



CLINICO-EPIDEMIOLOGICAL PROFILE OF DOG BITES FROM A TERTIARY CARE HOSPITAL IN EAST MARATHWADA, INDIA: A RETROSPECTIVE STUDY

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ABSTRACT

Animal attacks on humans continue to be a major medical and social issue, resulting in millions of deaths and injuries worldwide. The objective of the current retrospective study was to report the epidemiology, clinical and non-clinical manifestations, complications associated with dog bites, and anti-rabies serum from tertiary care hospitals in the East Maharashtra Region in a scientific manner. In the last 12 months, 300 dog bite victims were reported to tertiary care hospitals. Before beginning the study, patient consent and approval were obtained from the relevant ethical committee. The data on epidemiological, clinical, and non-clinical parameters were collected as per the case report form. The result was expressed in the percentage and number of patients for each considered parameter. According to findings 51% (153N) of men and 49% of women were victims of dog bites. The majority of patients were from urban regions 63% (189N) compare to the rural area. 68% (204N) of patients had bites on their lower extremities. The majority of bites occur in and around the home and roadside in urban areas, accounting for around 44% (132N) and 42% (126) respectively. The majority

of dog bite victims had category III wounds compared to category II wounds. The major sign and symptoms observed were pain, bleeding, and swelling at the site of the bite. Amongst 300 dog bites, bleeding was observed in 76% (228N) of patients and non-bleeding in 24% (72N). The majority of bites were from stray dogs (54%) as compared to unprovoked pet dogs (46%).

Keywords: Dog Bite, Retrospective study, Anti Rabies Vaccine, Epidemiology, Lyssavirus

INTRODUCTION

The nasty zoonotic disease rabies is caused by the neurotropic ribonucleic acid (RNA) virus Lyssavirus Type 1 and is primarily spread to people through dog bites [1, 2]. Animals from the *Carnivore* and *Chiroptera* orders have the presence of rabies virus (RABV) in their saliva [3]. Globally, there are 25.7 dog bites per 1000 people each year. Except for Antarctica, rabies has been reported in more than 150 countries across all continents [4]. India is the country with the highest number of rabies deaths worldwide. Some traditional uses include applying oils, red chili powder, and turmeric powder to the suspected wound [5]. The increase in rabies mortality is brought on by several factors, including ignoring the bite, a lack of awareness and information, ignorance of the benefits of treatment, economic concerns, etc. [6]. Because dog bites are common, it is reasonable to think that current preventative efforts are inadequate [7]. The rabies virus incubation time is mainly spent at the site of the bite and transmits to circulation after several years of bite incidence. The virus attaches to postsynaptic membrane nicotinic

acetylcholine receptors at neuromuscular junctions in muscles. With delays of up to 12 hours between synapses, the rabies virus travels centripetally from peripheral nerves to the spinal cord or brainstem. This process is known as retrograde fast axonal transport (rate up to 250 mm/d). The virus swiftly spreads to other areas of the brain once it has entered the Central Nervous System (CNS) through speedy axonal transport and neuroanatomic linkages [8]. Via sensory and autonomic neurons, the infection spreads centrifugally from the CNS to many tissues, including the skin, heart, adrenal glands, and salivary glands [9]. The rabies virus replicates in salivary gland acinar cells and is released in the saliva of rabid animals that act as disease vectors [10].

MATERIAL AND METHOD

The methodology was developed using references from several databases like PubMed, Delnet, Medline, Science Direct, National library etc. To frame constructive outcomes several parameters have been considered and presented in patient information form to address the clinico-epidemiological status of a dog bite. A

retrospective cohort study was designed to obtain the information by using the hospital administrative database, dog bite case record book, reviewing patient charts, conducting interviews, etc. The data was collected from June 2021 to May 2022. The current study was conducted at the casualty, outpatient department, and medicine ward of District Civil Hospital Omanabad. The hospital is having a 300-bed capacity and serves as a multi-specialist government hospital. Approval for a case study and case report form was taken from hospital authorities before the commencement of the study. All dog bite victims who visited the hospital received anti-rabies serum and anti-rabies vaccine injections. Considering the patient condition suitable time was selected to interact with the patient to collect the information using a case report form. The prior verbal consent was obtained from the victim in front of the physician in charge (IEC/2021-22/Retro/ID-059). The patients were interviewed using the case record form. The patients were categorized according to the severity scale mentioned in the World Health Organization (WHO) guideline for the management of Rabies. Detailed information regarding demographic and epidemiological parameters such as age, sex, residence, site of the bite, place of bite, time and date of bite, time and date of admission, Time and

date of discharge, signs, and symptoms after the bite, and the result of sensitivity test. Treatment such as antibiotics, supportive therapy, anti-rabies serum, anti-rabies vaccine, need for dressing and suture, etc. was obtained. A close clinical examination was carried out in each case for categorization of the type of dog bite (category I, category II, category III) opinion from the treating physician was taken. These data were compiled on a patient information sheet and analyzed using descriptive statistics such as a percentage. Criteria for the selection of subjects include patients who are referred by SDH or private hospitals and who are in the 2 to 80-year-old age range are the inclusion requirements. Exclusion criteria include subjects that do not fall inside a specific geographic location, Male or female, aged 2 or older but not more than 80, A patient with a critical condition who arrives after five days, a person who is previously immunized and suffers from mental retardation For the study's consideration of dog bite victims, the aforementioned criteria were adhered to.

RESULTS

Amongst the 300 patients, the number of a male was 51% (153N) and 49% (147N) of females were caught in the incidence of a dog bite. It was observed that the maximum number of patients was in the age group of 11 to 40 years (43%) (**Figure 1-A**). The

majority of dog bite incidences were recorded in May (12.67%) (Female- 27 and Males- 11) (Figure 1-B).

40% (120N) of dog bites were reported on the left lower extremities whereas 28% (84N) were on the right extremities. Of the major patients who had a bite on the lower extremities, 68 % considered the total number of patients (Figure 2-A). The major symptoms observed were pain at the site of the bite (28.30%), Bleeding (24.97%), and Swelling (23.64%). A moderate number of patients experienced redness (13.43%), oozing (9.32%) (Figure 2-B). Among the 300 dog bite cases, 74% (222N) had bleeding at the site of the bite and this indicates they were category III bites (Table 1-A). Out of 300 victims, 76% (228N) have bleeding (Table 1-B) hence they must be given Rabies Immunoglobulin (Table 1-D), and 4% (12N) (Table 1-F) of those victims show a positive reaction after the administration of it and referred to the higher center (Table 1-G). In 24% (72N) cases gave the history of applying home remedies (Table 1-C). Among 300 victims 17% (51N) receives <3 doses of Anti-Rabies Vaccine (Table 1-E). 44% (132N) of the patients were admitted <1 hr after bite. This indicates a maximum number of patients came within 1hr after the bite (Table 1-H). In 70% (210N) of dog bite victims, there is a single wound (Table 1-

I). Almost 71% (213N) bites were unprovoked and 29% (87N) bites were provoked (Table 2-A). Of a total of 300 victims, 46% (138N) of the bites were by pet dogs (Table 2-B). Out of 300 victims, 67% (201N) knew the benefit of immediate cleaning of the wound. Of those who cleaned the wound, 40% (120N) were cleaned with water only (Table 2-C). This proportion was almost the same in both rural and urban areas. Out of 300 patients, 51% (151N) victims belong to above poverty level (APL) economic status (Table 2-E).

The higher incidences (38%) of dog bites were observed in the summer season (February to May) and admitted to the hospital (Table 2-F). 45% (135N) of victims had a bite in the morning (6:00 am – 12:00 pm) and 24% (72N) in the evening (4:00 pm – 8:00 pm) (Table 2-G). The most common place of bite is in and around the house 44% (132N) followed by unprovoked dog bites on the road while walking 42% (126N). The occupation profile of dog bite cases showed that 6% (18N) were students, 4% (12N) belonged to field job categories were mainly vendors, carpenters, plumbers, and electricians and 4%(12N) were having a job (Table 2-H). The majority of the subjects belong to the urban area of Osmanabad taluka (63%).

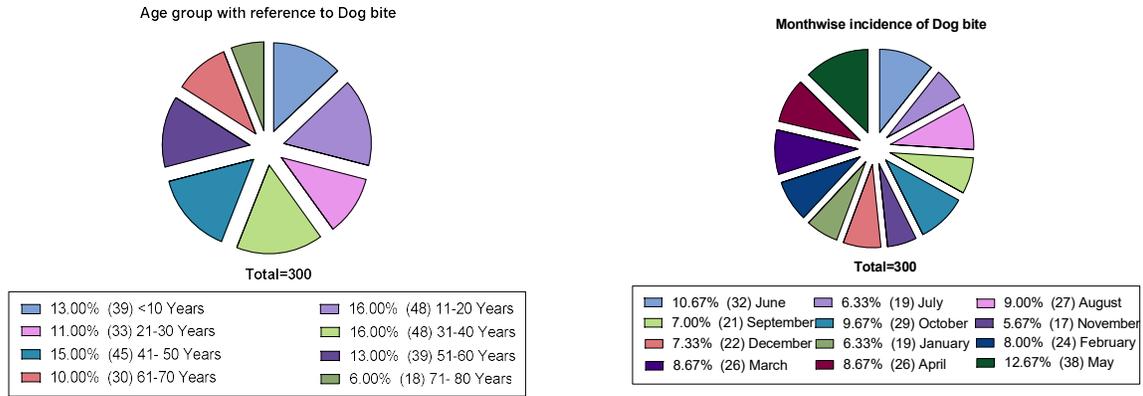


Figure 1: Pie chart of (A) Age group and (B) moth-wise distribution of dog bites

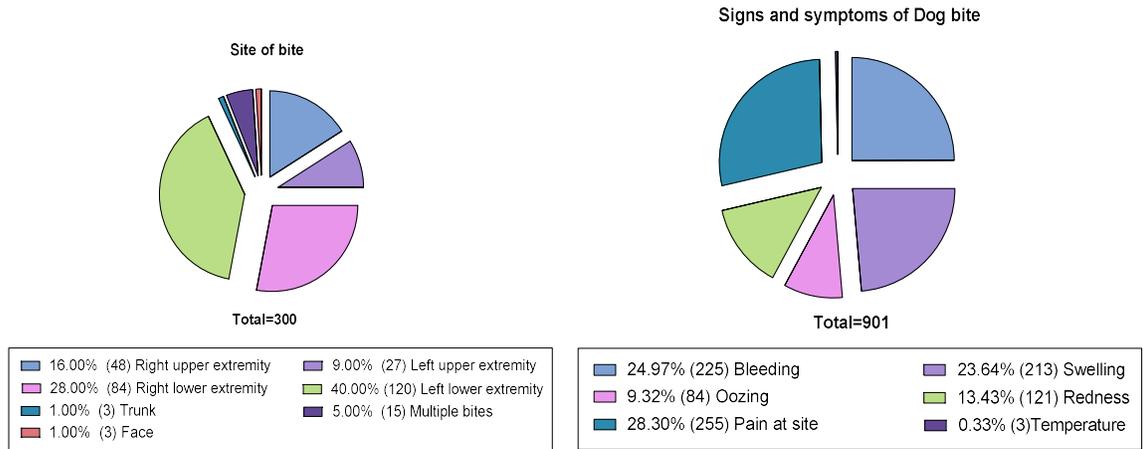


Figure 2: Pie charts of (A) Site and signs and (B) symptoms of a dog bite



Figure 3: Incidences of dog bite

Table 1: Clinical observation

	No. of Patients	Percentage of Patients (%)
A. Category of Dog bite		
Category 2	69	23
Category 3	231	77
B. Bleeding		
Yes	222	74
No	78	26
C. Application of Irritants		
Yes	72	24
No	228	76
D. Rabies Immunoglobulin (RIG)		
Yes	228	76
No	72	24
E. Anti-Rabies Vaccine (ARV)		
<3	51	17
>3	249	83
F. Sensitivity		
+ve	12	4
-ve	288	96
G. Referred Out		
Yes	12	4
No	288	96
H. Time of admission after bite		
<1 hr	132	44
1-3 hr	63	21
3-5 hr	39	13
>5 hr	66	22
I. No. of wounds		
1	210	70
2	72	24
3	15	5
>3	3	1

N=300, Data presented in number of patients and respective percentages

Table 2: Non-clinical observations

	No. of Patients	Percentage of patients (%)
A. Nature of Dog bite		
Provoked	87	29
Unprovoked	213	71
B. Type of the Dog		
Pet	138	46
Stray	162	54
C. Wound wash with water		
Yes	201	67
No	99	33
D. Wound wash with water and soap or detergent		
Yes	120	40
No	51	27
E. Socio-Economic Status		
APL	153	51
BPL	147	49
F. Seasonal incidences of dog bite		
Monsoon (Jun-Sept)	99	33
Winter (Oct-Jan)	72	24
Summer (Feb-May)	114	38
G. Time of bite		
Morning (6:00 am – 12:00 pm)	135	45
Afternoon(12:00 pm- 4:00 pm)	51	17
Evening (4:00 pm- 8:00 pm)	72	24
Night(8:00 pm – 6:00 am)	42	14
H. Place of bite		
Home	132	44
Road	126	42
School	18	6
Work	12	4
Other	12	4

N=300, Data presented in a number of patients and respective percentages

DISCUSSION

In this study, male victims accounted for 153 (51%), while female victims accounted for 147 (49%). The male-to-female ratio is 1:1 [11]. Pet dogs were responsible for 62.5% of the bites. Pet dogs were responsible for a higher percentage of bites. In the present study, 13% of the victims were children under the age of ten years. Children's shorter stature and lack of hesitation while prodding animals may increase their chances of being bitten. Other studies conducted in India back with our findings of a higher prevalence of dog attacks in people aged 10-40 [11, 12]. In 44% of bite victims, the most typical location is near a house with known dogs. These bites can be avoided if parents and caregivers keep a close eye on their children. In the current study, the average time it took to get to the hospital following a dog bite was less than one hour [13]. On the same day of the bite, 24% sought treatment [14, 15]. On the other hand, found that the majority of cases of animal bites did not promptly report to the PHC for treatment following a dog bite. In the majority of biting instances (68%), lower limbs were the most prevalent bite sites in and around the house, followed by on the road [11, 16]. In our study, 5% of bites were in the head and neck [17]. Class II instances accounted for 69 in this study, while class III cases accounted for 231 [18,

19, 20]. Unprovoked bites account for about 71% of bites. Only 40% of those in the current study cleansed the wound with soap and water [11, 21]. The majority of the participants in this study (24%) used various forms of local applications such as turmeric and chili [22]. A tetanus shot was given to the vast majority of dog bite victims. According to WHO standards, if the last dose of the primary series, or subsequent booster injections, was given 5 years ago for unclean wounds and 10 years ago for clean wounds, no booster is required. Lower socioeconomic status, greater distance from health facilities, personal job, or the date of vaccination on a holiday results in an indirect loss of one day's pay while seeking health care. As a result, even if ARV is provided free of charge at Civil Hospital Osmanabad (CHO), people may be unable to make use of it due to travel distance. As a result, dosing may be missed or delayed. Due to the small number of wounds, a few patients missed doses because they did not realize the need of sticking to the plan. Some of them neglected to show up for their vaccines. Another source of worry is the delayed delivery of PEP immunizations, which can result in the vaccines failing to provide full protection.

CONCLUSION

There is a lack of awareness and knowledge about dog bites and how to deal

with them. Only 40% of those polled knew that a dog bite wound should be cleansed with soap. The high prevalence of dog bites, along with a lack of information and dog bite care techniques for rabies control, is a concerning trend that policymakers trying to make India rabies-free should consider. It's worth noting that, as compared to previous surveys, the proportion of people who use home remedies is minimal. According to previous studies, the majority of dog bite victims (77%) had Category III wounds. The bite usually occurs on the lower extremities. The majority of dog bites have occurred between the hours of 6 a.m. and 4 p.m. More than 40% of dog bites happen when victims are strolling down the street. Over 70% of the bites were unprovoked and caused by stray dogs. This shows that it is a severe public health risk that requires the attention of civic health officials. The majority of bites occur in and around the home, and they may be avoided. Increased awareness can be achieved by including a dog bite prevention program in a school health program. Wound care was inadequate, and vaccination treatment was primarily reliant on government hospitals. Indigenous peoples frequently use irritants, but they rarely use life-saving RIGS. A health education program emphasizing dog bite prevention, proper local wound treatment, immunization, and rabies

immunoglobulins is required in a country with a large number of unvaccinated dogs. When it comes to diseases like rabies, where there is no cure, prevention is the best option.

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