

Thinking Beyond Dogs: Epidemiology, Care-Seeking Behaviour And Health-System Barriers Related To Non-Dog Animal Bites- A Mixed Methods Study At Anti-Rabies Clinic Of A Tertiary Health Care Centre In North Maharashtra

Mahesh Chavhan¹, Amrita Shastri^{1*}, Yogita Bavaskar¹, Girish Chavhan²

¹Department of Community Medicine, Government Medical College, Jalgaon.

²Department of Pharmacology, Government Medical College, Akola.

ABSTRACT

Background: Animal bites remain a significant public health concern in rabies-endemic countries such as India, which contributes an outsized share of global rabies mortality. While dog bites account for the majority of exposures, bites from non-dog animals (e.g., cats, monkeys, livestock, wild animals) also pose risks of rabies and other complications. These non-dog exposures are frequently under-recognized and inadequately managed due to poor awareness and systemic barriers. **Objectives:** (1) To determine the proportion and epidemiological characteristics of non-dog animal bites among patients presenting to a tertiary health care centre. (2) To assess socio-demographic and exposure-related factors associated with these bites. (3) To explore patient's perceptions, experiences and barriers related to health-care seeking behaviour in non-dog animal bite cases. **Methodology:** A mixed-methods study was conducted from May 2025 to July 2026 at the Anti-Rabies Clinic of a tertiary health care centre in North Maharashtra. The quantitative component included analysis of 300 consecutive animal bite patients. The qualitative component comprised in-depth interviews with purposively selected non-dog bite cases. Quantitative data were analysed with descriptive statistics & thematic analysis was done for qualitative data. **Results:** Non-dog animal bites constituted 26.00% (78/300) of animal bite cases, consistent with national data reporting 20–30% non-dog bites in India during 2019–2023. Socio-demographically, bites were more frequent among males (62.00%) and rural residents (66.00%). Delay of ≥ 24 hours in hospital arrival was found in 60.33% of cases. Five major qualitative themes emerged: risk perception, health-seeking behaviour, sociocultural beliefs, health-system barriers, and psychological impact. **Conclusion:** Non-dog animal bites are an under-recognized yet clinically relevant public health concern with 26% prevalence. Addressing awareness gaps and strengthening health-system responsiveness are essential to improve rabies prevention.

Keywords: Animal bites, non-dog bites, Rabies, Mixed-Methods Study, India.

INTRODUCTION

Animal bites are a well-recognized public health problem, particularly in rabies-endemic regions. Globally, the World Health Organization (WHO) estimated approximately 59,000 human rabies deaths annually, with over 35,000 deaths in India alone ($\approx 36\%$ of global mortality)^{1,2}. Rabies is nearly always fatal once clinical symptoms develop, yet timely and appropriate post-exposure prophylaxis (PEP) is highly effective^{1,3}.

Epidemiological evidence from WHO-supported population-based surveys in India conducted between 2017 and 2022 indicates that 70–80% of animal bite exposures are due to dogs, whereas 20–30% result from non-dog animals including cats, monkeys, livestock and wild animals⁴⁻⁷. A multicentric surveillance data coordinated by the Association for Prevention and Control of Rabies in India (APCRI) from 2019–2023 report that cats account for approximately 1.7–3% of bites, monkeys for 2–4% in select urban and peri-urban areas, livestock for $<3\%$, and wild animals (e.g., jackals, foxes) for $<1\%$ of reported exposures^{6,8}.

Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Despite lower proportions compared with canine bites, non-dog bites are clinically significant because they often involve high-risk anatomical sites, delayed presentation, lack of awareness and incomplete PEP^{5,9,10}. WHO rabies position papers (updated 2023) emphasize that any mammalian bite should be assessed and managed for rabies risk regardless of species^{1,3}. However, misconceptions persist among the public and even health providers that rabies is transmitted exclusively by dog bites^{11,12}.

Existing Indian literature predominantly focuses on dog bites, with limited systematic data on non-dog bites, especially from tertiary care settings. There is also scanty evidence on patient perceptions and systemic barriers impacting care-seeking for non-dog bites^{13,14}. Understanding these aspects is essential for optimizing rabies prevention strategies and improving clinical outcomes in rabies endemic regions such as Maharashtra.

OBJECTIVES:

1. To determine the proportion and epidemiological characteristics of non-dog animal bites among animal bite patients attending a tertiary health care centre.
2. To assess socio-demographic and exposure-related factors associated with non-dog animal bites.
3. To explore patient's perceptions, experiences and barriers related to health-care seeking and completion of post-exposure prophylaxis.

MATERIALS AND METHODS:

This mixed-methods study was carried out at the Anti-Rabies Clinic of a tertiary health care centre in North Maharashtra from May 2025 to July 2026. Patients of all age group with a history of animal bite presenting during the study period were included and those having a history of rodent/ Human bite were excluded.

SAMPLE SIZE ESTIMATION:

Using the formula $n = Z^2pq/e^2$ with:

Prevalence: $p = 25\%$ (proportion of non-dog bites based on recent WHO/APCRI data),

$q = 75\%$,

Absolute error: $e = 5\%$,

$Z = 1.96$ at 95% confidence interval, calculated minimum sample size was 288. To allow for incomplete records, 300 animal bite patients were included.

DATA COLLECTION TOOL:

For quantitative data: A pre-tested structured proforma was used which comprises:

1. Socio-demographic profiles (age, sex, residence, Occupation, Religion, education, Socioeconomic status)
2. Bite history (Type of animal, Provoked/Unprovoked bite, Pet/ Stray animal, Anatomical site, WHO exposure category)
3. Time interval from bite to presentation in hospital
4. Treatment details (wound care, anti-rabies vaccination, rabies immunoglobulin (RIG) administration)

For Qualitative Component: Patients with non-dog animal bites willing to talk freely were purposively selected for in-depth interviews using a semi-structured interview guide.

DATA ANALYSIS:

Quantitative data were analysed using descriptive statistics (frequencies, percentages). Qualitative data were analysed using thematic analysis.

ETHICAL CONSIDERATIONS:

Ethical approval was obtained from the Institutional Ethics Committee. Written informed consent and assent were obtained from all participants; confidentiality was maintained throughout the study.

RESULTS:

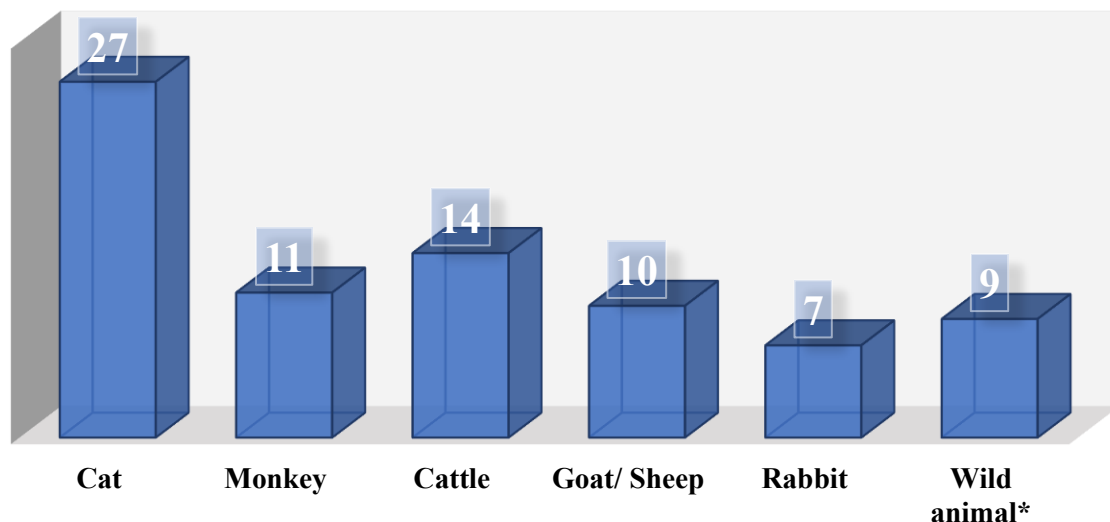
Characteristic		No.	%	Characteristic		No.	%
Age	0- 15	99	33.00	Gender	Male	186	62.00
	15- 30	82	27.33		Female	105	35.00
	30- 45	47	15.67		Transgender	09	03.00
	45- 60	39	13.00	Residence	Rural	198	66.00
	≥ 60	33	11.00		Urban	102	34.00
Education	Illiterate	03	01.00	Occupation involving exposure to animal	Yes	109	36.33
	Primary	91	30.33		No	191	63.67
	Secondary	105	35.00	Socio-economic status (Modified BG Prasad scale, May 2025)	Class I	27	09.00
	High school	42	14.00		Class II	36	12.00
	Graduate	50	16.67		Class III	101	33.67
	Post Graduate	09	03.00		Class IV	88	29.33
Total		300	100.00		Class V	48	16.00

Table 1: Sociodemographic Characteristics of Animal Bite Patients (n = 300)

Table 1 shows, the sociodemographic profile of the 300 animal-bite patients, among them one-third 99 (33.00%) were of aged 0-15 years, followed by 82 (27.33%) in the 15-30 age group, indicating a high incidence among children and young adults. The majority were male 186 (62.00%), reside in rural areas

198 (66.00%), and 199 (66.33%) had ≤ secondary school education. Most patients 101 (33.67%) were belonged to Class III and 109 (36.33%) were related to occupations involving exposure to animal.

Fig 1. Type of animal bite other than dogs (n= 78)



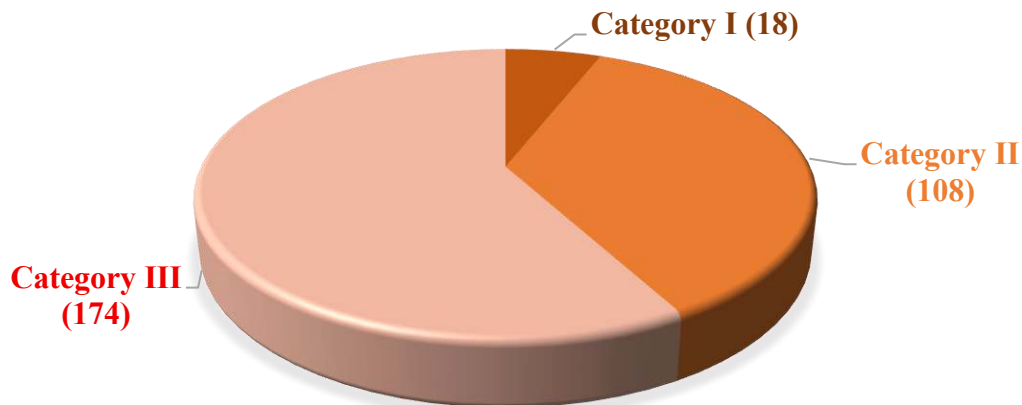
Characteristic		No.	%	Characteristic		No.	%
Type of animal	Dog	222	74.00	Nature of bite	Unprovoked	183	61.00
	Cat	27	08.00		Provoked	117	39.00
	Monkey	11	06.00	WHO exposure category	Category I	18	06.00
	Cattle	14	04.00		Category II	108	36.00
	Goat/ Sheep	10	03.00		Category III	174	58.00
	Rabbit	7	02.00	Time to presentation	<24 hours	119	39.67
	Wild animals*	9	03.00		≥24 hours	181	60.33
Ownership of animal	Stray animal	192	64.00	Anatomical site	Head & face	6	02.00
	Pet animal	108	36.00		Upper limb/ Abdomen	60	20.00
Previous h/o of bite	Yes	105	35.00		Lower limb & back	234	78.00
	No	195	65.00	Total		300	100.00
H/o of Vaccination (n=105)	Yes	79	75.24	Completed Vaccination (n= 79)	Yes	28	35.44
	No	26	24.76		No	51	64.56

*Wild boar, Bat, Horse, Mongoose

Table 2: History of Animal Bite and Exposure-Related Factors

The prevalence of non- dog bite was found to be 26.00% (78/300), among them mostly were cat bite followed by cattle, monkey, goat/ sheep and wild animals like boar, bat, mongoose and horse. Most animal bites were from dogs 222 (74.00%), the majority were unprovoked bites 183 (61.00%) and classified as WHO Category III bite 174 (58.00%).

Most patients presented ≥24 hours after the bite 181 (60.33%), bites commonly occurring on the lower limb and back 234 (78.00%). One third 105 (35%) had a previous history of animal bites, 79 (75.24%) of those having received prior vaccination but among them 51 (64.56%) had not completed the vaccination schedule.

Fig. 2 WHO category of animal bite

Treatment Variable		No.	%	Treatment Variable		No.	%
First Aid after bite (n=300)	Wound washing	169	56.33	Anti-rabies vaccination initiated within 24 hrs (n= 282) *	Yes	179	63.48
	Application of Chilli, turmeric etc	57	19.00		No	103	36.52
	Use Antiseptics	33	11.00	Rabies immunoglobulin received (n= 174) #	Yes	107	61.50
	Done nothing	41	13.67		No	67	38.50

*Category II & III

Category III

Table 3: Treatment Details of Animal Bite Patients

Among 300 patients, 169 (56.33%) received appropriate first aid as wound washing, while 57 (19.00%) applied irritants like chilli or turmeric etc. Among those requiring anti-rabies vaccination, 179 (63.48%) initiated treatment within 24 hours. Of the 174 Category III exposures, 107 (61.50%) received rabies immunoglobulin.

QUALITATIVE ANALYSIS:

Five themes were emerged after In- depth interviews of 27 participants with those having h/o non-dog bite. (number of respondents)

Theme 1: Perception of Risk**Subthemes: 1.1 Underestimation of severity****1.2 Species-specific beliefs****Quotes:**

1. *From childhood, we were told that rabies comes only from dog bites, especially from dogs that look mad and have foam in their mouth. So if a normal-looking dog bites, we don't feel much fear. We think it is just a small injury and will heal on its own. Nobody in our family ever explained that even a simple bite from any dog can be dangerous."* (11)

2. *"In our homes, cats live around us like family animals. They sit in the kitchen, play with children, and sometimes scratch by mistake. We usually just wash the wound with water or apply some turmeric and leave it. We don't go to the hospital because we believe a small cat scratch is nothing serious and cannot cause a big disease like rabies."* (15)

3. "Near temples and tourist places, monkeys are very common, and they often snatch food or bite people suddenly. We think it is part of daily life and not something very risky. If a monkey bites, people say just clean the wound and that's enough. I never thought that monkeys can also spread rabies like dogs do, and that it can become life-threatening if not treated." (09)

Theme 2: Health-Seeking Behaviour

Subthemes: 2.1 Delay in care

2.2 Informal treatments

Quotes:

1. "At first, I thought it was just a small bite and not something serious. There was no severe pain, so I decided to wait and see if it would heal by itself. Going to the hospital means losing a day's wages and spending money, so I delayed for two to three days. Only when the wound started troubling me, my family insisted that I should go to the hospital." (11)

2. "In our house, whenever there is a wound, elders tell us to apply turmeric, oil, or some herbal paste. We believe these home remedies can remove infection and help in quick healing. So after the bite, we first tried these traditional methods instead of going to the doctor. We thought it was enough and did not realize that rabies needs proper medical treatment." (10)

3. "In our area, the local healer is easily available and people trust him a lot. He gives some herbal medicine or ties a thread and says it will prevent any bad effect. It is also cheaper than going to a big hospital. So my first thought was to visit him, because we believe he has experience in treating animal bites." (13)

Theme 3: Sociocultural Beliefs

Subthemes: 3.1 Traditional practices

3.2 Community influence

Quotes:

1. "In our family, elders' words are final. When the bite happened, they said in their time there were no injections and people were fine. They told me it was just a small wound and would heal naturally. So I

believed them and did not feel it was important to take injections immediately." (07)

2. "When I told my neighbours about the bite, they laughed and said it happens to everyone. They said there is no need to run to the hospital for such small things. Hearing this, I also felt relaxed and thought maybe I was overthinking. Their words made me delay taking proper treatment." (03)

3. "In our area, people believe only certain animals like stray dogs spread rabies. They say animals like cats or monkeys are not dangerous in that way. So when I was bitten, many people told me not to worry because this animal doesn't cause rabies. I trusted what everyone was saying and did not understand the real risk." (02)

Theme 4: Health-System Barriers

Subthemes: 4.1 Accessibility

4.2 Availability

Quotes:

1. "The government hospital giving rabies injection is very far from our village. We have to take two buses to reach there, and it takes almost half a day. Bus charges are also high for us. Because of distance and travel problem, it is not easy to go immediately." (10)

2. "When I finally went to the hospital, they told me that injection for severe bite was not available that day. They asked me to come after two days or go to a private hospital. Private hospital is very costly for us. So I felt helpless because I came from far and still did not get full treatment." (17)

3. "Doctor told me to come many times for full course of injections. I work as daily wage labour, and if I don't go to work, I don't get money. Taking leave again and again is very difficult. Because of work and money problem, it was hard for me to complete all follow-up visits." (06)

Theme 5: Psychological Impact

Subthemes: 5.1 Fear and anxiety

5.2 Social stigma

Quotes:

1. *"After the bite, my son showed me videos on mobile about rabies. They were saying once symptoms start, the person can die. After seeing that, I got very scared in my heart. Even small headache or fever was making me think something bad will happen."* (09)

2. *"The monkey bit me near the temple when many people were watching. Some people even laughed and said I should have been careful. I felt very ashamed standing there. I did not like telling others about it because I felt people would make fun of me."* (03)

3. *"After the bite, everyone in my house was scared. They kept asking me if I am feeling fever or pain. My mother was praying daily thinking something bad might happen. Seeing them so worried was also making me more tense and afraid."* (08)

DISCUSSION:

This mixed-methods study shows that non-dog animal bites accounted for 26% of bite exposures, aligning with national estimates reporting 20–30% non-dog exposures in India^(4–7). The male predominance 62% and rural majority 66% reflect consistent patterns noted in Ichhpujani et al. (2008)⁵ and Agarwal et al. (2019)⁹. The high proportion of WHO Category III exposures 58% corroborates findings from Sharma et al. (2020)⁸ and Bharti et al. (2016)¹¹, highlighting the clinical importance of non-dog bites.

Delay of ≥ 24 hours in hospital arrival was found in 60.33% of cases, a finding similar to Singh et al. (2017)¹⁰, who reported delayed care due to low perceived risk. Qualitative themes highlight that misconceptions about species-specific rabies transmission persist, reflecting gaps in community awareness documented by Agarwal et al. and others^(9,10).

Although 63% taken vaccination, RIG administration was lower (61%). Similar gaps have been reported by Bharti et al¹¹. and others^(12,15). Most patients 101 (33.67%) were belonged to Class III as per Modified BG Prasad scale, similar scale was used in the study conducted by Keshavrao CM et al (2023)²¹, Shastri A et al (2023)²⁶.

CONCLUSION

Non-dog animal bites are an under-recognized yet clinically relevant public health concern with 26% prevalence. Addressing awareness gaps and strengthening health-system responsiveness are essential to improve rabies prevention.

RECOMMENDATIONS:

1. Mandate species-specific documentation and counselling at anti-rabies clinics to ensure appropriate risk assessment for non-dog bites.
2. Expand decentralized RIG availability at select peripheral centres to reduce delays and improve PEP completion.

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