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RESEARCH ARTICLE
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GEOSPATIAL DISTRIBUTION AND SOCIO-DEMOGRAPHIC PROFILE OF ANIMAL BITE CASES AT TERTIARY CARE CENTER IN KOTA (RAJASTHAN) – A 5 YEARS STUDY

Dr. Ankita Rana[1], Dr. Preeti Gupta[2], Dr. Vineet V. Nair[3], Dr. Shirish Gupta[4*]

[1]PG Resident, Department of Community Medicine, Government Medical College, Kota; Mobile no. 8619289664; Email id – ankitaranakota@gmail.com, https://orcid.org/0009-0009-6163-8132
[2]Senior Professor & Head of Department, Department of Community Medicine, Government Medical College, Kota; Mobile no. 9352618018; Email id - preetipsm@gmail.com, https://orcid.org/0000-0002-3577-3594
[3]PG Resident, Department of Community Medicine, Government Medical College, Kota; Mobile no. 6238567072; Email id - vineeth9186@gmail.com, https://orcid.org/0009-0007-4838-3548
[4*]Assistant Professor, Department of Community Medicine, Government Medical College, Kota; Mobile no. 8107851583; Email id - rishi.doc@gmail.com, https://orcid.org/0009-0004-1340-7173

***Corresponding author:** Dr. Shirish Gupta
Assistant Professor, Department of Community Medicine, Government Medical College, Kota; Mobile no. 8107851583; Email id - rishi.doc@gmail.com, https://orcid.org/0009-0004-1340-7173

Abstract

Background: In India there are 17.4 million exposures to animal bites and 20 thousand deaths attributed to rabies occurring every year. In view of this, this study was conducted on distribution and management of animal bite cases from Anti Rabies clinic at tertiary care center, Kota (Rajasthan)

Methods: A record based descriptive study was carried out at the tertiary health centre, Kota (Rajasthan). The data regarding various animal bites cases coming to hospital in last 5 years (2019-2023) was taken. Socio demographic details of cases, type and category of bite, and total number of deaths in last 5 years was collected from anti-rabies clinic records and the results were tabulated.

Results: A total of 19,263 of animal bite cases were recorded in the last 5 yearswith maximum cases in 2019.Majority 77.06% were males. Urban area contributed to maximum cases 71.7%. Among the animal bite cases majority were dog bites 95.1%. Majority of reported cases were of category I (51.32%) and monthly index ranges from 0.5 to 1.7.

Conclusion: Keeping in mind high animal bite cases and the monthly variations in new animal bite cases, policy actions and interventions should be planned accordingly.

Keywords: Dog disease, Rabies, Study, retrospective, Time study, Vaccine, rabies

Introduction

Rabies is a vaccine-preventable, zoonotic disease caused by Rabies virus belonging to Rhabdoviridae family (Lyssavirus),affecting the central nervous system. It spreads to people and animals via saliva, usually through bites, scratches or direct contact with mucosa (e.g. eyes, mouth or open wounds) (1). Once clinical symptoms appear, rabies is virtually 100% fatal. In resource-limited countries (Africa, Asia, Eastern Europe and some parts of South America) rabies in humans are mainly caused by dog

mediated bites. According to WHO, around 59,000 deaths occur globally due to dog mediated rabies annually. In India there are 17.4 million exposures (2) to animal bites and 20 thousand deaths attributed to rabies occurring every year (3).

India accounts for 36% of the global deaths and 65% of the deaths due to rabies in the Southeast Asia region. To address the issue of rabies in the country, National Rabies Control Programme was started which reported 6644 clinically suspected cases and deaths of human rabies between 2012 and 2022 (4).Steps should be taken to reduce animal bite cases especially dog bites along with proper anti rabies treatment including wound management, ARV, and immunoglobulin's. It is a lifesaving treatment for a fatal disease like rabies.
In view of this background, this study was conducted on distribution and management of animal bite cases from Anti Rabies clinic at tertiary health centre ,Kota (Rajasthan) with the objective of finding out long term trends and monthly variations in new animal bite cases at the clinic from 2019-2023.

Methods
A descriptive record-based study was carried out at a tertiary health centre, Kota (Rajasthan). The data regarding various animal bites cases coming to Anti-Rabies clinic in last 5 years (2019-2023) was taken. Socio demographic details of cases, type of animal bite with category of bite, type of immunoglobulin administered and total number of deaths in last 5 years was collected from records and the results were tabulated.

Tools used for analysis
MS excel was used to analyze the data.

Results
A total of 19,263 of animal bite cases were recorded in the last 5 years (2019-2023), with maximum cases in 2019 (4409). Majority of the cases belong to age group 19-60 (13,013, 67.55%) followed by age group <19 (5155, 26.76%) and least in age group >60 (1085, 5.69%). Majority 14,844(77.06%) were males. Urban area contributed to maximum cases 13,817 (71.7%).
Among the animal bite cases recorded within the study period, maximum were dog bites 18,319 (95.1%), followed by monkey, cat, pig bites accounting for 4.25% (i.e; 2.5%,1.25% and 0.5% respectively). 0.73% of the bites were from other animals which included rat, rabbit, cow, horse, jackal, crocodile, bear. Majority of reported cases were of category I (51.32%), followed by category II (30.38%), followed by category III (18.33%).

Immunoglobulin was administered to category III bites. ARS (Anti-Rabies serum) and HRIg(Human Rabies Immunoglobulin) were given almost equally depending upon supply. 78.2% (15,063) of cases completed treatment.
A declining trend in dog bite cases was seen with maximum cases in 2019(4140) and least in 2023(2790). In the last 5 years, 18 people died as a suspected case of rabies. Out of the total deaths, 73% of cases were from rural area while only 27 % from urban. Majority of the reported death comprised of male population (14 out of 18) and 4 were children.

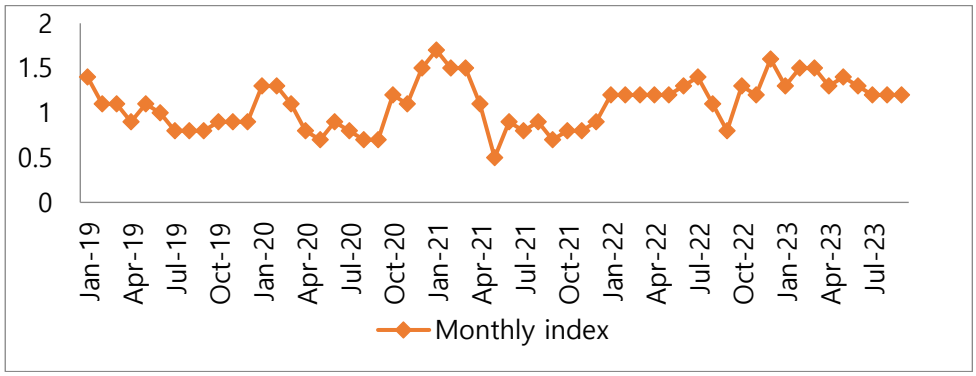
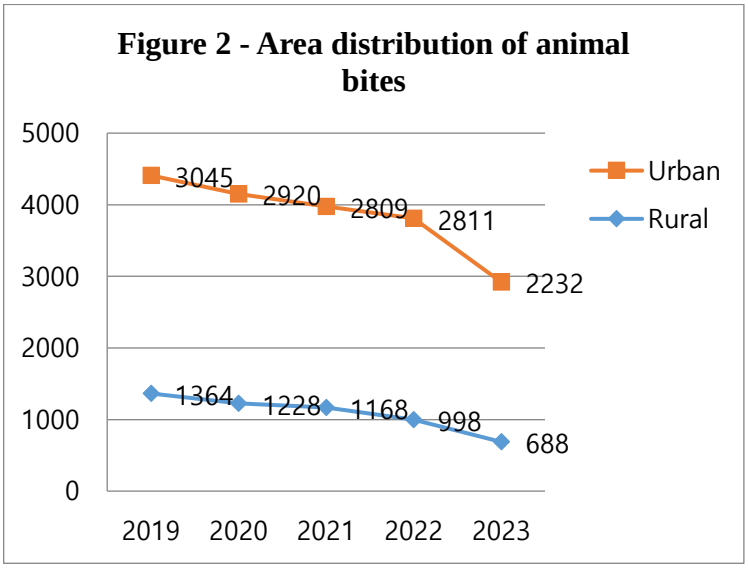


Figure 1: **Monthly Index** of bite cases over 5-year duration.

Monthly index =
Total cases in a month
mean cases in that year



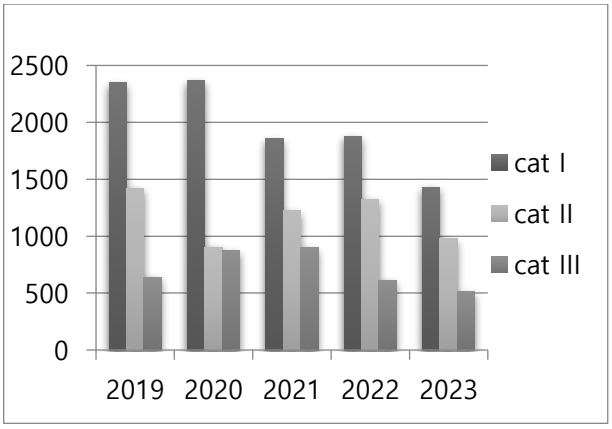


Figure 3 – Distribution of cases according to category of bite

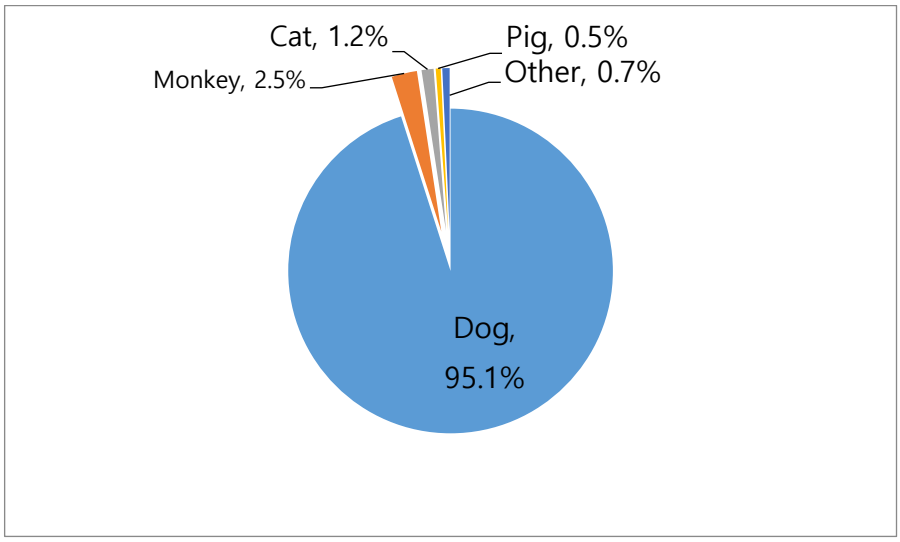


Figure 4: Distribution of bites according to type of animal

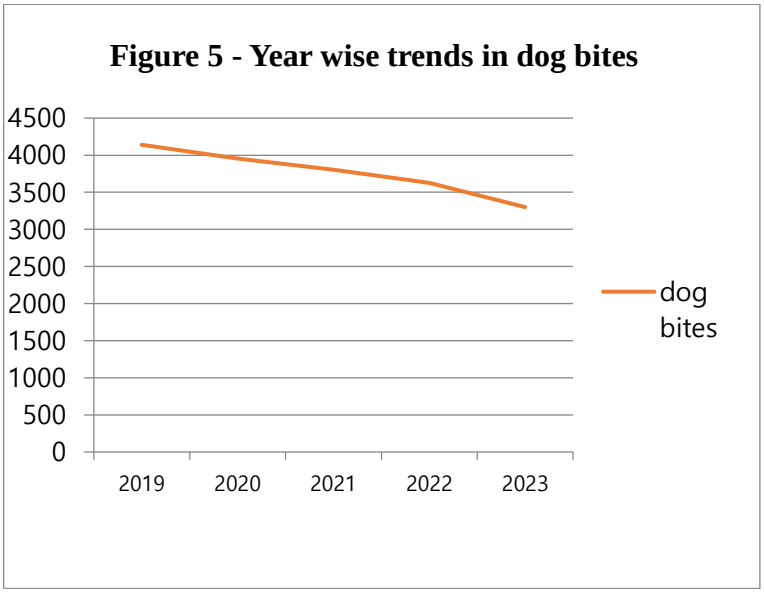


TABLE NO. 1 – SOCIODEMOGRAPHIC PROFILE WITH MEAN AND STANDARD DEVIATION

	2019(%)	2020(%)	2021(%)	2022(%)	2023(%)		Mean	Standard deviation
Age<19	25.2	25.2	22.8	32.6	29.4	**Age <19**	1033	155.8
Age19-60	69.9	67.9	73.1	62	63	**Age 19-60**	2602	502.5
Age>60	4.9	6.8	4.1	5.4	7.6	**Age >60**	217	41.9
Male	75.9	75.9	77.5	78.6	77.8	**Male**	2968	409.7
Female	24.1	24.1	22.5	21.4	22.2	**Female**	884	163
Rural	69.1	70.3	70.6	73.8	76.4			
Urban	30.9	29.7	29,4	26.2	23.6			

TABLE NO 2 : TYPE OF ANIMAL BITE

	2019(%)	2020(%)	2021(%)	2022(%)	2023(%)
Dog bites	93.9	95.4	95.8	95.3	95.5
Monkey bites	3.1	2.4	2.2	2.3	2.3
Cat bites	1.2	0.9	0.9	1.5	1.5
Pig bites	1	0.6	0.3	0.2	0.07
Other bites	0.8	0.6	0.7	0.71	0.61

TABLE NO.3 : CATEGORY OF BITE

	2019(%)	2020(%)	2021(%)	2022(%)	2023(%)
Category I	53.3	57.2	46.7	49.3	48.9
Category II	32.2	21.9	30.8	34.7	33.4
Category III	14.5	20.9	22.5	16	17.7

TABLE NO.4 : TYPE OF IMMUNOGLOBULIN

YEAR	2019(%)	2020(%)	2021(%)	2022(%)	2023 (%)
ARS	66.6	58.2	35.6	84.8	69.4
HRIG	33.4	41.8	64.4	15.2	30.6

Discussion

A total of 18,319 dog bite cases were reported in the study period of 5 years, with maximum numbers noted in the year 2019. Though reported throughout the years, different studies have documented that there is a seasonal pattern in animal bite/ dog bite cases. In our study a seasonal trend was seen where most bites occurred between the months of November to March main reason behind this finding could be due to the fact that August-October is the mating season of dogs. In a study in northern India, it was found that the mean number of dog bite cases per month was highest in the spring season (March and April) followed by winters (November to February) [5]. Over the year monthly index ranges from 0.5 to 1.7, maximum seen in January and was in line with the study conducted in Jaipur by Somya et. al. (3).

487 monkey bites cases were reported over the 5 years study period with majority of cases in the months of June to September which can be attributed to the high population of monkeys in many places of Kota like Nayapura, Rampura, Railway colony. Scarcity of food in their natural habitat leads to more interaction with humans as they search for food in areas of higher density and places where food is easily accessible to them, like temples. This can be the reason behind increased monkey bite cases in Kota. It also aligns with the study conducted in Delhi by Sumit et. al. (6).

Cases recorded from rural area were almost 1/3rd of urban area. Deaths from rabies were also high from rural area. Lack of awareness about rabies and its treatment in the rural population could be the cause; most of the bites were from stray dogs.

In our study, we observed a predominance of male individuals, constituting approximately three-fourths (77%) of the study population. These findings align with previous investigations conducted by Khokar et al., Domple et al., and Bedi et al.{(14),(15),(16)}, where male individuals accounted for 69.9%, 65.1%, and 71.6% of individuals exposed to animal bites, respectively (9-16). In a study conducted in China, overall male to female ratio of 2.4:1 was seen (19). The reason could be because males are more involved in outdoor activities.

Most of the animal bite cases were registered as category I.All the category III cases were administered immunoglobulin's with almost an equal distribution among equine and human based immunoglobulins. In our study 78.2% cases completed treatment which align with the study conducted by Dhaneswari Jena et al (18).

Most of the deaths were from rural area (73%), as was seen in study conducted in Assam by Ojah et.

al.(20), which might point towards the lack of awareness of the rural population about rabies treatment. An increasing trend of animal bite cases from 2010 to 2019 was seen by a study done in Jaipur (3). In the aforementioned study, 90% were dog bite cases and this increase in cases was attributed to the increased chances of interaction between humans and dogs due to the increase in human and dog populations, coupled with the increase in outdoor activities by humans. On the other hand, in our study a decreasing trend in animal bite cases was seen and it can be attributed to various reasons. Firstly, it could be due to reduced interactions between humans and animals during lockdown due to pandemic. Secondly, due to under-reporting of cases during the time of Covid-19. Thirdly, in last three years steps have been taken for sterilization of dogs in order to decrease stray dog population in Kota. It also points to the fact that in order to bring down animal bite cases, proper vaccination and sterilization of dogs will be required.

Conclusion

To achieve "Zero by 30," which is the goal of a global strategic plan to prevent human deaths from dog-transmitted rabies by 2030 (9), policy actions and interventions like population survey of dogs, dog vaccination and population management of dogs under National rabies Control Programme should be strictly implemented. Keeping in mind the monthly variations in new animal bite cases, adequate measures should be taken.

Article information

Limitations

The study was based on data collected from records maintained at an Anti-Rabies Clinic under one of the extensions of a tertiary health centre in Kota.

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Nil

Conflicts of interest

There are no conflicts of interest.

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