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RETROSPECTIVE STUDY OF DOG BITE CASES REPORTED IN TAMIL NADU FROM JANUARY 2022 TO DECEMBER 2023.

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Abstract

INTRODUCTION : Dogs have the potency to cause a multitude of health problems to humans when not maintained well. Over the years, the dog population and dog bite cases have increased. Measures to prevent rabies have increased the financial burden on the community and healthcare system.

AIM : To describe the epidemiology of dog bite cases reported in Tamil Nadu.

METHODOLOGY : This retrospective secondary data analysis was conducted among Dog bite cases reported in Tamil Nadu from January 2022 to December 2023 through IHIP-IDSP platform. The collected data was analyzed using SPSS version 21.

RESULTS : The reported number of dog bite cases increased by 18.1% in 2023 compared to 2022 and maximum cases were reported during May and June. Males contributed to 35% of cases more than females. Among the cases 98.1% were provided PEP in OPD care and approximately 62% of the cases sought care at Primary healthcare institutions.

CONCLUSION : With the increasing burden of strayed dogs and dog bite cases, the requirement of post-exposure prophylaxis(PEP) for rabies infection is increasing. Hence government needs an holistic approach to control the dog population by Animal Birth Control measures (ABC) to prevent the financial burden on healthcare institutions and the cases of dog bites.

KEYWORDS : Dog bites, Post exposure prophylaxis, Integrated disease surveillance programme.

INTRODUCTION

Human-animal bite injuries are a significant health problem. Every year, about 1% of emergency department visits worldwide are due to animal bites, which can cause virtually anything from minor scratches to severe, sometimes fatal wounds. Infection can occur in even relatively minor wounds.¹ Because of this, every bite must be examined vigilantly, and any potential consequences should be handled vigilantly Globally, dog and cat bites are the most common animal bites, making up nearly 95% of all bite wounds seen in the emergency room.²

Dogs are the most loved pets in India and also the most common pets abandoned. This has led to a significant increase in dog straying, leading to an unaccounted dog population. The increase in dog population led to increased dog bites over the years.³ Several incidents of dog bites by strayed dogs have been reported during the past decade, and the number keeps increasing. Due to the potential for exposure to the rabies virus, particularly in developing countries where rabies is an endemic disease, human-animal bite injuries represent a significant public health concern.^{4,5}

Dogs are the primary source for 85 to 90% of human-animal bite injuries, followed by cats (5 to 10%). Numerous studies have shown that dogs cause between 76 and 94% of animal bite injuries in low-income nations, which leads to a high frequency of rabies.^{6,7} Children (5 to 9 years old) are the most likely to suffer from animal bites. Children under the age of 15 are one of the most significant at-risk populations

for rabies, according to a WHO research.⁸

The findings of various research carried out throughout multiple regions of India suggest that there has been a rising trend in the number of animal bites in our nation in recent times.⁹ In the previous study conducted by officials in DPH&PM, the number of rabies deaths was stable but the number of dog bites was high. As we are focusing on eliminating rabies, it is important to focus on preventive and control measures. Among rabies death cases, pet dogs were the major source of rabies infection.^{10,11} The epidemiology of dog injuries and their consequences for public health need to be continuously monitored in light of the rise in dog ownership and stray dog populations in India, as well as the changing traits of both dog owners and canines.^{12,13}

This study assessed the time, place, and person distribution of dog bites in Tamil Nadu reported in the Integrated Health Information Platform - Integrated Disease Surveillance Programme (IHIP-IDSP).

METHODOLOGY

This descriptive secondary data analysis was conducted in Tamil Nadu between April and May 2024.



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This study assesses the epidemiological profile of dog bite cases from January 2022 to Demeber 2023. Dog bite case details were collected from the IHIP-IDSP collected by the Communicable Disease section of the Directorate of Public Health and Preventive Medicine (DPH&PM).

The National Centre for Disease Control (NCDC) uses IHIP-IDSP as a standard real-time surveillance platform to monitor all diseases that are notifiable and have public health importance. Dog bites and other animal bites are among the incidents recorded in the IHIP-IDSP, which includes a set up of case epidemiological profiles.

Cases of dog and animal bites are reported through the IHIP-IDSP platform using the P form or presumptive case form. Information was collected from the platform, and bites unrelated to dogs were excluded. The collected data was entered in Microsoft EXCEL and analyzed using SPSS version²¹. Age was grouped into 10 with a class interval of 10 years. Continuous variables are expressed as mean and standard deviation. Categorical variables are expressed as frequency and percentage. All dog bite cases are considered major public health concerns, and appropriate response measures must be initiated to prevent an outbreak. Prior official permission to conduct this study was obtained from the DPH&PM. To maintain the privacy of the cases, their names were kept a secret, and the initials were used alone for the study.

RESULTS

The distribution of dog bite cases reported from Tamil Nadu in the IHIP-IDSP p-form from January 2022 to Demeber 2023 is described in Table 1. During the study period, 8,06,239 dog bite cases were reported in Tamil Nadu (2022 - 3,65,318 and 2023 - 4,40,921). Among the dog bite victims, males contributed 60.2% (n=4,85,622). Similarly, among the age group distribution, dog bites were most prevalent in adults in the age group 41-50 years (16.3%) and 31-40 years (16.2%), followed by children ≤10 years (15.4%).

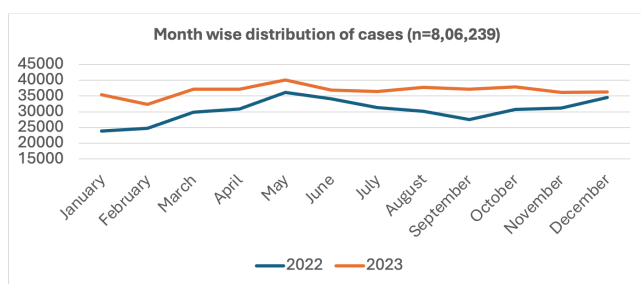


Figure 1: Month-wise distribution of dog bite cases in Tamil Nadu from January 2022 to Demeber 2023 (n=8,06,239).

Table 1: Age-sex distribution of dog bite cases in Tamil Nadu from January 2022 to Demeber 2023 (n=8,06,239).

Age group	Female		Male		Transgender		Grand Total	
	Number of cases	Percentage	Number of cases	Percentage	Number of cases	Percentage	Number of cases	Percentage
≤10 years	45,092	14.1%	79,148	16.3%	57	17.1%	1,24,297	15.4%
11-20 years	39,541	12.3%	77,852	16.0%	46	13.8%	1,17,439	14.6%
21-30 years	43,602	13.6%	76,986	15.9%	44	13.2%	1,20,632	15.0%
31-40 years	55,413	17.3%	75,063	15.5%	48	14.4%	1,30,524	16.2%
41-50 years	57,534	18.0%	74,095	15.3%	63	18.9%	1,31,692	16.3%
51-60 years	46,323	14.5%	58,811	12.1%	45	13.5%	1,05,179	13.0%
61-70 years	23,855	7.4%	30,216	6.2%	19	5.7%	54,090	6.7%
71-80 years	6,677	2.1%	10,074	2.1%	9	2.7%	16,760	2.1%
81-90 years	1,530	.5%	2,216	.5%	2	.6%	3,748	.5%
≥91 years	717	.2%	1,161	.2%	0	0.0%	1,878	.2%
Total	320284	100.0%	485622	100.0%	333	100.0%	806239	100.0%

Figure 1 describes the month-wise distribution of dog bite cases in Tamil Nadu during the study period. The number of dog bite cases is almost constant over the year, with a slight increase in cases during the month of May (9.5%) and December (8.8%).

Table 2: Age-year distribution of dog bite cases in Tamil Nadu from January 2022 to Demeber 2023 (n=8,06,239).

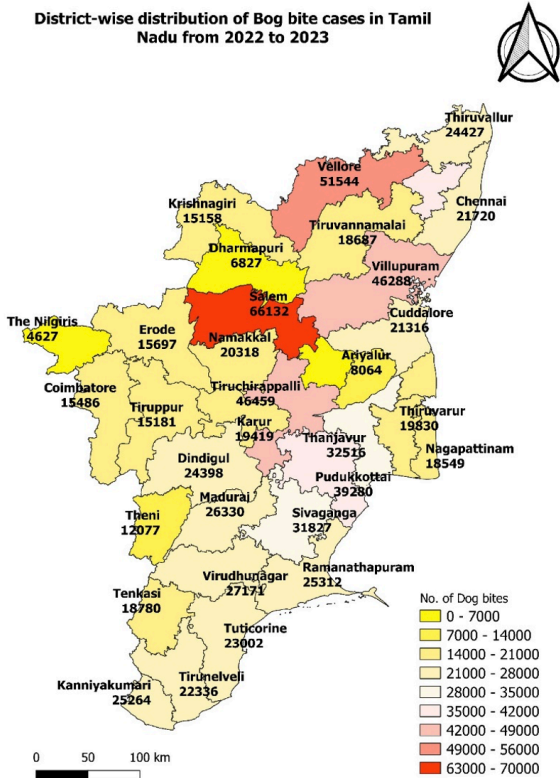
Age group	2022		2023		Grand Total	
	No. of Cases	Percentage	No. of Cases	Percentage	No. of Cases	Percentage
≤10 years	58,609	16.04	65,688	14.90	1,24,297	15.42
11-20 years	52,945	14.49	64,494	14.63	1,17,439	14.57
21-30 years	55,405	15.17	65,227	14.79	1,20,632	14.96
31-40 years	59,484	16.28	71,040	16.11	1,30,524	16.19
41-50 years	58,693	16.07	72,999	16.56	1,31,692	16.33
51-60 years	46,693	12.78	58,486	13.26	1,05,179	13.05
61-70 years	23,618	6.47	30,472	6.91	54,090	6.71
71-80 years	7,426	2.03	9,334	2.12	16,760	2.08
81-90 years	1,655	0.45	2,093	0.47	3,748	0.46
≥91 years	790	0.22	1,088	0.25	1,878	0.23
Total	3,65,318	100.00	4,40,921	100.00	8,06,239	100.00

Table 2 describes the age-wise distribution of dog bite cases in Tamil Nadu between the years 2022 and 2023. The number of dog bites among persons over 80 was lower. In 2023, there were more reported dog bites across all age groups than there were in 2022.

Figure 2 describes the distribution of dog bite cases District (HUD)-wise between the years 2022 and 2023. The number of dog bite cases in 2023 (54.69%) was higher than in 2022 (45.31).

Among the HUDs, most cases were reported from Salem (8.2%) followed by Vellore (6.39%) and Tiruchirappalli (5.76%), and the least was reported from Perambalur (0.5%) and The Nilgiris (0.57%).

Figure 2: District-wise distribution of Dog bite cases in Tamil Nadu from January 2022 to Demeber 2023 (n=806239).



dog population are to be neutered. The cost of the Animal Birth Control procedure for one dog was Rupees 1,650, which included Rupees 1,450 for the procedure and Rupees 200 for the dog catcher. The calculated financial burden on the Animal Birth Control program was Rupees. 107 crores excluding the dog vaccination expenditure.

Table 3: Type of healthcare facility approached for first aid among dog bite cases in Tamil Nadu from January 2022 to Demeber 2023 (n=8,06,239).

Health Care Facility	2022		2023		Total	
	Np. Of Cases	Percentage	Np. Of Cases	Percentage	Np. Of Cases	Percentage
Primary Health Care Institute	2,31,700	28.74	2,71,944	33.73	5,03,644	62.47
Community Health Center	68,450	8.49	80,277	9.96	1,48,727	18.45
Mobile Medical Unit	1,158	0.14	880	0.11	2,038	0.25
Primary Health Center	1,60,913	19.96	1,90,348	23.61	3,51,261	43.57
Rashtriya Bal Swasthya Karyakram	1,179	0.15	439	0.05	1,618	0.20
Secondary Health Care Institute	1,14,333	14.18	1,35,022	16.75	2,49,355	30.93
District Head Quarter Hospital	20386	2.53	21603	2.68	41989	5.21
Sub District Hospital	93,947	11.65	1,13,419	14.07	2,07,366	25.72
Tertiary Health Care Institute	18,516	2.30	33,339	4.14	51,855	6.43
Medical College Hospital	18,516	2.30	33,339	4.14	51,855	6.43
Private Institute	769	0.10	616	0.08	1385	0.17
Grand Total	3,65,318	45.31	4,40,921	54.69	8,06,239	100.00

DISCUSSION

This study has found that the number of dog bite cases in Tamil Nadu has been increasing. This increase is evident both in the State and district-level analysis. The increase in dog bites was apparent in all age groups. Studies carried out in the United States, Canada, Uganda, Switzerland, and India produced similar results. This suggests that when dog bites are on the rise, all age groups are more vulnerable.^{3,9,14-18} This could indicate the increasing number of dog populations.

In our study, dog bite cases were more prevalent among males than females. Males aged 41 to 50 were the most common victims of dog bites, followed by those aged <10 years. Among the entire population, ages between 41-50 years followed by 31 to 40 years were the vulnerable population. Similar findings were observed in studies from India, the USA, Canada, and Uganda.¹⁸⁻²⁰ In contrast to our study, a study conducted in Salem in Tamil Nadu showed higher prevalent in the age group less than 15 years.³ This high prevalence in the adolescent age group could be due to the high exploring nature in this age group and the affection towards pets in that particular age.

According to our study, more dog bite incidents were reported in males than females. Global research projects, including those in the USA, Canada, Uganda, Belgium, and India, have reported similar results.¹⁶⁻¹⁹ These results may be explained by the fact that men travel more often and are more likely to be bitten by dogs in unfamiliar areas.

When analyzing the month-wise distribution of dog bites, a higher prevalence was observed during May

Table 3 describes the place of contact for first aid following dog bites in Tamil Nadu from January 2022 to December 2023. Following a dog bite, primary healthcare facilities (62.47%) are the most frequently used facilities for administering first aid; private institutions (0.17%) are the least frequently used locations. In the outpatient department (OPD), 98.2 percent (n=7,90,292) of the dog bite cases received first aid.

The number of reported dog bites in IHIP-IDSP was 8,06,239. The post-exposure prophylaxis included the Anti-rabies vaccine (1 vial = 209 Rupees with 5 doses), Tetanus toxoid administration (1 vial = 106 Rupees with 20 doses) and assuming 10% of bites are Category III requiring Rabies Immunoglobulin (1 vial = 263 Rupees) and including the loss of wages on the day of visiting the hospital for post-exposure prophylaxis care (assuming 1-day wage as 272 Rupees for 4 days). The calculated financial burden on post-exposure prophylaxis including loss of wages for the study period was Rupees. 94 crores which is recurrent over the years and increases with increasing dog bites.

According to the data from the 20th Livestock Census for the dog population in Tamil Nadu released in the year 2020, the total dog population in Tamil Nadu was 12,97,230. As the exact number of dogs neutered under the Animal Birth Control program, we assumed 50% of

and December in Tamil Nadu. The findings were consistent during the years 2022 and 2023. Similar findings showing two peaks in a year were observed in studies conducted in the USA, Canada, Uganda, and India.^{14,17,20,21} In Western countries, the first peak occurs in March or April, and the second peak occurs in October or November. These findings could correlate with the proestrus cycle in dogs, which shows behavioral changes in all dogs.

Post dog bites, the victims seek health care facilities for first aid and post-exposure prophylaxis (PEP) with Tetanus toxoid and Anti-rabies vaccine. In certain patients, Rabies immunoglobulin is administered. The mode of health care provided was OPD care among most patients. Similarly, other studies conducted in India at Delhi, Tamil Nadu, and Kerala identified a similar kind of care provided.^{3,9,19,22} This indicated that dog bites are not fatal and can be managed in OPD facilities.

The PEP is necessary to prevent rabies. It is provided in all government health facilities on a 24-hour basis. Similarly, private institutions offer PEP when patients seek care in private institutions. According to our data, most dog bite cases sought PEP at a government health facility. Studies in Western nations have not produced much evidence-based literature on this. This indicates the effectiveness of government healthcare facilities and the trust within the community in India. This variability of higher reporting from Government institutions could also be due to the quality of reporting by Government institutions.

Primary healthcare facilities saw more PEP patients among government institutions than secondary and tertiary care facilities. This demonstrates the community's primary healthcare organizations' dependability and accessibility in delivering primary care, a crucial aspect of health.

The estimated burden on the community and the healthcare system including the public health system and animal husbandry due to dogs and dog bites is estimated to be Rupees 94 crores and 107 crores. These estimates could also increase over the years due to the increasing dog population. The estimates of animal husbandry is a non-recurring as it's a one time procedure. If not covered, the expenditure on the public health system for post-exposure prophylaxis will increase over the years hampering the entire system.

CONCLUSION

The number of people requiring PEP and the incidence of dog bites in Tamil Nadu are rising. With an increase in the requirement of PEP, the budgeting for procurement of PEP is also an increasing trend, leading to

a financial burden to the patients and the healthcare system. Therefore, it is imperative to implement a comprehensive plan to limit the number of stray dogs and use animal birth control methods to minimize dog bites. Similarly, the probability of rabies infection is high with an increase in dog bite cases. To prevent rabies infection, outreach to vaccination services for strayed and pet dogs and improving the knowledge in the community to seek healthcare providers for administration of PEP following dog bites is mandatory. It is high time that policymakers focus on preventive measures and increase budgeting for activities like animal birth control and promoting dog vaccination drives to prevent any untoward event in the upcoming years.

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