

Original Research Article

Profile, knowledge about rabies and practice among animal bite patients in an urban health centre in Andhra Pradesh: a cross-sectional study

Sathiyamarayanan Sathiyamoorthi¹, Sreelakshmi Muralikrishnan¹,
Siva Santosh Kumar Pentapati², Rajeev Aravindakshan^{1*}, Ravi Babu Dunna¹

¹Department of Community and Family Medicine, All India Institute of Medical Sciences, Mangalagiri, Andhra Pradesh, India

²Preventive Oncology, Tata Memorial Center, Varanasi, Uttar Pradesh, India

Received: 01 March 2025

Revised: 06 March 2025

Accepted: 12 March 2025

*Correspondence:

Dr. Rajeev Aravindakshan,

E-mail: rajeev.a@aiimsmangalagiri.edu.in

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ABSTRACT

Background: Awareness and knowledge about the management of animal injuries are insufficient among general public. Various traditional practices and myths have also been reported. To estimate the Prevalence of unprovoked bites and profile of animal bites in terms of type of animal, nature, category of exposure and associated factors among the patients with animal bite presenting to UHTC, Mangalagiri and to find the Knowledge about Rabies and practice of animal bite management among study population.

Methods: Expecting a 64.3% prevalence of unprovoked bites from a previous study, a minimum of 96 subjects had to be studied. Bite resulting due to individual initiating interaction with the animal, like playing, annoying or pelting stones at animal was classified as provoked bite. The categorical variables of epidemiological profile were expressed as Frequencies and proportions.

Results: Among 113 participants, 69% were males and 31% were females. The prevalence of unprovoked bites was 90.3%. Majority (92.9%) were dog bites and 70.8% were due to stray animals. 44.6% were category 3 exposure, 42.9% were category 2 exposure, where lower limbs (64.6%) were most affected followed by upper limbs (31.9%). Only 44.2% washed the site with soap in running water, 41.7% applied turmeric and other substances over the site and only 39.8% knew that untreated bite might cause rabies. There were gender and age-based differences in the proportions of nature of the bite, knowledge and practices but most of these differences were not statistically significant in this study.

Conclusions: The knowledge about rabies and animal bite management is not adequate. Periodic health education and behaviour change strategies must be conducted.

Keywords: Animal bite, Prevalence, Profile, Rabies, Wound management

INTRODUCTION

Animal bites are rampant and pose various health risks in addition to the physical injuries. This includes transmission of rabies, a zoonotic disease caused by a virus of the Rhabdoviridae family, affecting the central nervous system. Bites of animals like dogs, cats, monkeys

and wild foxes, leading to rabies, kill over 50,000 people every year worldwide and India being endemic to rabies accounts for 36% of these deaths.¹ The actual extent of public health burden due to animal bites is not fully known as several cases are often unreported, with almost no post-exposure care, especially among vulnerable groups like children and those from lower socioeconomic

groups. Even though rabies is almost always fatal, it is preventable with the existing post exposure prophylaxis protocols which include proper wound toileting with running water and soap, application of antiseptics, anti-rabies vaccination and rabies immunoglobulin when indicated.

Sustainable development goals prescribe a global target of eliminating dog-mediated rabies by 2030.² This requires constant surveillance and prompt response system to animal bites. Adopting the 'One health' approach requires interconnection of Human, animal and environmental health to achieve holistic health for all.

Understanding the epidemiological profile of animal bites and assessing the knowledge and practices among general public with respect to animal bites is important for effective public health measures to bridge the gap in seeking health care and addressing unhealthy practices and beliefs. The perception about animal bites and the knowledge regarding correct management practices varies from region to region and has been found to be inadequate in various studies.³⁻⁵

In this study we have tried to find out the epidemiological profile of animal bites that presented to a primary health care facility in Andhra Pradesh and the existing knowledge about animal bite and rabies among the victims. We have also explored the wound management practices prevalent among the population.

Objectives

To estimate the prevalence of unprovoked bites and profile of animal bites in terms of type of animal, nature of bite, category of exposure and associated factors among the patients with animal bites presenting to Urban health Training Center, Mangalagiri.

To find the Knowledge about Rabies and practice of animal bite management among study population.

METHODS

Study design and setting

A facility-based cross-sectional study was conducted at the Urban Health Training Center (UHTC), Mangalagiri, a primary healthcare facility under All India Institute of Medical Sciences (AIIMS), Mangalagiri, Guntur. This facility provides anti-rabies vaccination for animal bites where it is indicated. Data was collected over 4 months from April to July 2023.

Study population and sampling strategy

Individuals visiting the health care facility for management of animal bites were interviewed. The Minimum required sample size was estimated to be 96 based on a previous study by Patnaik et al, which reported

the proportion of unprovoked bites among the animal bite victims as 64.3% and considering a relative error of 15%, (absolute error of 9.6) with 95% confidence interval.³

Inclusion criteria

All animal bite patients of both genders visiting the primary health facility between April and July 2023 were included in the study.

Exclusion criteria

Participants who were mentally challenged or anyone who was not able to attend to themselves, people with chronic illness restricting their mobility were excluded.

Study procedure

Once a patient presents with a bite by a mammal (e.g., dog, cat, monkey, rodent), their wound was categorized as per World Health Organisation (WHO) exposure category for rabies post exposure prophylaxis and appropriate management was prescribed.

A semi structured questionnaire was used to collect information on sociodemographic details, characteristics of biting animal; whether pet, stray or semi pet (partially domestic animals like rodents), the species and vaccination status of animal, characteristics of bite (category of rabies exposure, whether provoked or not, site of bite) and the knowledge regarding rabies (whether they knew the risks of unmanaged animal bites) and the practices followed immediately after animal bite by the participants (wound washing, application of substances).

Participants were consecutively recruited until the required sample size was obtained. The study was approved by Institute Ethics Committee.

Operational definitions

Provoked bite

Bite resulting from the person initiating interaction with the animal such as playing, annoying or pelting stone at the animal

WHO rabies exposure category

Category 1

Touching or feeding animals, animal licks on intact skin (no exposure).

Category 2

Nibbling of uncovered skin, minor scratches or abrasions without bleeding (exposure).

Category 3

Single or multiple transdermal bites or scratches, contamination of mucous membrane or broken skin with saliva from animal licks, exposures due to direct contact with bats (severe exposure).

Data analysis

Data was entered and analysed using Statistical Package for the Social Sciences (SPSS Inc., released 2007, SPSS for Windows, version 16.0, Chicago, IL, USA).

Descriptive statistics were used to summarize categorical variables as frequencies and percentages and Chi square test or Fisher's exact test was used as applicable for the association between gender and age group with bite characteristics. A p value of <0.05 was considered as statistically significant.

RESULTS

Out of the 113 individuals with animal bite for whom data was collected, 78 Males constituted 69.0% of animal bite victims and females were 35 (31.0%). Mean age was 32.4 years (SD=19.52) and ranged from 3 years to 75 years. Table 1 depicts that majority of animal bites were by dogs, with 105 bites amounting to 92.9%. Out of all the cases, 80% of bites were by stray animals and 90.3% were unprovoked.

The lower and upper limbs were most commonly the bite site, comprising 73 (64.6%) and 36 (31.9%) of bites respectively. Most of the bites led to category 2 and 3 exposure (42.9% and 44.6% respectively). The vaccination status of the biting animal was not known in 40.7% and the animal was unvaccinated in 46.9% cases.

Previous history of animal bite was present in 10.6 % of victims and 66.6% of those with repeated bites belonged to age group 15-30 years (8 out of 12 participants). 50.4% bites were reported to have happened between morning 6-10 am and 25.6 % of the total bites were reported to be concentrated between 8-9 am. Only 19 (16.8%) of total bites occurred between 6-10 pm. Out of this, 14 (73.7%) bites were observed in males during night time.

Wound management practices of participants: Washing the bite site with soap and water was done by 44.2 % participants, 28.3% washed with only water and 27.4% did not wash the bite site. Figures 1 and 2 depicts the wound management practices across gender and age groups.

Application of turmeric on the wound was reported by 16.8% and 17.7% applied antiseptic cream. Other substances reported to be applied were bitter gourd leaf paste, talcum powder and sanitizer, by a total of 7 participants.

Awareness about the risk of rabies was present in 39.8% participants, while 55.8% were unaware of the risks associated with animal bites.

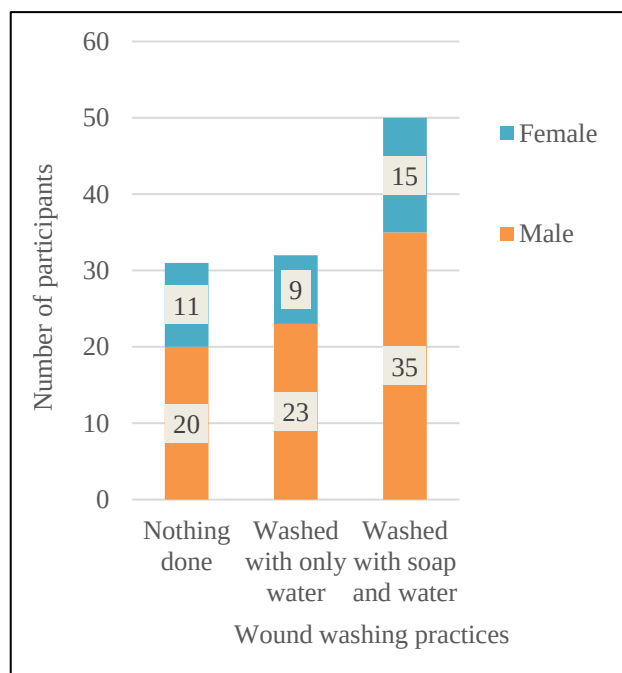


Figure 1: Wound management practices after animal bite across genders (n=113).

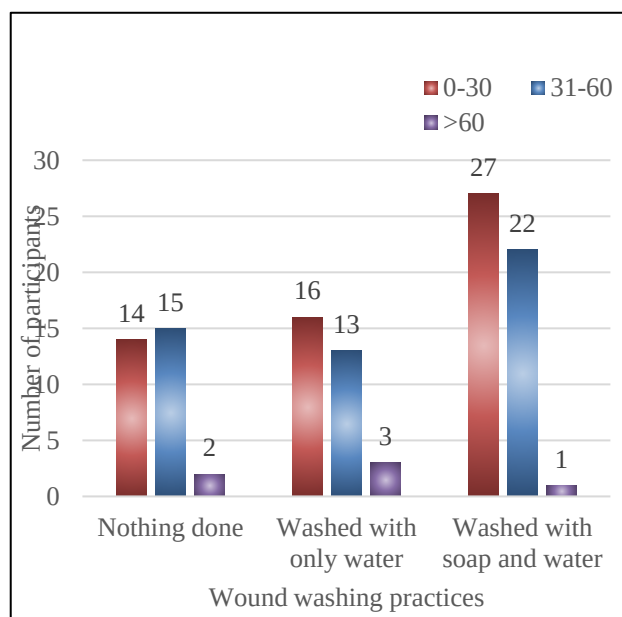


Figure 2: Wound management practices after animal bite across age groups (in years) (n=113).

Table 2 depicts the association of bite characteristics with gender and age category. Age group below 30 years was more prone to bites by pet animals than older age groups (p=0.007).

50% of males and 68.6% females did not know the risks following animal bites. This difference was not statistically significant. Table 3 depicts the gender and

age-wise distribution of knowledge regarding risks of untreated animal bites.

Table 1: Epidemiological profile of animal bite (n=113).

Characteristics	Frequency	%
Gender		
Male	78	69.0
Female	35	31.0
Age group in years		
0-15	27	23.9
16-30	30	26.5
31-45	26	23.0
46-60	24	21.2
Above 60	6	5.3
Animal		
Dog	105	92.9
Monkey	5	4.4
Cat	2	1.8
Rat	1	0.9
Animal type		
Pet	31	27.4
Semi pet	2	1.8
Stray	80	70.8
Nature of bite		
Unprovoked	102	90.3
Provoked by self/others	11	9.7
Whether animal was vaccinated		
Yes	14	12.4
No	53	46.9
Don't know	46	40.7
Site of wound		
Lower limb	73	64.6
Upper limb	36	31.9
Head and neck	2	1.8
Trunk	1	0.9
Genitals	1	0.9
Category of exposure (n=112)		
1	14	12.5
2	48	42.9
3	50	44.6
Previous history of animal bite		
No	101	89.4
Yes	12	10.6
History of application of substances to wound		
Antiseptic cream	20	17.7
Turmeric	19	16.8
Others	7	6.2
Nothing	67	59.3
Wound washing after bite		
Not done	31	27.4
Running water only without soap	32	28.3
Running water with soap	50	44.2
Status of Injection TT		
Yes	82	72.6
No	31	27.4

Continued.

Characteristics	Frequency	%
Knowledge of the risks of untreated animal bites		
Don't know	63	55.8
Rabies	45	39.8
Death	5	4.4

Table 2: Association between participant gender and age group with bite characteristics.

Variable (N)	Type of animal			Nature of bite		Category of exposure		Animal species	
	Stray	Pet	Semi pet	Unprovoked	Provoked	Category 1	Category 2 or 3	Dog	Others
Gender									
Male (78)	55 (70.5)	21 (26.9)	02 (2.6)	70 (89.7)	08 (10.3)	9 (11.7)	68 (88.3)	72 (92.3)	6 (7.7)
Female (5)	25 (71.4)	10 (28.6)	0	32 (91.4)	03 (8.6)	5 (14.3)	30 (85.7)	33 (94.3)	2 (5.7)
			p=0.72		p=1.00		p=0.76		p=1.00
Age (in years)									
0-30 (57)	35 (61.4)	22 (38.6)	0	50 (87.7)	7 (12.3)	8 (14.3)	48 (85.7)	51 (89.5)	6 (10.5)
31-60 (50)	40 (80.0)	09 (18.0)	01 (2)	47 (94)	03 (6)	6 (12)	44 (88)	49 (98)	1 (2)
>60 (06)	5 (83.3)	0	1 (16.7)	05 (83.3)	01 (16.7)	0	6 (100)	5 (83.3)	1 (16.7)
			p=0.007*		p=0.28		p=0.94		p=0.10

*Statistically significant (Fisher's exact test value=12.124). Cells have frequency and row percentage.

Table 3: Gender and age-wise knowledge regarding risks of untreated animal bites.

Variable	Knowledge about rabies and risk of untreated animal bites, N (%)			History of application of any substance over bite site, N (%)		
	Absent	Present	P value	No	Yes	P value
Gender						
Male (n=78)	43 (55.1)	35 (44.9)	0.145	44 (56.4)	34 (43.6)	0.411
Female (n=35)	25 (71.4)	10 (28.6)		23 (65.7)	12 (34.3)	
Age (in years)						
0-30 (n=57)	34 (59.6)	23 (40.4)	0.595	32 (56.1)	25 (43.9)	0.226
31-60 (n=50)	29 (58.0)	21 (42)		33 (66)	17 (34)	
>60 (n=6)	5 (83.3)	1 (16.7)		2 (33.3)	4 (66.7)	

DISCUSSION

Animal bites burden varies across regions, as do the knowledge and practices of bite management. The availability of exact statistics regarding the prevalence of bites is limited, but essential to understand the factors associated and for informing appropriate policy measures. This study found the prevalence of unprovoked animal bites to be 90.3%, comparable to 88% reported by Jain et al, however, another study in Andhra Pradesh by Patnaik et al, reported 64.3% unprovoked bites. Provoked bites resulting from humans initiating the interaction with the biting animal were lower (9.7%) in this study, pointing to better behavioural practices.^{3,4} Among the study population, overall occurrence of animal bites was higher in males (69.0%) as compared to females (31%). This could be attributed to more outdoor interaction and males being relatively more likely to walk alone. Also, there is a higher chance of men being outdoors at night, thus supporting our findings where the bites during night time were more frequent in males.

Similar results were found by Kumar et al, in Jharkhand (72.8% males), 76.8% males reported by Acharya et al.^{5,6}

All age groups were affected with animal bites, out of which individuals 0-15 years of age were 23.9%, comparable to another study that reported 21.0% of animal bites.⁷ Previous studies have reported age above 15 years to be more affected by animal bites though few studies have reported more bites in children below 15 years (52.8%).^{4,8} Children are particularly vulnerable to dog bites, possibly because of their relatively lesser ability to defend themselves or a lack of knowledge regarding animal interaction and may not always report the bites. Prior behavioural training would aid in preventing animal bites. The older age group above 60 years was less commonly affected (5.3%) and another study reported 6.8%.⁴

Dogs caused the majority of bites (92.9%), consistent with previous studies and monkeys contributed to 4.4% of bites, which was 3.0% in another study.³⁻⁵ Stray dog population is ever increasing in urban areas, leading to more man-animal conflicts. Among all the bites, 70.8% were by stray animals, 69% was previously reported by Jain et al, Kumar et al, found bites by stray animals constitute 63.2% of total.^{4,5} Only 12.4 percent of the biting animals had been confirmed to be vaccinated,

raising concerns regarding the prevalence of rabies among animals, especially stray animals. Lower limb followed by Upper limb were most commonly affected and this is consistent with previous study by Acharya et al, that reported 45.62% bites in lower limb and all other similar studies, being easy target areas for animals to bite.⁶ In this study, 44.6% bites lead to category 3 exposure, followed by category 2 bites comprising 42.9%. Previous studies have reported a higher proportion of category 3 bites.^{4,8} severe exposure rates are hence lesser than observed in other studies. We found that most bites that were reported occurred in the morning hours, particularly 8-9 am, coinciding with the school and work commute and were by stray animals.

The knowledge regarding the potential risks of animal bites was suboptimal (39.8%), with the elderly above 60 years being more unaware. A large proportion of the population being not fully aware of the risk of animal bite is concerning and necessitates more information dissemination. Adequate knowledge regarding rabies was 27.7% in a study by Sivagurunathan et al, at an urban area in Tamil Nadu.⁹

Wound washing after a bite is known to reduce the risk of infection. Washing with soap and water before coming to the health facility was done by 44.2% whereas in a similar study by Sachdeva et al, this was 45.4%.¹⁰ Additionally, 28.3% washed with water alone, hence a total of 72.5% performed wound wash in this study. Higher rates have been reported by Jana et al, (84%) in West Bengal and 61.3% was reported in Punjab.^{11,12} A lower rate of 23.5% reported by Sharma et al, in Maharashtra.¹³ Several traditional practices were reported in this study, which include 16.8% applying turmeric over the site.

In a similar study, this practice was reported among 19.1% animal bite patients.¹³ Application of turmeric was lower (2%) in a study by Singh et al, but at the same time they reported 10.7% participants applying chilly over the wound site, this was not reported in this study, though participants reported applying talcum powder, bitter gourd leaves etc over the wound which is surprising and not ideal.¹² Overall, 59.3% did not apply any substance over the wound, higher than 44.3% reported by Sharma et al.¹³ Identifying the practices being followed in the community will aid in targeted health education.

This study could bring out a glimpse of the epidemiology of animal bite and associated knowledge and practices among animal bite victims visiting a single health care facility. The situation in the general public might be different and studies are needed to be carried out to explore this, on a larger scale.

CONCLUSION

Bite by stray dogs is an issue of public health concern. The knowledge about risks of animal bite is inadequate in

the study population. More community engagement and knowledge dissemination are required to promote preventive measures from risky animal interaction, vaccination of pet animals and to encourage seeking prompt medical care and applying correct initial management measures for animal bite, in order to achieve the goal of elimination of dog mediated rabies and reducing the burden.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Sathiyamoorthi S, Muralikrishnan S, Pentapati SSK, Aravindakshan R, Dunna RB. Profile, knowledge about rabies and practice among animal bite patients in an urban health centre in Andhra Pradesh: a cross-sectional study *Int J Community Med Public Health* 2025;12:1769-75.