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Original Research Article

An epidemiological study of the clinico-social profile of animal bite patients attending the anti-rabies clinic of a tertiary care hospital in New Delhi

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ABSTRACT

Background: Rabies is a zoonotic disease caused by the rabies virus (RABV). Annually about 59,000 persons die of rabies, of which 20,000 are from India alone. Rabies though 100% fatal is preventable with post-exposure prophylaxis which includes wound washing, anti-rabies vaccination (ARV) and rabies immunoglobulin. The objective of the present study was to describe the clinico-social profile of animal bite patients attending the anti-rabies clinic of a tertiary care hospital in New Delhi.
Methods: A longitudinal descriptive hospital-based study was conducted in the anti-rabies clinic of Vardhman Mahavir Medical College and Safdarjung Hospital (VMMC and SJH), New Delhi from February 2019 to July 2020. Study participants were interviewed by using a semi-structured, pre-designed and pre-tested proforma. Data regarding socio-demographic and clinical profile of the study participants following animal bite exposure was collected.
Results: The total number of animal bite victims enrolled in the study were 360. Majority of the bite victims belonged to adult population (20-59 years). Majority were males (73.9%). 58.9% were working and 27.5% were students. Most bites belonged to category III (80.8%). Dogs (88.1%) were the most common biting animal. 79% of the bites were provoked.
Conclusions: Knowing the socio-demographic characteristics and the clinical profile of animal bite victims gives an idea about important baseline characteristics of animal bite victims and the burden of the disease. As in majority cases dogs are involved, steps should be taken to control stray dog population in co-ordination with the Non-government organizations (NGOs) and Municipal Corporations.

Keywords: Anti-rabies clinic, Clinico-social profile, Epidemiology of animal bite, Rabies, Socio-demographic profile

INTRODUCTION

Rabies is a zoonotic disease caused by the rabies virus (RABV). The etiological agents of rabies encephalitis belong to the *Mononegavirales* order, the *Rhabdoviridae* family and the *Lyssavirus* genus.[1,2,3] This fatal disease is the 10th biggest cause of death due to infectious diseases worldwide. The annual death toll is around 50,000-60,000, with 99% of the deaths occurring in the tropical developing countries. Across the globe, 59,000 human deaths annually due to dog mediated rabies have been reported with an associated loss of 3.7 million Disability adjusted life years (DALYs). Of these, Asia accounts for 59.6%.[1] (35,172 human deaths) deaths which translates into a loss of 2.2 million DALYs. India alone accounts for 59.9% of the total annual deaths in Asia i.e. 21,068 and 35% of human rabies annual deaths globally.[3] In India the annual estimated number of dog bites is around 17.4 million, leading to approximately 18,000-20,000 cases of human rabies per year.[4]

The present study aimed to assess the socio-demographic profile and the clinical profile of the animal bite patients (including profile of biting animal, clinical profile of wound etc.) who attended the Anti rabies clinic (ARC) of Vardhman Mahavir Medical College and Safdarjung Hospital, New Delhi.

METHODS

This was a hospital based descriptive longitudinal study conducted at the ARC of Vardhman Mahavir Medical College (VMMC) and Safdarjung Hospital, New Delhi, from February 2019 to July 2020. The study subjects for the purpose of this study were the animal bite patients attending the ARC of VMMC and Safdarjung Hospital. Since the present study is a part of a larger study, the details of the sample size have been discussed elsewhere. The sample size was calculated to be 360, using the formula:

$$Sample\ size\ (n) = \frac{z^2_{1-\alpha/2} * p\ (1-p)}{\varepsilon^2}$$

Where,

n=sample size
$Z_{1-\alpha/2}$ is the constant 1.96 for 95% confidence limits.
p=anticipated population proportion
Ɛ=relative precision

Patients with category-II and category-III animal bite wounds coming to the ARC, for day 0 dose of ARV were included in the study. The categorisation of wounds was done as per the classification of animal bite wounds for post-exposure prophylaxis based on World Health Organization (WHO) recommendations.[1]

A non-probability convenient sampling method was used to select the study subjects and achieve the sample size. The importance of the study was explained to the animal bite patients or to the guardians for those who were less than 18 years. Those willing to participate were included and written informed consent/assent was obtained for their participation in the study. Baseline information from the selected participants regarding their socio-demographic profile and detailed history of animal bite exposure including type of animal, site of bite, category of exposure, circumstance of bite etc. were collected using a pre-designed, pre-tested, structured questionnaire which was administered by interview technique.

All the data were coded and entered into a master spreadsheet on Microsoft (MS) office excel and later transferred from MS excel to Statistical package for social sciences (SPSS) (IBM SPSS statistics 21.0) for analysis. Data validation checks were performed at regular interval for data entered into the worksheet of MS excel. Results obtained were expressed in terms of percentages and proportions. Results depicted as tables and graphs.

Ethical clearance was obtained from the Institute ethics committee of VMMC and Safdarjung Hospital, New Delhi.

RESULTS

The study was conducted among 360 study participants who attended the ARC of VMMC and Safdarjung Hospital, New Delhi following the incident of animal bite. The sociodemographic profile of the study participants has been captured in Table 1.

Table 1: Socio-demographic profile of the study participants attending the ARC (n=360).

Variable	Number (N)	Percentage (%)
Age (years)		
Children and adolescents (0-19)	107	29.7
Adults (20-59)	242	67.2
Geriatric (≥60)	11	3.1
Gender		
Male	266	73.9
Female	94	26.1
Religion		
Hindu	327	90.8
Muslim	33	9.2
Marital status		
Married	189	52.5
Unmarried	171	47.5
Occupation		
Employed/working	212	58.9
Student	99	27.5
Housewife	33	9.2
Unemployed	9	2.5
Retired	7	1.9
Literacy status		
Literate	298	82.8
Illiterate	62	17.2

The age of the study participants ranged from 2 to 65 years and the mean age was (29.3±15.2) years. The median age (interquartile range) of the study participants was 26 (18-40) years.

About three-fourth (73.9%) of the study participants were males while one-fourth (26.1%) were females. Majority (90.8%) were Hindus and almost half (52.5%) were married. Majority (82.8%) of the study participants were literate. 58.9% of the study participants were employed, while little more than one-fourth (27.5%) were students (Table 1).

Majority (32.8%) of the study participants belonged to class-II socio-economic status followed by class-III (25.3%) as per the Modified BG prasad socio-economic classification, update-2019 (Figure 1).

Table 2: Distribution of the study participants according to the clinical features of animal bite exposure (n=360).

Variable	Number (N)	Percentage (%)
Category of wound		
Category – II	69	19.2
Category – III	291	80.8
Type of wound		
Abrasion	227	63.1
Laceration	133	36.9
Number of wounds		
Single	217	60.3
Multiple	143	39.7

*According to WHO recommendation[1]

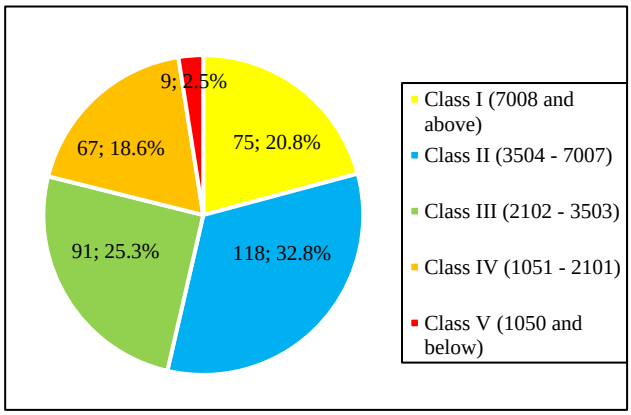

Figure 1: Distribution of study participants according to socio economic status* (n=360).

*(Upper class – I; middle class – II, III, IV; lower class- V, As per Modified BG Prasad Socio-economic Classification, Update – 2019 [5])

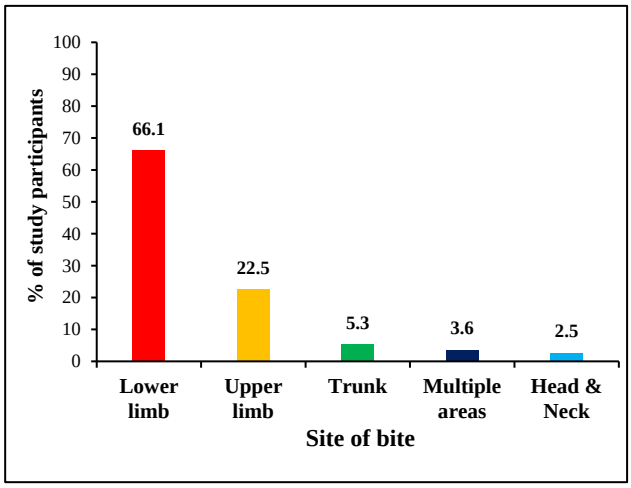

Figure 2: Distribution of study participants according to the site of bite (n=360).

Majority (80.8%) of the study participants had category-III wounds as per the classification of animal bite wounds for post-exposure prophylaxis based on WHO recommendations. Majority (60.3%) of the study participants had single wound with 63.1% of the participants had abrasion wounds (Table 2).

A larger proportion (66.1%) of participants reported to have been bitten in their lower limb followed by upper limb (22.5%) (Figure 2).

Majority (88.1%) of the bites were caused due to dogs. Almost 4/5th (82.8%) of the study participants were bitten by stray animals whereas (14.7%) were bitten by pet dogs. Majority of the bites (68.3%) were unprovoked and in 78.3% of the cases, the biting animal was non-observable (Table 3).

Table 3: Distribution of the study participants according to characteristics of animal bite exposure (n=360).

Variable	Number (N)	Percentage (%)
Type of animal		
Dog	317	88.1
Cat	22	6.1
Monkey	16	4.4
Rat	5	1.4
Category of biting animal		
Stray animals	298	82.8
Pet dogs	53	14.7
Wild	9	2.5
Observability		
Observable	78	21.7
Non-observable	282	78.3
Type of bite		
Provoked	114	31.7
Unprovoked	246	68.3

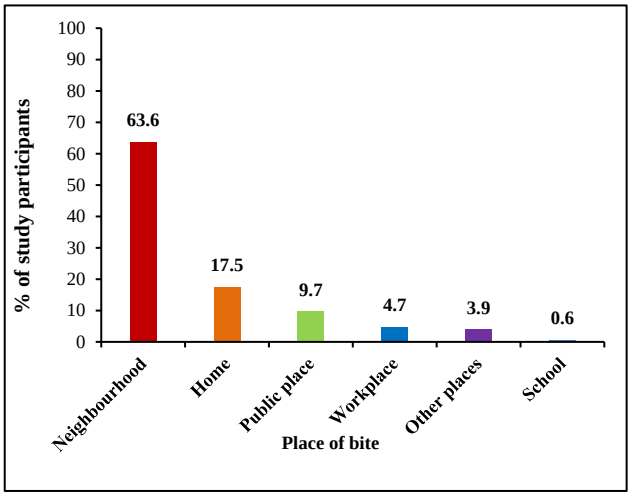

Figure 3: Distribution of study participants according to the place of bite (n=360).

Majority (63.6%) of the animal bite incidents took place in the neighbourhood of the study participants followed by home (17.5%) and public places (9.7%) (Figure 3).

Table 4: Association between the age group of the study participants and the type of bite.

Age group (in years)	Type of bite		Total (%)	P value
	Provoked (%)	Unprovoked (%)		
Children and adolescents (0-19)	49 (45.8)	58 (54.2)	107 (100)	0.001
Adults (20-59)	62 (25.6)	180 (74.4)	242 (100)	
Geriatric (≥60)	3 (27.3)	8 (72.7)	11 (100)	

It was observed that among the children and adolescents, the incidence of provoked bites (45.8%) were higher as compared to adults (25.6%) and geriatrics (27.3%). This difference in incidence of provoked bites was found to be statistically significant (Table 4).

DISCUSSION

The age of the study participants ranged from 2 to 65 years. The mean age of participants was found to be (29.3±15.2) years. This finding was comparable to that reported by Laishram et al who reported a mean age of (32.97±13.02) years but different to those reported by Chandan et al and Herbert et al who reported a mean age of (34.95±13.49) years and (35.4±11.4) years respectively.[6,7,8] This difference may be due to the difference in study population since in the study by Chandan et al only the agricultural workers were included whereas in the study by Herbert et al only the adult participants were recruited.[7,8] About three-fourth (73.9%) of the study participants were males while one-fourth were females in the present study. Similar findings were reported in the studies by Wadde et al, Salve et al and Dhaduk et al in which 71.39%, 70.4% and 75% of the study participants were males respectively.[9,10,11] Majority of the study participants were males in all these studies which might be due to the reason that males have increased outdoor activity, mobility and hence have increased risk of exposure to bite. In the present study, majority of the study participants (90.8%) were Hindus while (9.2%) were Muslims. Similar findings were reported by Mog et al and Chandan et al in which 99% and 86% of their study participants were Hindus respectively.[12,7]

In the present study, 17.2% of the study participants were illiterate which was similar to the findings of a hospital-based study by Ganasva et al and Domple et al who reported 15.4% and 21.5% of the study participants to be illiterate.[13,14]

In the present study, majority (58.9%) of the study participants were employed while nearly one-third (27.5%) were students. However, the findings were different from the study conducted by Domple et al in which 43.8% were students.[14] This difference may be attributed to the difference in sample size which was lesser than the present study.

In the present study, majority (80.8%) of the study participants had category-III wounds whereas only (19.2%) had category-II wounds as per the classification of animal bite wounds based on WHO recommendations. Similar findings were reported by Salve et al where nearly 80% of the wounds were category-III bites and in the study by Anandaraj et al where 77.1% of the animal bite patients had category-III bites.[10,15] Shankaraiah et al in their study reported majority of the study participants to have category-III bites both in Intramuscular rabies vaccine (IMRV) group (79.0%) and in Intradermal rabies vaccine (IDRV) group (70.8%).[16] Domple et al, also reported higher proportion (78.5%) of category-III bites in their study.[14]

It was observed that most (60.3%) of the study participants, in the present study, had single wound while the remaining (39.7%) received multiple wounds. This finding was similar to that reported by Khazaei et al in which 60.4% of the animal bite patients had single wound.[17] However, this finding was different from the study by Jain et al who reported majority of the study participants having single wounds and only 1% cases having multiple site bites.[18]

A larger proportion (66.1%) of the study participants reported to have been bitten in their lower limb in the present study. Similar findings were reported in the study by Wadde et al (69.74%), Salve et al (60%), Venkatesan et al (53.3%), Domple et al (70.4%) and Jain et al (77.9%) who reported the commonest site of bite as the lower extremity.[9,10,14,18,19]

In the present study, majority (88.1%) of the bites were caused due to dogs. Studies by Dhaduk et al, Lilare et al and Masthi et al, also reported dog to be the main biting animal in their studies i.e. 98.8%, 91.2% and 74.1% respectively.[11,20] In the present study, out of the 360 cases of animal bites, almost 4/5th (82.8%) of the study participants were bitten by stray animals whereas (14.7%) were bitten by pet dogs. Similar findings were reported from the study by Jain et al and Ganasva et al in which majority of the study participants (88.9%) and (95.8%) were bitten by street dogs respectively.[13] These findings suggest that the huge stray dog population is largely responsible for most cases of animal bite. Majority (68.3%) of the bites were reported to be unprovoked bites in the present study. Similar findings were reported by Wadde et al, Venkatesan et al, and Jain et al who reported 76.6%, 78% and 86.2% of the bites to be unprovoked respectively.[9,19,18] In the present study it was observed that majority (63.6%) of the study participants were bitten in the neighbourhood. Similar observation was reported in

the study by Venkatesan et al in which 70.4% of the bites were reported to be in and around the house.[19]

CONCLUSION

Rabies is a fatal disease that is transmitted to humans by the bite of a rabid animal. The current study was undertaken to understand the socio-demographic profile and the clinical profile of the animal bite patients. This study highlights certain important baseline characteristics of animal bite patients. Majority of the bite patients are students or are engaged in outdoor occupational activity and had category-III bites. Health education campaigns are utmost important to make people aware of rabies and the importance of seeking timely medical care after an animal bite incident is recommended to help in reducing the morbidity and mortality due to such animal bites. Control of stray dog population should be done by the government authorities in co-ordination with the NGOs and Municipal corporations who are involved in rabies prevention activities. Human and canine rabies have to be considered as one health approach.

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