Original Article

Epidemiological and Clinical Profile of Patients with Animal Bite Injuries Attending a Teaching Hospital, Tamil Nadu, India

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Abstract

Background: Rabies is a zoonotic disease occurs following a deep bite or scratch by a warm-blooded infected animal. The objective of this study was to describe the epidemiological and clinical profile of patients with animal bite injuries requiring an anti-rabies vaccine. **Material and Methods:** A cross-sectional study was conducted in the emergency department in a tertiary care hospital for a period of six months from Sep 2023 - Feb 2024 among victims of animal bite injuries which requires rabies post-exposure prophylaxis. A total of 222 participants were interviewed. **Results:** The average age of the animal bite victims was found to be 33.2±18.7 years and majority of the study participants (62.2%) were males. Most of the animal attacks occurred at their residence (54.9%). The majority of the injuries were caused by dogs (96.8%) followed by cats (3.2%). A majority reported that they were bitten by stray animals (56.8%). The majority of the patients had bites (73.4%) followed by scratches (21.2%). Majority had single-site exposure (72.5%) and the common site was the lower limb (66.7%). The average duration of washing of the wound was found to be 6.7±5.7 minutes. The majority of the patients had Category II bites (54.5%) followed by Category III (33.8%) and Category I (11.7%). **Conclusion:** The younger population, males and urban residents were the common animal bite victims. Bite is the most common type of exposure and the majority of the bites are caused by dogs, mostly in the lower limbs with a single site.

Keywords: Epidemiology, Rabies, Animals, Injuries, Post exposure prophylaxis, Vaccination.

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Introduction

Rabies is a zoonotic disease transmitted by bites or licks of rabid warm-blooded animals such as dogs, and cats. Infection occurs following a deep bite or scratch by an infected animal and also due to the direct contact of human mucosa with infectious material. It is a fatal disease but it is preventable by taking appropriate measures. Preventive measures include pre-exposure, post-exposure and re-exposure prophylaxis. Treatment of the post-exposure prophylaxis includes local treatment of the wound, vaccination and immunoglobulin. The incubation period varies and depends on many factors such as the severity of the exposure and site of the bite, by type of animal, the number of wounds and the amount of virus injected.[1]

Rabies is responsible for 60,000 deaths every year. The majority of the deaths occur in Africa and Asia. The victims are children younger than 15 years of age.[2] World Rabies Day is observed on the 28th of September every year to create awareness about rabies and promote preventive measures. In India, the national rabies control program was introduced with the objective of prevention and control of deaths due to rabies in humans and working towards achieving the global target of Rabies-zero by 2030. Under the program, about 130-210 deaths are reported every year. Approximately 6-7 million animal bites are reported annually.[3]

Exploring the socio-demographic, epidemiological and clinical details of animal bite injuries will give insights into the current patterns. This will contribute to strengthening the healthcare service delivery. Hence, this study started with the objectives of describing the epidemiological profile of patients with animal bite injuries requiring an anti-rabies vaccine and studying the clinical profile of these patients.

Materials and Methods

Study setting: This descriptive cross-sectional study was conducted in the emergency department in a tertiary care teaching hospital for a period of six months from Sep 2023 - Feb 2024 among victims of animal bite injuries which requires rabies post-exposure prophylaxis. All willing patients with animal bite injuries attending the emergency department to get

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the first dose of anti-rabies vaccine for the treatment were included in the study.

Sample Size: The calculated sample size was found to be 222. In a study by Ain SN et al., it was found that the majority (63.4%) of the patients had bites over the lower limb.[4] Based on this prevalence with an allowable error of 10%, the sample size was calculated as 222.

Data collection tools: A semi-structured questionnaire was used to collect the data. Data collection tools include socio-demographic characteristics (age, gender, occupation, residence, etc.,), habits, epidemiological aspects such as about the pet animal, cattle-rearing practices, type of bite animal, vaccination status, provocation status, abnormal behavior, time to reach hospital, referral status, etc., and clinical details of animal bite injuries such as type of exposure, site, washing of the wound, and category of the wound.

Data collection and methods: The study was conducted after getting Institutional Ethics Committee approval. All the eligible participants were interviewed by the investigators after getting the written informed consent. Relevant information from the treatment card/referral card was also used to collect the data. At the end of the session, all the study participants were given health education about the importance of washing the wound, completion of follow-up doses, and other information related to the prevention of rabies.

Analysis: Collected data was entered in sheets and coding was given. Analysis was done using Epi info version 7.2.6.0, Centers for Disease Control and Prevention (CDC), Atlanta, Georgia, USA. Descriptive analysis was done using percentage and mean, standard deviation and median.

Results

Socio-demographic details: The average age of the animal bite victims was found to be 33.2±18.7 years. The majority (51.8%) of the patients were aged between 16-45 years. The majority of the study participants (62.2%) were males with a male and female ratio of 1.64. The average family size of the study participants was found to be 3.8±0.74. A majority (76.1%) of the participants were from urban areas. Regarding personal habits, a small proportion of our study participants are consuming alcohol (13.1%) and smoking (6.8%) [Table 1].

Epidemiological details: Around 29.7% of the participants had pet animals in the house. The most common pet animal was found to be the dogs. About 4.1% of participants had cattle-rearing practices in the house. The most common cattle were cows. Most of the animal attacks occurred at residence (54.9%) followed by while in transit (23.9%) and at the workplace (21.2%). The majority of the injuries were caused by dogs (96.8%) followed by cats (3.2%). A majority reported that they were bitten by stray animals (56.8%) and the remaining bites by domestic animals. The vaccination status of the bite animal was not known for the majority (82%) of the bites. The majority of the bites were not provoked (90.5%) and they did not notice any abnormal behavior (93.7%).

A small proportion (3.2%) of participants reported that other people were also bitten by the same animal within a week period of time before this current bite. The majority (99.1%) of the participants directly accessed this tertiary care hospital and only two participants were referred from the nearby hospital. The majority (81.5%) of the participants reached the hospital within one hour of the bite.

Clinical details: Around 23.4% of the participants applied antiseptics immediately after the bite before reaching the hospital. About 9.5% of the participants reported a previous history of animal bites and had anti rabies vaccine previously. The majority of the patients had bites (73.4%) followed by scratches (21.2%) and licks (5.4%). A majority had single-site exposure (72.5%). The most common site of the exposure was the lower limb (66.7%) followed by the upper limb (27%). The majority of the participants washed the wound with soap (68.5%) and running tap water (84.3%). The time taken to wash the wound after the bite was found to be 9.4±13.4 minutes. The average duration of washing of the wound was found to be 6.7±5.7 minutes. The majority of the patients had Category II bites (54.5%) followed by Category III (33.8%) and Category I (11.7%) [Table 2].

Table 1: Socio-demographic characteristics of the study population

Characteristics	n	%
Age category (in years)		
< 5	7	3.1
5-15	33	14.9
16-45	115	51.8
46-60	51	23.0
>60	16	7.2
Gender		
Male	138	62.2
Female	84	37.8
Residence		
Rural	53	23.9
Urban	169	76.1
Alcohol consumption		
Yes	29	13.1
No	193	86.9
Smoking		
Yes	15	6.8
No	207	93.2

Table 2: Epidemiological and clinical characteristics of the animal bite victims

Pet animal in the house		
Yes	66	29.7
No	156	70.3
Cattle rearing practices		
Yes	9	4.1
No	213	95.9
Attack occurred at		
Residence	122	54.9
Transit	53	23.9
Workplace	47	21.2
Bite animal		
Dog	215	96.8
Cat	7	3.2
Type of animal		
Stray	126	56.8
Domestic	96	43.2
Vaccination status of the animal		
Vaccinated	40	18.0
Not known	182	82.0
Provocation status		
Provoked	21	9.5
Unprovoked	201	90.5
Noticed abnormal behaviour		
No abnormal behaviour	208	93.7
Abnormal behaviour	14	6.3
Previous bite within one week		
Yes	7	3.2
No	215	96.8
Referral status		
Referred	2	0.9
Direct visit	220	99.1
Time to reach the hospital		
< 1 hour	181	81.5
≥ 1 hour	41	18.5
Applied antiseptics		
Yes	52	23.4
No	170	76.6
Previous h/o animal bite		
Yes	21	9.5
No	201	90.5
Type of exposure		
Bite	163	73.4
Scratches	47	21.2
Licks	12	5.4
Number of injuries		
Single site	161	72.5
Multiple sites	61	27.5
Category of the wound		
Category I	26	11.7
Category II	121	54.5
Category III	75	33.8

Discussion

The majority of the animal bite victims in our study are young adults and males. A similar finding was noted in other studies.[5-7] The mean age of the victims in the current study was found to be similar to a retrospective study where the average age was found to be 30.9±17.5 years.[8] Many studies have reported that younger age is more commonly affected.[9-13]

As found in other studies, in our study the majority of the victims are from urban areas.[6,14] This could be attributed to the location of this tertiary care teaching hospital. However, many other studies found that the majority are from rural areas.[10,12,13,15,16] A sizable proportion of animal bite victims in the current study drink alcohol, they may be educated to avoid excess intake of alcohol while receiving anti-rabies vaccination. Victims with pet animals in the house may be educated on the avoidance of bites and exposure to infectious materials. Also to give rabies vaccination to the pet animals in the house up to date. As most attacks occurred at their residence, measures may be taken to avoid animal bites in the residential areas.

As found in other studies the majority of our study participants were bitten by dogs followed by cats.[6,12,17-22] Similar to other study findings the stray dog was found to be the most common attacking animal.[5,6,18] However other studies suggest that domestic animal attacks were more common.[8,16] In our study it was reported that the vaccination status of the animal was not known for the victims. This could be because the majority of the bites are caused by stray animals. Hence the vaccination status is not known. The pet dog rabies vaccination rate was

found to be low.[11] As noted in other studies unprovoked bites are common in our study.[16,18] When there is a bite due to a stray animal, immediate preventive measures may be taken to avoid a bite due to the same animal. Few participants reported that they had a past history of animal bites and taking vaccination indicates the presence of continuous exposure to the risk of bite.

The injuries are mostly due to the bite of the animal followed by the scratches. A small proportion of study participants applied antiseptic after the exposure. A similar finding was observed in another study where 26% of the animal bite victims applied antiseptics in the affected area.[23] Immediate use of antiseptics having virucidal activity to be promoted among the participants. Majority of the victims immediately accessed this tertiary care teaching hospital. This suggests the appropriate health-seeking practices of the animal bite victims. This will enable them to receive the post exposure prophylaxis at the earliest. Similarly, early initiation of treatment was found among participants in other studies.[16,22,23] The median duration for reaching the hospital was found to be 20 minutes. The mean delay in seeking medical care was found to be 22±4.6 hrs.[19]

In the current study, category II bites were found to be more common. Similar findings were observed in other studies.[16,21,24,25] However many other studies have reported that category III bite was the most common type of wound classification.[5,6,18,20,26,27] The category II and III type of exposures assessed as having risk of developing rabies. Hence, appropriate measures to be taken to avoid severe injuries. Most common sites of the bite were found to be lower limbs. This could be due to the accessibility to the animal for biting. Similarly many studies have reported that the lower limb is the most common site of the bite.[6,10,16-18,21,24,25,28] In the current study, the majority of the bite was restricted to a single site, only 27.5% had multiple bites. In a study by Datta M et al., it was found that 38% had multiple injuries.[7] Similar to other studies, the majority of our study participants also immediately washed the wound with soap and water.[16,23,28] This suggests the level of awareness of the animal bite victims regarding post-exposure prophylaxis. It was observed that 50% of the victims cleaned the wounds thoroughly for 15 min.[23] However, the average duration of the washing of the wound may be increased so that the removal of the virus will be more. Hence, people should be made aware of the importance of washing the bite area as soon as possible with soap and water for up to 15 min duration.

Conclusion

The younger population, males and urban residents were the common animal bite victims. Residence areas are found to be risky. Participants reached the hospital immediately after the bite. Bite was the most common type of exposure and the majority of the bites are caused by dogs, mostly in the lower limbs with a single site. Category II bites were found to be more common. Health education may be given to people, especially the younger age group on the importance of avoiding animal bites, and appropriate methods of washing the wound immediately after the animal bite.

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Conflicts of interest

There are no conflicts of interest.

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