

An epidemiological study of animal bite cases in a tertiary care center of Bhopal city: A cross-sectional study

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ABSTRACT


Background: Rabies is 100% fatal, 100% vaccine preventable disease, yet continues to kill. There are no global estimates of dog bite incidence; however, studies suggest that dog bites account for tens of millions of injuries annually. Tens of thousands of people die from rabies each year; one person dies every 10 min, with the greatest burden in Asia and Africa. Rabies is the 10th biggest cause of death due to infectious diseases worldwide, and it causes more than 59,000 fatalities per year worldwide. **Objective:** To determine the profile of animal bite cases attending the Anti-rabies Clinic of Hamidia Hospital, Bhopal. **Materials and Methods:** It was a cross-sectional study carried out at Anti-rabies Clinic of Hamidia Hospital, Bhopal. The study was carried out by interviewing 1200 cases of animal bite for a period of 1 year. **Result:** A total of 1200 cases of animal bites were interviewed and examined in the present study. Most commonly (34.58%) affected age group was <15 years. Males were more (74.5%) affected as compared to females. Dogs were the main (92%) biting animals and protection of pet dogs (29.22%) with vaccination was low (24.4%). Lower limbs were the site of bite in 68.6%. 71.5% cases were of category III as per the WHO classification. **Conclusions:** High number of injuries due to dogs who are freely roaming, indicating the need of legislative measure which includes an effort to remove stray dogs and encourage owners to properly vaccinate their dogs, should be implemented.

KEY WORDS: Epidemiological; Animal Bite; Rabies; Tertiary Care Centre; Bhopal

INTRODUCTION

Rabies is one of the oldest diseases affecting human. It has been recognized in India since the Vedic period (1500-500 BC) and is described in the ancient Indian scripture Atharvaveda.^[1] It is primarily a zoonotic disease of warm-blooded animals, particularly carnivorous such as dogs, cats, jackals, and wolves. It is transmitted to man usually by bites or licks of rabid animals.^[2] Human rabies is present in more than 150 countries and territories and on all continents except for

Antarctica.^[3] Its global distribution has changed little since 2011, with more than 90% of rabies deaths occurring in Africa and Asia.^[4] It causes more than 59,000 fatalities per year worldwide.^[5] It is estimated that the South East Asia Region accounts for approximately 45% of human deaths due to rabies in the world.^[6] The situation is especially pronounced in India, which reports about 18,000 to 20,000 cases of rabies a year and about 36% of the world's deaths from the disease, with 17.4 million exposures to animal bite every year.^[6-8] Thus, the burden of the disease in India comes around 2/lakh population and is substantial.^[2] The figures might be even higher as the disease is neither reported nor notified.^[7] Rabies is reported throughout the year from all states of India except Lakshadweep and the Andaman and Nicobar Islands.^[9] It is estimated that in the absence of the post-exposure prophylaxis about 327,000 people would die from rabies every year just in Asia and Africa.^[2] Majority of the people who die of rabies are poor or belong to low socioeconomic status.^[7] The Indian

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research output represents 4.4% of the global research on rabies which is grossly disproportionate to the magnitude of the problem and the size of the research community in India.^[10] It is important to know about epidemiology of animal bites for prevention of human deaths due to rabies and formulation of effective rabies control strategies because rabies is the disease which has many misconceptions, and the general population is usually unaware of consequences of animal bite; hence, many of them do not seek medical care. Dog bites are reported proportionately more frequently than human cases of rabies and may provide an accessible data source from which human deaths from rabies can be inferred. As no accurate data regarding the magnitude of animal bite are available in the capital city of Bhopal, and very few studies conducted in the area; hence, the present study is undertaken with the objective to determine the profile of animal bite cases attending the Anti-rabies Clinic of Hamidia Hospital, Bhopal.

MATERIALS AND METHODS

It was a cross-sectional study carried out at Anti-rabies Clinic (ARC) of Hamidia Hospital, Bhopal, for a period of 1 year. Sample size of 1200 was calculated on the basis of the pilot study, all the new cases of animal bite attending the ARC on the day of visit were included in the study. After obtaining verbal consent, data were collected by face-to-face interview and examination of the cases using predesigned questionnaire which include sociodemographic variables such as age, gender, education, occupation, monthly income, number of family member, variable related to animal bite - type of the biting animal, site of bite, time of reporting to ARC after bite, local wound care, pretreatment practices, treatment taken before reporting the ARC, previous history of animal bite, previous history of anti-rabies vaccine, knowledge about rabies, and measure to prevent rabies. In case of children <10 years, interview was taken from the accompanying person, but occupation of victim was recorded for analysis. Frequency and percentage were calculated, and statistical test was applied.

RESULTS

Figure 1 shows that out of 1200 cases maximum (34.58%) number of cases occurred in below 15 year of age, followed by 15-29 years age group and minimum (7.42%) affected population was geriatric age group. males were predominantly affected, constituted 74.5% of the total cases while females were less (25.5%) affected.

Majority (72.33%) of the cases reported to the ARV clinic were from urban area while 27.67% of cases belonged to rural area (Figure 2). Most (30.25%) of the respondents were educated up to primary school, 17% were educated up to middle school followed by 10.83% educated up to or above graduation and 26.33% respondents were illiterate. Majority (32.9%) of the victims were students followed by laborer (18.0%) followed by businessman or self-employed person (13.9%), 12.4%

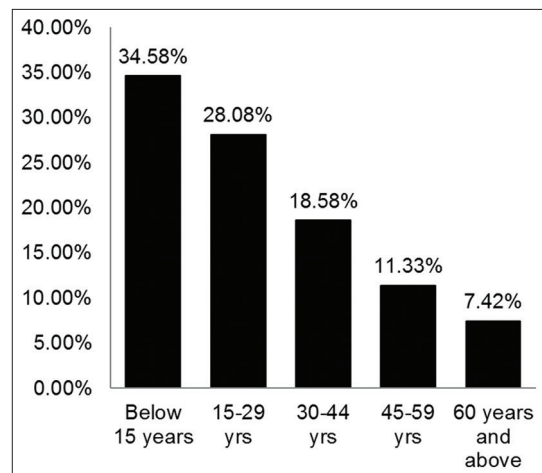


Figure 1: Distribution of cases in various age groups

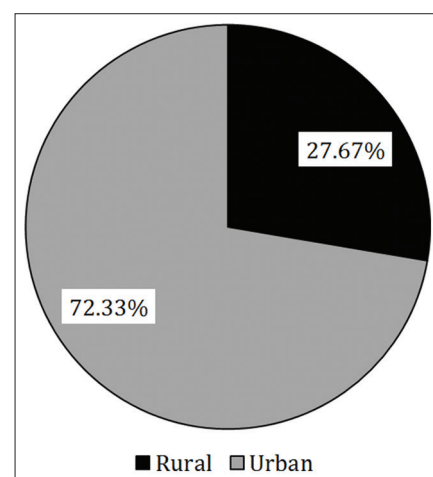


Figure 2: Residence-wise distribution of cases

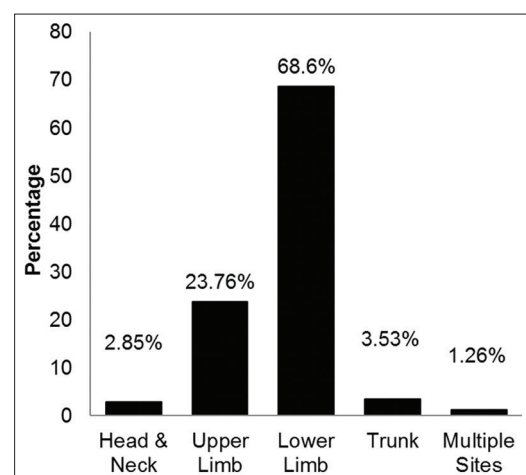


Figure 3: Distribution of cases according to site of bite

cases were involved in either government or private service, farmers constituted 9.9%, 6.3% victims were housewives, and 5.4% cases were unemployed; 55 cases (4.5%) were children under 4 years of age and were excluded from the analysis of occupation. In majority (68.6%) of the cases lower limb was most common site of bite followed by upper limb in 23.76% cases followed by trunk in 3.53% cases, bites

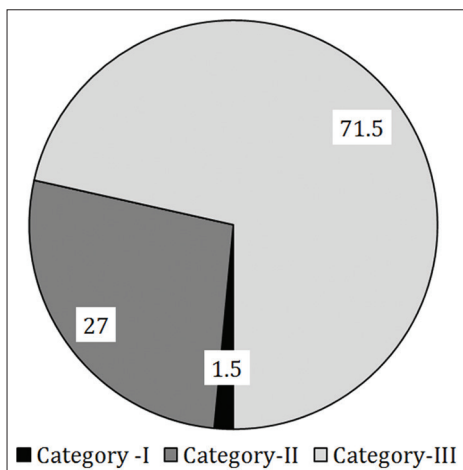


Figure 4: Distribution of cases according to category of bite

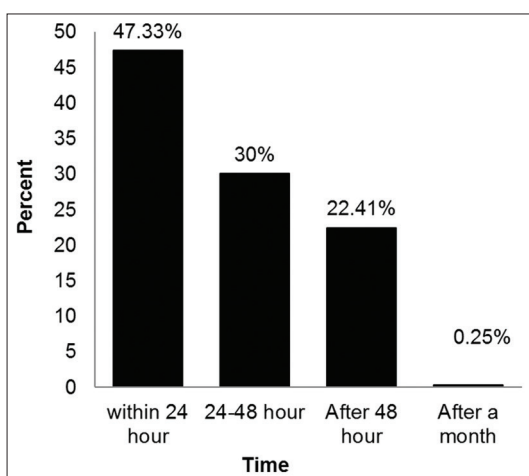


Figure 5: Distribution of cases according to time of reporting to anti-rabies clinic after bite

over head and neck was present among 2.85% and multiple sites were involved in 1.26% of the cases (Figure 3). 71.50% cases were of Category III bite followed by category II in 27% whereas only 1.50% cases were falling in Category I (Figure 4). Maximum (47.33%) cases reported within 24 hour of bite, 30% reported within 48 hour and 22.4% cases reported after a delay of 48 hour, some (0.25%) cases are reporting even a month after the animal bite (Figure 5). Dog was the most common (92%) biting animal followed by cat (5.75%) rest 2.25% cases were bitten by other animal which includes cases of monkey, pig, hyena, fox and rat bite, 4 cases of suspected rabid cow's milk consumption and 5 cases were of suspected rabid animal exposure (Table 1). When the status of the biting animal involved was studied, it was found that maximum (70.78%) number of cases were of stray animal bite whereas pet animals were responsible for 29.22% of the event. The vaccination status of pet animals was quite alarming as only one-third of the pet was vaccinated and two-third were not vaccinated, thus making the situation more grievous. Most (76.99%) of the animal bite events were unprovoked, biting as a result of provoking the animal occurred in only 23.01% of the cases. In older age i.e. 60

Table 1: Distribution of cases according to type of animal involved

Type of animal involved	Number (%)
Dog	1104 (92.00)
Cat	69 (5.75)
Others*	27 (2.25)
Total	1200 (100)

*6 monkeys, 2 pigs, 4 hyenae, 5 rats, 1 fox, consumption of suspected rabid cow's milk (4), exposure to suspected rabid person (5)

Table 2: Relation between age and category of bite

Age	Category			Total
	I (%)	II	III	
<15 year	5 (1.20)	108 (26.0)	302 (72.7)	415
15-29 years	6 (1.78)	96 (28.49)	235 (69.7)	337
30-44 years	1 (0.45)	69 (30.94)	153 (68.6)	223
45-59 years	6 (4.41)	36 (26.47)	94 (69.12)	136
≥60 years	0	15 (16.85)	74 (83.15)	89
Total	18 (1.50)	324 (27.0)	858 (71.5)	1200 (100)

Chi-square - 18.4, P - 0.01

years and above no case of category I was seen and majority (83.15%) cases were of category III, In below 15 years of age group 72.7% cases were of category III, and just 1.2% cases were of category I (Table 2).

DISCUSSION

The present study shows that dog bites affect people of all age groups but most commonly (34.58%) affected the age group was <15 years, and least (7.42%) affected age group was above 60 years of age. This has not only direct health implication but also indirectly effects in terms of work loss and school absenteeism and leads to catastrophic expenditure. Males were more (74.5%) affected as compared to females (25.5%) due to more outdoor activities. Nearly 72.33% victims were from the urban area and rural cases constitute 27.67% of the affected person. Except 26.3%, all the respondents were educated to some level, majority (30.2%) were educated up to primary school, 17% up to middle school, 10.08% up to high school, 5.5% up to higher secondary school, and 10.83% were educated up to graduate level or more. As far as occupation is concerned most of the victims were students (32.9%) followed by laborer (18.8%), 13.9% were self-employed person, 12.4% were involved in services either government or private, farmer were 9.9%, 6.3% were housewives, and unemployed person were 5.4%. Majority of the cases reported belonged to socioeconomic class IV (35.5%) and V (29.1) of modified BG Prasad classification. Dogs were the main (92%) biting animals and protection of pet dogs (29.22%) with vaccination was low (24.4%). Lower limbs were the site of bite in 68.6% followed by upper limbs in 23.7%, trunk in 3.5%, and head and neck

area were involved in 2.8%. Nearly 71.5% cases were of category III as per the WHO classification. Majority 47.33% have reported to ARC within 24 h of animal bite that was good so that proper wound washing could be done which is the first step to prevent rabies, but nearly 50% cases reported after 24 h and some cases reported even a month after bite.

Most commonly affected age group was <15 years. Smaller height and provoking the animals may increase the probability of their being bitten more. A similar finding was seen in a study done by Shelke *et al.*,^[11] Jain *et al.*,^[12] and Wagh *et al.*^[13] While a study done by Ganasva *et al.*^[14] showed more cases in >50 years of age. More males (74.5%) involvement compared to females might be due to more outdoor activities in male thereby have greater chances of being bitten. The higher male proportion in this study corroborates with Shelke *et al.*,^[11] Jain *et al.*^[12] While females were more victims in a study conducted by Gupta *et al.*^[15] Majority of the cases in the present study were from urban area comprises 72.3% of the total, it may be because the present study was conducted in an urban area, similarly more urban victims were observed in other studies, Pavithra *et al.*,^[16] Varsharani *et al.*^[17] While more cases from rural areas were reported in studies done by Debasis *et al.*,^[18] Rambhau and Dilip,^[19] and Behera *et al.*^[20] As far as occupation of animal bite cases is concerned, in the present study, most (31.4%) of the victims were students followed by laborer (18%). Similar finding was reported by Jain *et al.*^[12] and Wankhede *et al.*^[21] In the present study, dog was found to be the most common biting animal, this observation was seen uniformly in other studies too Sheetal^[22] Sudarshan *et al.*^[23] In the present study, most of the bites were, due to stray animal, 70.78% and pet animals were responsible for only 29.22% of the cases. Umrigar *et al.* (2013)^[24] observed that just 5% cases were due to pet animal, Shah *et al.* (2010)^[25] observed that 3.5% cases were due to pet animal bite. As far as the vaccination of the pets is concerned, in the present study out of 348 pet animal bite cases only in 24.4% of the pets were vaccinated. Senivasan *et al.*^[26] observed that 48.1% of the cases were due to pet animal bite, of which only 21.4% were protected by canine vaccination, Sudarshan *et al.*^[23] In WHO sponsored multicentric study stated that 32.9% pet dogs were vaccinated. In the present study, majority of the cases were due to unprovoked bite, 76.99% and provocative bites were seen in 23.01% of cases. Other studies also reported more cases of unprovoked bite, Jain *et al.*,^[12] Umrigar *et al.*,^[24] while more cases of provoked bite were seen in studies conducted by Rambhau *et al.*^[19] and Behera *et al.*^[20] In the present study, overall lower limb was main site of bite as these are most easily approachable part of the body for an animal, head and face bites were common in children, and smaller height in children may be the reason. Similarly, studies in India and other countries reported lower limb as the most common site of bite, Kabeta *et al.*,^[27] Shah *et al.*,^[25] and Sheetal.^[22] The findings of the present study reveal that majority of the animal bites were of category III. This could be due to the fact, Hamidia Hospital is a tertiary

care Hospital, and severe animal bite cases are referred here, especially for administration of anti-rabies serum. This finding of the present study is compatible with other studies Patil *et al.*,^[28] Rambhau *et al.*,^[19] and Ichhpujani *et al.*,^[29] while more cases of category II bite were reported by Rasania *et al.*^[30] and Ganasva *et al.*^[14] In the present study, most of the cases reported within 24 h; similarly Jain *et al.*^[12] also found that most of the victims reported within 24 h of bite.

Strength and Limitations of This Study

This study provides valid data to the concerned institute on above-mentioned problem and it includes whole year data which was not done before in this area. Our study is limited by its area of work, i.e., hospital-based, community-based study is needed to be done to understand the magnitude of problem.

CONCLUSION

The study findings conclude that animal bites, especially dog bites still pose a public health problem, the situation is especially pronounced in the capital city of Bhopal. Although all age groups were affected, the problem was very much prevalent among the children. This has not only direct health implication but also indirectly effects in terms of school absenteeism, work loss, and leads to catastrophic expenditure. Dogs were the main biting animals encountered, and protection of pet dog with vaccination was low. Category III exposure was seen in the majority of the cases. This indicates the importance of need of a large amount of anti-rabies serum thereby increasing the cost of management of animal bite cases.

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