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Original Research Article

Epidemiological study of animal bite cases attending a tertiary care hospital in Tripura: North-East India

Manish Acharjee*, Goutam Saha

Department of Statistics, Maharaja Bir Bikram College, Agartala, Tripura, India

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***Correspondence:**
Dr. Manish Acharjee,
E-mail: manishacharjee9@gmail.com

ABSTRACT

Background: This research article presents an epidemiological study in Tripura, North-east India, investigating animal bite cases at a tertiary care hospital. Animal bites pose significant public health concerns, including potential zoonotic disease transmission. The study aims to assess animal bite incidence, envenoming, and treatment-seeking behaviours among victims. Data from individuals over one year old will reveal the burden of animal bites on healthcare facilities, guiding effective prevention and management strategies for this pressing health issue.
Methods: A cross-sectional study at AGMC and GBP Hospital, Tripura, assessed animal bite patterns referred to the ARV centre (2018–2021). Included animal-related bites and excluded incomplete data. Collected age, gender, socio-economic status, biting animal, and bite category. Staff ensured nationwide surveillance. Categorised subjects by age.
Results: The cross-sectional study investigated animal bite patterns at AGMC and GBP Hospital, Agartala, Tripura, from 2018 to 2021. Analysis revealed male adults (20-39 years, 41.7%) were most affected, predominantly by dogs (57.58%). The APL category showed the highest frequency (70.79%). Missing category bites decreased, while third category bites increased over time. The winter months had higher frequencies of animal bites. Continued surveillance and targeted interventions are vital for effective prevention.
Conclusions: This study highlights male adults (20–39 years old) as being most affected, predominantly by dog bites. The APL category showed higher susceptibility. Continued surveillance and targeted interventions are crucial for effective prevention.

Keywords: Animal bites, Biting category, Gender, Socio-economic status

INTRODUCTION

This research paper aims to investigate animal bite patterns at the ARV center of AGMC and GBP Hospital in Agartala from 2018 to 2021. It analyzes factors like age, gender, socioeconomic status, biting animals, and bite categories. The study also assesses temporal variations and seasonal trends in animal bite incidents, employing SPSS for data analysis. The objective is to provide insights into these bite patterns for public health interventions.

A study in India reported 20,565 annual rabies cases, including atypical forms. Unvaccinated adult males from rural areas were affected, bitten mainly by stray dogs (96.2%) on their extremities. Child victims had a prevalence of 17.9 per 1000, with 78% of bites unprovoked, mostly occurring around homes (70%) on lower limbs (53.6%). Only 4% received immune globulins despite 67% of wounds being class 3.[1]

The data analysis for the period of 2010 to 2018 shows that the highest proportion of animal biting cases belonged to category III (91.0%), with the majority of

cases (93.6%) resulting from dog bites compared to other animals. Whereas only 2.7% of patients with Category III bites received the HRIG vaccine and 318 patients didn't complete the entire vaccination procedure.[2,3]

A study found that respondents had a mean age of (45.23147) years, with 54.5% being female, 32% being homemakers, and 39% being graduates. About 83.5% had heard of rabies, but only 20.5% knew it was caused by a virus. Adequate knowledge was found in 40%, and literacy was significantly associated with better knowledge (p = 0.002). Before going to anti-rabies clinics, 58.5% had washed the wound properly, while 10.8% had used unconventional remedies like chillies and ash.[4]

Rabies is an ancient zoonotic disease in India, causing 25,000 to 30,000 human deaths annually. Control requires vaccination, public awareness, and managing stray dog populations.[5]

In the past year, there have been 13.7 dog bite incidents per 1,000 children. The majority of bites occurred in male children (51.5%), children under the age of ten (56%), and children living in poverty (80%). Primary health centres and conventional faith healers are the two most frequent sources of therapy for bites.[6]

Of the 870 rabies cases, 76.3% were male, 23.7% female, and 23.4% aged 11-20. Dogs caused 98.04% of bites, 86.2% of which were unprovoked. Lower limbs were bitten in 77.9% of cases. Males dominated for 20 years (31% of students). 94.2% of class III bites were from stray animals; 56.2% applied indigenous remedies promptly.[7,8]

A total of 2612 fresh animal bite victims were interviewed (exit interview) from the anti-rabies centres (ARCs). Dog bites caused maximum. Second most common biting animal was cat, followed by others. In this study 68.3% animal bite victims were males and 31.7% were female, 29.3% in age group of 2-19 years. 8.9% had category III exposure as per the WHO classification.[9]

In a cross-sectional study at Sassoon Hospital, 587 animal bite cases were analysed. Most were male (79%) and children (0–14 years) accounted for 52.8%. Dogs caused 94.4% of bites, with 30% being pet dogs and 38.02% of them immunised. Stray dogs were responsible for 94% of bites in the total of 587 cases. Children under 15 were found to be more likely to provoke a bite ($p \leq 0.05$). Among the cases, 59% fell under category II bites. Lower extremities were affected in 89.8% of cases.[10,11]

Young males were most affected, with category III dog bites being common on lower limbs (57.6% and 58.8%, respectively). About 49.0% were bitten by dogs and 45.1% by cats. Stray animals accounted for most attacks (57.8%). Prompt preventive measures and improved medical care are necessary to reduce the incidence and consequences of animal bites.[12,13]

In a study of 362 brain samples, 83.1% showed positive results for rabies. The cases increased over time (p = 0.01), with higher occurrences in the winter and fall. Ecologically, decreased rainfall was correlated with animal rabies resurgence (r = 0.34, P = 0.001) in Kerman province.[14]

The study reported an annual incidence of 35.31 per 1,000 people for animal bites and envenoming. Dog bites were most common (51.4%), followed by scorpion bites (23.6%). Many sought faith healers (38.9%), and 70.8% received appropriate health facility treatment.[15,16]

METHODS

Data has been collected from the anti-rabies clinic of Agartala Government Medical College, Agartala, for the time period January 2018 to March 2021. The time schedule was chosen on the basis of the availability of data. Another important reason was the COVID-19 pandemic situation in the state. The data has been classified in such a way to maintain a time schedule according to pre-lockdown, during lockdown, and post-lockdown. Among these data, important parameters such as gender, socio-economic status, type of animals, category of bite, etc. are chosen for analysis purposes.

A cross-sectional study has been conducted to investigate the animal bite patterns among the cases referred to the ARV centre of AGMC and GBP Hospital in Agartala, Tripura, during the period 2018–2021. Incomplete data were excluded from the analysis. Parameters like Age group, Gender, socioeconomic status, biting animals, and category of bites are included in this study. We evaluate the frequency distribution of the factors that we just mentioned; from that, we see what is the highest and lowest frequency of those factors, and secondly, we use the same technique for the respective factors with respect to time and analyse various factors status. We mainly studied, firstly, the factors in various combinations, e.g., We make cross-tabulations of biting animals according to gender, socio-economic status, category of bites, and age category, respectively. We also used combinations, such as the biting category, with other factors. Secondly, we studied bite patterns with respect to time, yearly as well as monthly, to see any seasonal changes in bites. As people take doses, namely the first dose taken in our study, we consider it as the number of bites by the animal. We have data on categories of bites such as type I, II, III, and missing (which is unidentified) according to the wound caused by the bite.

Data analysis was done with the software called Statistical Package for Social Sciences (SPSS) from IBM (licensed version at Department of Statistics, MBB College).

RESULTS

In this study, a total of 2612 samples from the period 2018-2021 have been considered for analysis purposes. We have parameters called age category, gender, socioeconomic status (SES), biting animals, category of bites, first dose taken annually, first dose taken monthly, etc. The analysis part has been subdivided into two sections, viz. Section A contains a bar diagram of age category vs. biting percentage, a bar diagram of socio-economic status and biting percentage, a bar diagram of biting animals and their percentage, a category of bites and their percentage, instead of, section B contains the first dose taken yearly and their percentages: First dose taken yearly with age category, first dose taken yearly with SES, first dose taken with gender, first dose taken yearly with biting category, first dose taken monthly, and first dose taken monthly with biting animals.

Section A

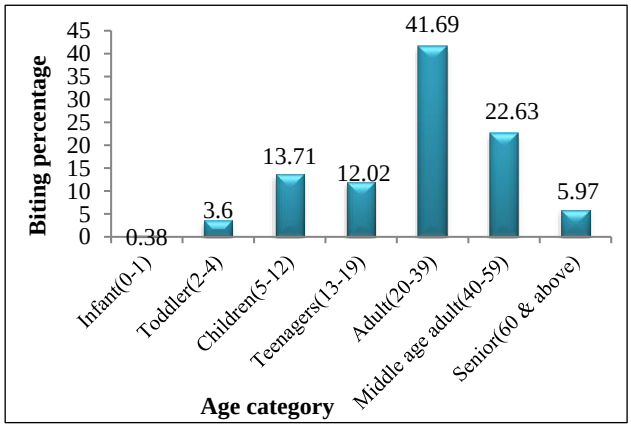

Figure 1: Bar diagram of age category vs biting percent.

We find most of the victims were male (1785), which is 68.3% under the age group of adults (20-39), which is 41.7%, followed by middle-aged adults (40-59), which is 22.6%. Children (5–12) were more exposed (13.71%) to animal biting compared to teenagers (13–19) having (12%) shown in Figure 1.

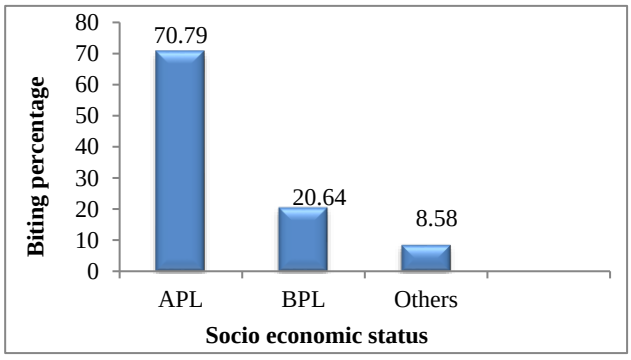

Figure 2: Bar diagram of socio economic status and biting percent.

Most of the victims belong to the APL (70.79%) category with regards to socio-economic status, followed by BPL (20.64%) and others (8.58%) in Figure 2.

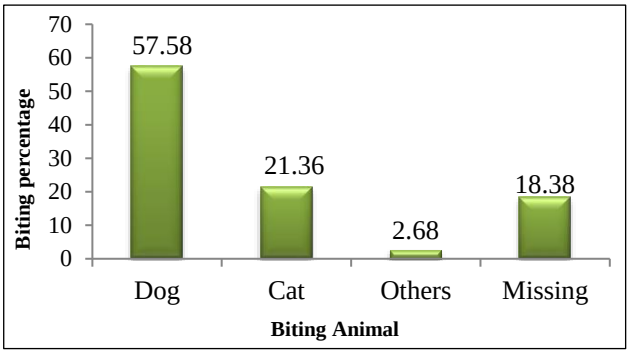

Figure 3: Bar diagram of biting animal vs their percentage.

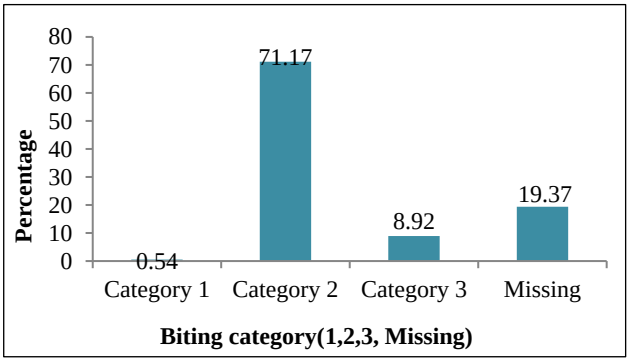

Figure 4: Category of bite and their percentage.

Most of the animal bites were dog (57.58%), followed by cat (21.36%), others (e.g., monkey) (2.68%), and missing (18.38%) (unidentified by patients) (Figure 3).

Section B

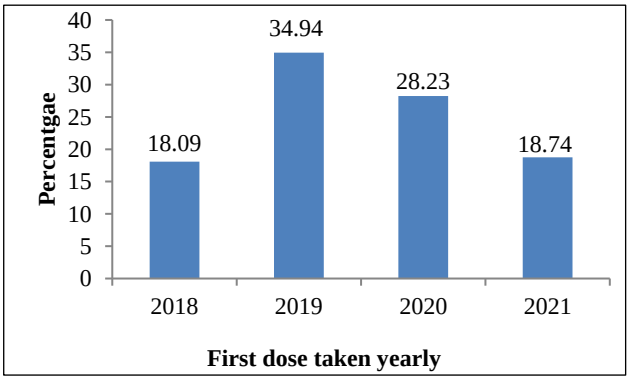

Figure 5: First dose taken yearly and their percentage.

Most of the bites were second-category bites (blood came out after the wound). 71.17% followed by missing bites (that couldn't be identified by the doctor but have been treated) 9.37%, the third category bites (8.92%), and the first category is 0.54% (Figure 4).

We analyse the data yearly and monthly as well, and we see that in the year 2019, it was the highest (35.01%) frequency of animal bite, followed by 2020 (28.21%), 2021 (18.72%), and 2018 (18.06%) in Figure 5.

In 2019, there was the highest frequency of animal bites for all age groups except senior citizens, and they (senior citizens) were mostly exposed to the year 2020 (Figure 6).

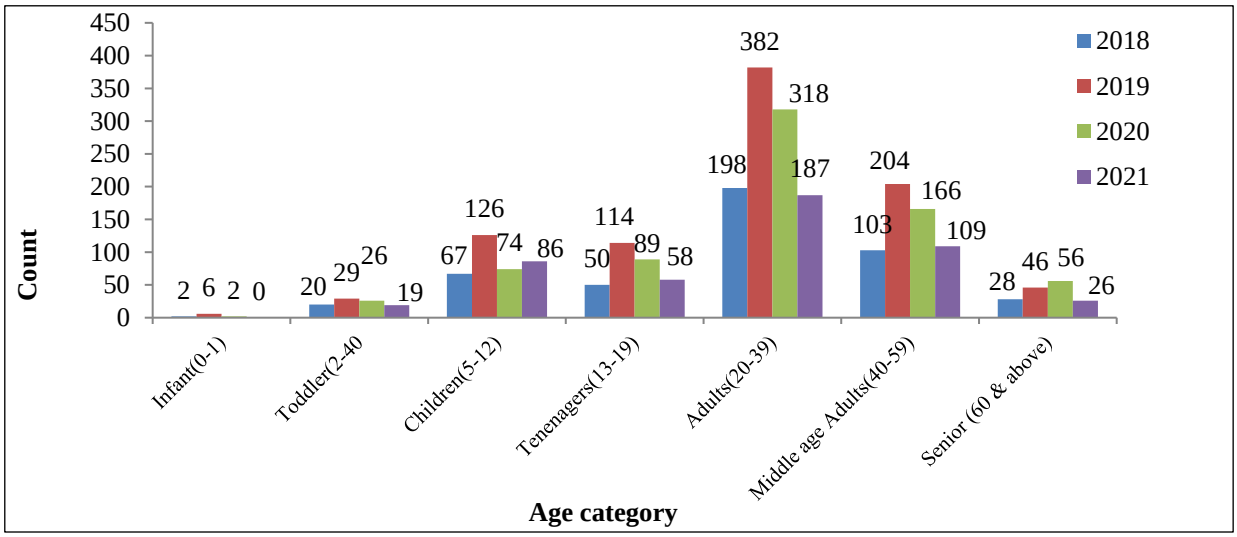

Figure 6: First dose taken yearly with age category.

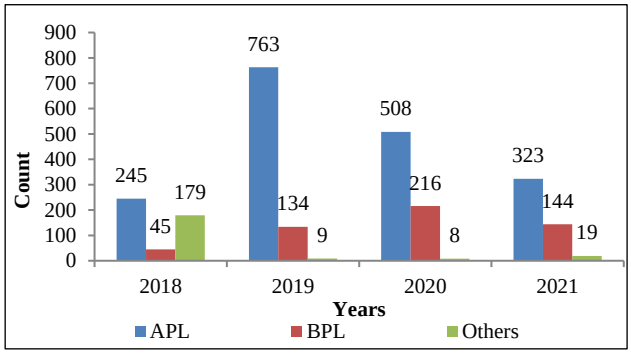

Figure 7: First dose taken yearly with SES.

In all the years, APL was the highest socioeconomic status for all time, others were highest in 2018, and BPL was highest in 2020 (Figure 7).

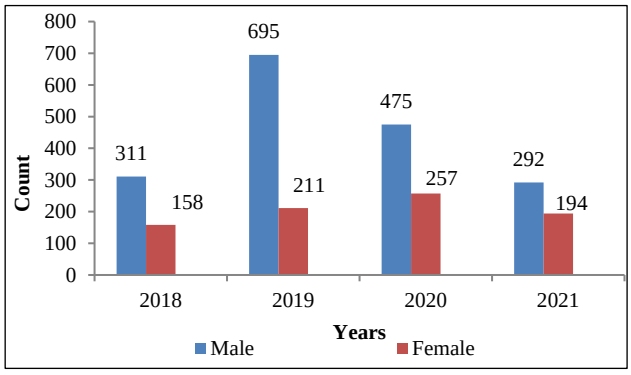

Figure 8: First dose taken with gender.

In the year 2019, males had the highest frequency of animal bites compared to other years, and females had the highest frequency in 2020 compared to other years (Figure 8).

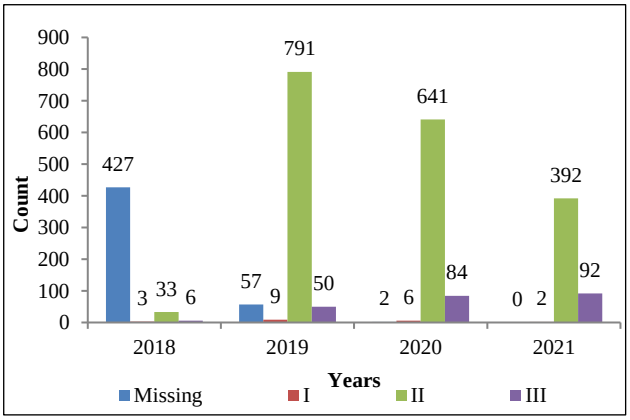

Figure 9: First dose taken yearly with biting category.

We have seen an important pattern in the years to come in the bite category. The missing category bites were highest in 2018 and started decreasing in successive years from 2018 to 2021, while on the other hand, third category bites (the most severe) are increasing through the successive years from 2018 to 2021 (Figure 9).

When we analyse monthly data on biting animals, we find that most of the bites are due to dogs, followed by cats, missing people, and others. For dogs and cats, the frequency stays at its peak for the months of January, February, March, and April; on the other hand, missing animal bites were higher in May, June, and July (Figure 10).

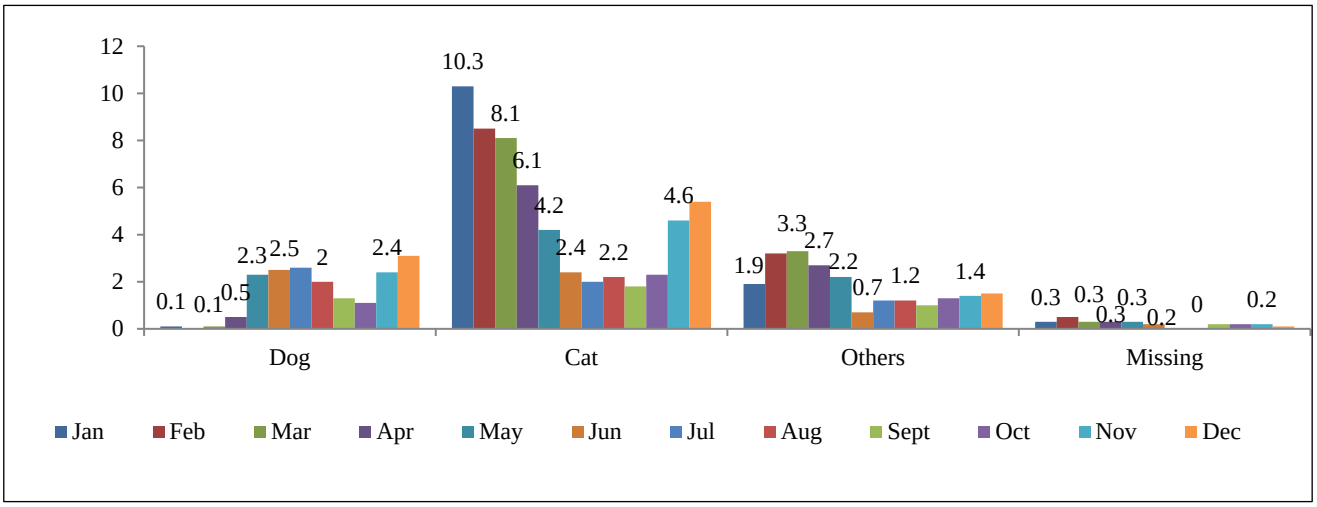

Figure 10: First dose taken monthly with biting animal.

DISCUSSION

Demographics and socioeconomic factors

Male individuals, particularly adults in the age group of 20-39, were the most vulnerable to animal bites.[1] Children aged 5-12 were more exposed to animal bites compared to teenagers (13-19) and (10-11). Most victims belonged to the Above Poverty Line (APL) socioeconomic category, followed by Below Poverty Line (BPL) and other categories.

Biting animals

Dogs were the primary cause of animal bites, followed by cats and other animals like monkeys.[2] A notable percentage of bites were from unidentified animals.

Category of bites

Second-category bites (bleeding occurred after the wound) were the most common, followed by missing bites (treatment was provided, but the doctor couldn't identify the animal). Third-category bites (severe bites) showed an increasing trend over the years.[3]

First dose taken analysis

Animal bites showed a varying frequency across different years, with 2019 having the highest frequency, followed by 2020, 2021 and 2018. The age distribution of first doses taken aligned with the overall distribution of animal bites, with the highest frequency in 2019. APL individuals consistently had the highest frequency of first doses taken across all years. Male individuals had the highest frequency of first doses taken in 2019, while females had the highest frequency in 2020. Missing category bites decreased over the years, while third category (severe) bites also increased by.[12]

Monthly analysis

Animal biting incidents were more frequent during the winter months (December to March) and lower during the months of June to October.

Dog and cat bites were most frequent during the winter months, while missing animal bites were higher during the summer months.

Overall, the study suggests that male adults, especially those in the (20-39) age group, are at higher risk of animal bites, with dogs being the primary cause. The socioeconomic status of victims influenced the frequency of bites and the first doses taken. Additionally, the severity of bites appeared to be increasing over the years. The timing of animal bites showed a correlation with seasonal variations, with higher incidents during the winter months. These conclusions provide insights into the patterns of animal bites and the effectiveness of the first doses taken, which could guide public health interventions and awareness campaigns.

CONCLUSION

In summary, this study reveals significant insights into the dynamics of animal bites and first-dose uptake. Male adults within the 20–39 age group emerge as a high-risk category for animal bites, particularly those inflicted by dogs. This vulnerability extends to children (5–12) and teenagers, warranting attention. The above-poverty line demographic appears most affected, with notable incidents of second-category bites and a concerning increase in severe bites over time.

The correlation between first dose administration and bite trends underscores the importance of prompt medical response. Notably, first dose uptake aligns with socioeconomic status, with individuals above the poverty line showing better adherence. Additionally, the study

highlights a seasonal pattern, with the winter months seeing a surge in animal bite cases, mainly involving dogs and cats.

These findings emphasise the necessity of tailored awareness campaigns and targeted interventions. Strengthening education about animal behaviour, preventive measures, and the significance of first doses is crucial. Moreover, strategies addressing the identified high-risk groups, such as male adults, children, and teenagers, can contribute to reducing the incidence of animal bites. Ultimately, by addressing these insights, public health authorities can work towards enhancing community safety and well-being.

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Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee of Agartala Government Medical College, Tripura, India

REFERENCES

1. Sudarshan MK, Madhusudana SN, Mahendra BJ, Rao NS, Narayana DA, Rahman SA, Meslin FX, Lobo D, Ravikumar K. Assessing the burden of human rabies in India: results of a national multi-center epidemiological survey. Int J Infect Dis. 2007;11(1):29-35.
2. Jethani S, Singh SK, Kamble BD, Dobhal V, Singh S, Jha D, Ahlawat P. Epidemiological pattern and trend analysis of animal bite cases of anti-rabies clinic of tertiary care hospital of Delhi. J Family Medi Prim Care. 2022;11(2):728.
3. Gogtay NJ, Nagpal A, Mallad A, Patel K, Stimpson SJ, Belur A, et al. Demographics of animal bite victims & management practices in a tertiary care institute in Mumbai, Maharashtra, India. Ind J Medi Res. 2014;139(3):459.
4. Mog C, Roy A, Choudhuri P. Knowledge about rabies among urban adult residents, Agartala, West Tripura: a cross sectional study. Int J Comm Medi Public Health. 2019;6(8): 1-5.
5. Public health: rabies in India-NIBI-NIH. Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2244675/. Accessed on 12 July 2018.
6. Murugan V, Amol D, Kalaiselvan G. A Community based cross sectional study of dog bites inchildren in a rural district of Tamil Nadu. Int J Med Sci Public Health. 2017;6(1):109-12.
7. Jain M, Prakash R, Garg K, Jain R, Choudhary M. Epidemiology of animal bite cases attending anti-rabies clinic of a Tertiary Care Centre in Southern Rajasthan. J Res Med Dent Sci. 2015;3(1):79.
8. Minhas A, Singh M, Sood A, Raj D, Bhardwaj AK. Epidemiology of animal bite reported at animal bite clinic during 2015-16 at a tertiary care centre of Himachal Pradesh. Ind J Comm Health. 2018;30(4):1-7.
9. Ichhpujani RL, Mala C, Veena M, Singh J, Bhardwaj M, Bhattacharya D, et al. Epidemiology of animal bites and rabies cases in India. A multicentric study. J Communi Dis. 2008;40(1):27-36.
10. Shetty RA, Chaturvedi S, Singh Z. Profile of animal bite cases in Pune. J Commun Dis. 2005;37(1):66-72.
11. Umarigar P, Parmar G, Patel PB, Bansal RK. Profile of animal bite cases attending urban health centres in Surat city: a cross-sectional study. Natl J Community Med. 2012;3(4):631-5.
12. Santra S, Lahiri SK, Ray TG. Determinants of Animal Bite and Practices Following Bite among the Victims Attending a Block Primary Health Centre of West Bengal. Int J Heal Sci Res. 2015;5(8):24-7.
13. Bashir K, Haq I, Khan MS, Qurieshi MA. One-year descriptive analysis of patients treated at an anti-rabies clinic-a retrospective study from Kashmir. PLoS Negl Trop Dis. 2022;14(8):1-10.
14. Bahonar AR, Rashidi H, Simani S, Fayaz A, Haghdoost AA, Rezaei-Nassab M, et al. Relative frequency of animal rabies and factors affecting it in Kerman province, 1993-2003. J Sch Pub Heal Insti Publ Heal Res. 2007;5(1):69-76.
15. Purwar N, Kumari K, Singh A, Nagesh SR. A study on animal bites and envenomings in rural Varanasi: a community based cross-sectional study. Inter J Comm Medi Publ Heal. 2018;5(12):5343-8.
16. Sangeetha S, Sujatha K, William RF. An epidemiological study of animal bites among rural population in Tamil Nadu, India. Int J Comm Med Public Health. 2016;3(6):1413-8.

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