Original Research Article

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

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Received: 04 July 2019
Accepted: 13 August 2019

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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.

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.
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 228.3

**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.

| Age group (in years) | Male | Female | Total |
|----------------------|------|--------|-------|
| 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 socio-economic 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 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 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|

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.

| 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 | N (%) |
|-----------|-------------|-------|
|           | Pet (%)     | Stray (%) |  |
| 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).
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. 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. 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. 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. 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. 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. 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. 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. 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

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

| Category of bite | Type of dog | Vaccination status of dog | Total N (%) |
|------------------|------------|---------------------------|-------------|
|                  | Pet        | Unknown N (%) | Vaccinated N (%) | Not vaccinated N (%) |
| Stray            | Pet        | 3 (5.5)        | 38 (69.1)        | 14 (25.5)          | 55 (24.1) |
| Total            | 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 (%) |
|------------------|-------------------------------|-------------|
|                  | 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. 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. 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. 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. 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. 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. 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. 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. 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.

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. 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.

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. 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. 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. 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. Shah et al conducted a cross sectional study which reports 67.8% were category 3 bites. Sajna et al conducted a cross sectional study which reports majority of the bite was category 3. These studies differ from our study.

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 cross-sectional 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.

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

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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.