports that having an experience of a dog bite does not mean that the victim or their family member has subsequently learned how to prevent dog bites. The same holds good in our study despite past history of animal bite by dog yet did not know how they could have been cautious to prevent the current bite.¹⁷

CONCLUSION

The burden of dog bite seem to be borne by the economically productive age group, the DALY of dog bite needs to calculated so that the actual impact on the health and economy can be calculated. The higher day to day activities among men and the type of outdoor jobs that men are engaged in make them more vulnerable to dog bite. The owners of the dog need to be responsible enough to ensure that their dogs are vaccinated. Man animal contact is frequent in places with high population and animal density; individuals hence need to be educated on how to behave around animals so that they can avoid animal bite.

ACKNOWLEDGEMENTS

We would like to thank Late Dr. R. R. Shinde under whose guidance this study was conducted and the department of Community Medicine for their constant support. We would also like to extend our gratitude to Medical Officer ARV OPD and the staff of ARV OPD.

Funding: No funding sources Conflict of interest: None declared

Ethical approval: The study was approved by the

Institutional Ethics Committee

REFERENCES

- WHO Fact sheet- animal bites. 2013. Available at: https://www.who.int/news-room/fact-sheets/detail/ animal-bites. Accessed on 25 June 2019.
- Mansuri FA, Al-Saani SMAJ, Khan WA, Islam N. Epidemiological features of dog bite and its awareness among victims: Report from Abbasi Shaheed Hospital Karachi. ASH KMDC. 2016;21:88-93.
- 3. Weekly Epidemiological report-rabies vaccine: WHO position paper. 2010. In: Ridder BA, eds. WHO/Department of Control of Neglected Tropical Diseases. 2018;16(93):201-20.
- 4. Sudarshan MK, Mahendra BJ, Narayan DHA. A community survey of dog bites, anti-rabies treatment, rabies and dog population management in Bangalore city. J Commun Dis. 2002;33(4):245-51.
- 5. Sudarshan PMK. Rabies Prevention-A Medical Guide Book. 2nd ed. Pune: Serum Institute of India Ltd.; 2007.
- 6. Buso DS, Queiroz LH, Silva JE. Epidemiological aspects of dog bites considering biter dogs and victims. 2013;20:296-306.

- Tenzin, Dhand NK, Gyeltshen T, Firestone S, Zangmo C, Dema C, et al. Dog bites in humans and estimating human rabies mortality in rabies endemic areas of Bhutan. PLoS Negl Trop Dis. 2011;5(11):1391.
- 8. Vijayan C, Kumar A. Assessing the burden of human dog bite cases in Puducherry, India. Int J Curr Res. 2016;8:40589-93.
- 9. Khokhar A, G S M, Mehra M. Profile of dog bite cases attending M.C.D. dispensary at Alipur, Delhi. Indian J Community Med. 2003;28(4):157.
- Agarwal N, Reddajah VP. Epidemiology of Dog bites: a community-based study in India. Trop Doct. 2004;34:76-8.
- 11. Gogtay NJ, Nagpal A, Mallad A, Patel K, Stimpson SJ, Belur A, et al. Demographics of animal bite victims and amp; management practices in a tertiary care institute in Mumbai, Maharashtra, India. Indian J Med Res. 2014;139(3):459-62.
- Shah V, Bala DV, Thakker J, Dalal A, Shah U, Chauhan S, et al. Epidemiological determinants of animal bite cases attending the anti- rabies clinic at V. S. General Hospital, Ahmedabad. Healthline. 2012;3:66-8.
- 13. Mshelbwala P, Maikibi VB, Angani M, Nlebedum U, Nwokocha Q, Ogunkoya A. Retrospective study

- of dog bite cases reported to zonal veterinary clinic, Umuahia, Abia State, Nigeria. J Exp Biol Agric Sci. 2013;1:317-20.
- 14. Hemagiri K, Someshwar G, Aravind K. An epidemiological study on dog bite and its management in Bellary, Karnataka. J Commun Dis. 2012;44:15-23.
- 15. Tondare SB, Tondare MB, Maka SS, Usturge SM, Tondare AB. Injuries due to dog bites: a cause of concern. Int Surg J. 2016;3:1456-9.
- 16. Sajna MV, Culas R. Cost analysis of post exposure prophylaxis of rabies in a tertiary care centre- a cross sectional study\n. IOSR J Dent Med Sci. 2014:13:8-12.
- 17. Dixon CA, Melinda Mahabee-Gittens E, Hart KW, Lindsell CJ. Dog bite prevention: a new screening tool. J Pediatr. 2012;160:337-41.

Cite this article as: Subramanya SU, Kembhavi RS. Profile of dog bite cases reporting to ARV OPD of a tertiary care hospital. Int J Community Med Public Health 2019;6:4088-93.