

**Health seeking behaviours of individuals exposed to animals**

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**ABSTRACT**

**Background:** India is a rabies endemic country, where animal bites to humans are a major public health problem and an estimated 17.4 million animal bites occur annually. It is more common in urban poor locality, since there is a combination of large human and dog populations in congested habitable areas. Seeking timely and correct post exposure prophylaxis by the exposed victims is important to prevent rabies. **Objectives:** 1. To know the characteristics of animal exposures. 2. To determine the post exposure prophylaxis seeking behaviour of individuals exposed to animals. **Methodology:** A community based cross-sectional study was conducted in urban poor locality of Tumkur District, Karnataka. The study subjects were interviewed using a pretested, semi-structured proforma to collect information regarding any history of animal exposures in last one year; if there were any animal exposures, a detailed history regarding the post exposure prophylaxis seeking behaviour was obtained. **Results:** A total of 11,289 individuals were surveyed, among whom 128 animal bite cases were reported giving the prevalence of 1.13%. In all the 128 cases, the biting animal was dog and 86.2% of them were unprovoked bites. The common bite injuries were abrasions (59.4%) and were mainly on the limbs (97.6%); 52.4% of them were category III exposures. Among the exposed, 96.1% sought help from the medical doctor, among whom 61.7% from government health care facility. **Conclusion:** The post exposure prophylaxis seeking behaviour has to be further improved; since early and correct post exposure prophylaxis is necessary to prevent rabies.

**Key Words:** health seeking behaviour, urban poor locality, rabies, animal bite, post exposure prophylaxis.

**INTRODUCTION**

Rabies is one of the oldest zoonotic disease which continues to pose a significant threat to humans in most parts of the world; particularly in Asia and Africa.<sup>1</sup> Nearly 95% of all human infections are due to exposure to rabid dogs.<sup>2</sup> As per a World Health Organization (WHO) estimate, annually about 59,000 human rabies deaths occur globally and of these 31,000 are from Asia and 24,000 from Africa.<sup>3</sup>

Rabies is primarily a disease of terrestrial and airborne mammals, including dogs, wolves, foxes, coyotes, jackals, cats, bobcats, lions, mongooses, skunks, monkeys, bats and humans.<sup>4</sup> It is transmitted to humans and other animals through close contact with saliva from infected animals i.e. bite, scratches, licks on broken skin and mucous membranes.

India is highly endemic for rabies and has the largest number of animal bites in the World. About 15 million people are bitten by animals, mostly dogs, every year and require post-exposure prophylaxis.<sup>5</sup> In urban areas, because of increased urbanization and ineffective dog population control measures; the incidence of dog bites are more. It is more so in urban poor localities, because of combination of large human & dog populations in congested habitable area. India has approximately 25 million dogs, with an estimated dog : man ratio of 1: 36.2. <sup>6</sup> The reported incidence of animal

bites is 17.4 per 1000 population. The annual number of person-days lost because of animal bites is 38 million, and the cost of post-bite treatment is about \$25 million. <sup>7</sup>

Rabies deaths can be prevented by effective post exposure prophylaxis (PEP) with potent rabies vaccines and immunoglobulins administered soon after the exposure.<sup>8</sup> Successful human rabies control programme comprise of three pillars: Community participation, public awareness and access to post-exposure prophylaxis. Therefore, seeking timely and correct PEP by the exposed victims is important to prevent rabies. The exposed person should seek immediate post exposure prophylaxis from the health care facility. Timely and correct PEP, which includes thorough wound wash, full course of anti-rabies vaccine (ARV) and local infiltration of rabies immunoglobulin (RIGs), is almost invariably effective in preventing rabies, even after high-risk exposure.<sup>9</sup>

The present study was taken up to assess the health seeking behaviour of animal exposure victims in the urban field practice area of a medical college.

**Objectives**

1. To know the characteristics of animal exposures in the study population.
2. To determine the post exposure prophylaxis seeking behaviour of individuals exposed to animals.

**MATERIAL AND METHOD**

Study place: Urban field practice area of medical college in Tumkur.

Study subjects: All household members of the study area after getting their informed consent.

Study design: Cross-sectional study.

Sample Size: 11,289 Subjects.

Statistical Analysis: Percentages.

Study period: January to June, 2018.

**Methodology:** A cross-sectional study was conducted in the urban poor locality of Tumkur district, Karnataka. A total of 2786 households were visited and 11,289 people were surveyed using a pretested, semi-structured proforma to collect information regarding any history of animal exposures in last one year. If there were any, than a detailed history regarding socio-demographic profile, details of exposure, PEP seeking behaviour after the exposure and details of PEP received by them were recorded. The data was analyzed using Microsoft Excel.

**RESULTS**

Among the study population of 11,289; 128 had animal exposure during the past one year, giving the prevalence rate of 1.13%. Among the exposed persons, majority of them were adults (63.3%) followed by children (33.6%); most of them were males (78.9%) and educated above primary school. (Table 1)

**Table 1: Profile of animal bite victims (n = 128)**

Characteristics		N=128
Age	Children (<14years)	43 (33.6)
	Adults (15-60 years)	81 (63.3)
	Elderly (> 60years)	4 (3.1)
Sex	Male	101 (78.9)
	Female	27 (21.1)
Education	Illiterate	37 (28.9)
	Primary school	51 (39.8)
	High school	28 (21.9)
	Diploma	11 (8.6)
Occupation	Graduate/Postgraduate	1 (0.8)
	Unemployed	24 (18.7)
	Student	55 (42.9)
	Unskilled	7 (5.5)
	semiskilled	7 (5.5)
	Skilled	26 (20.3)
	Semi profession clerk/shopkeeper	3 (2.3) 6 (4.6)

Figures in the parenthesis indicate percentage

**Characteristics of exposure:** Biting animal was dog in all subjects and majority of them were stray dogs (78.9%) whose fate was not known. Among the exposed individuals; 55.1% had category III exposures and 44.9% had category II exposures. Majority of the exposed

individuals had on the limbs (97.7%); abrasion and lacerations were the most common type of exposures. (Table 2)

**Table 2: Characteristics of exposure (N = 128)**

Characteristics		N=128
Biting animal	Dog	128 (100.0)
	Stray	101 (78.9)
Fate of the animal	Pet	27 (21.1)
	Healthy	28 (21.9)
Category of exposure	Killed	2 (1.5)
	Not known	98 (76.6)
Site of bite	II	59 (44.9)
	III	69 (55.1)
Type of wounds	Upper limb	36 (28.1)
	Lower limb	89 (69.6)
	Trunk	3 (2.3)
Type of wounds	Abrasion	76 (59.4)
	Laceration	36 (28.1)
	Punctures	4 (3.1)
	Multiple	12 (9.4)

Figures in the parenthesis indicate percentage

**Table 3: Details of health seeking behaviour (N = 128)**

Characteristics		N=128
Wound wash done at home	Soap & water	77 (60.1)
	Only water	17 (13.3)
	Nothing	34 (26.6)
Seeking medical care	Medical doctor	123 (96.1)
	None	5 (3.9)
Type of health care visited (n =123)	Govt. hospital	79 (61.7)
	Private tertiary hospital	29 (22.7)
	Private clinic/nursing home	15 (11.7)
	None	5 (3.9)
Distance to the health care facility (n =123)	<1km	35 (28.5)
	1-4km	25 (20.3)
	5-10km	63 (51.2)
Time of reporting to medical care (n =123)	<4hrs	110 (89.4)
	4-12hrs	9 (7.3)
	1-2days	4 (3.3)

Figures in the parenthesis indicate percentage

**PEP seeking behavior:** Only 73.4% of the study subjects washed their wound/s with either water or soap & water. 96.1% of them sought medical care from a medical doctor, mostly (61.7%) from a Government hospital and most of them (51.2%) travelled to the health care facility which was located at 5-10km distance from their

residence and majority of them (89.4%) reported to health care facility within 4 hours after exposure. (Table 3)

**Details of PEP received:** Majority of study subjects received wound management (96.1%) and anti-rabies vaccination (96.1%) in the health care facility. 99.1% of the vaccinees received by intramuscular route and only 0.9% received by intradermal route. Rabies immunoglobulin was infiltrated only in 14.5% of category III exposure victims. Only 85.9% of study subjects completed full course of anti-rabies vaccination. The reasons for not completing the full course of vaccination were negligence (38.4%), lack of transportation (15.4%), cost involved (15.4%), loss of wages (15.4%) and interferes with school timings (15.4%) (Table 4).

**Table 4: Details of PEP received and compliance (N = 128)**

Characteristics		N=128
Wound wash	Yes	123 (96.1)
	No	5 (3.1)
Anti-rabies vaccination	Yes	123 (96.1)
	No	5 (3.1)
Type of regimen (n =123)	Intradermal	1 (0.9)
	Intramuscular	122 (99.1)
RIG administration (n=69)	Yes	10 (14.5)
	No	59 (85.5)
Complications	None	123 (100.0)
Completion of course (n =123)	Completed	110 (85.9)
	Not completed	13 (14.1)
Reasons for non-compliance (n = 13)	Negligence	5 (38.4)
	Lack of transportation	2 (15.4)
	Cost involved	2 (15.4)
	Loss of wages	2 (15.4)
	School	2 (15.4)

Figures in the parenthesis indicate percentage

## DISCUSSION

Rabies is a neglected zoonotic disease caused by the rabies virus; occurs in over 100 countries and poses a potential threat to >3.3 billion people worldwide.<sup>10</sup> The neglected disease indicates that, it is insufficiently addressed by Governments and the International community, as they are best defined by the people and communities they affect the most i.e., poor people living in the remote rural areas and urban slums of the developing World.<sup>11</sup> It is however, the disease most amenable to control, as the tools for prevention i.e., post exposure prophylaxis (PEP) are available worldwide. Therefore, early and correct post exposure prophylaxis is necessary to prevent rabies.<sup>12</sup>

India is highly endemic for rabies and has the largest number of animal bites in the World. Therefore, in rabies endemic country like India, where every animal

bite is potentially suspected as a rabid animal bite, the treatment should be started immediately. It is important that the exposed individuals should seek proper medical care immediately for complete post exposure prophylaxis to prevent rabies.

The present study in the urban poor locality showed that, the prevalence rate of dog bite was 1.13 %. Likewise, the WHO sponsored multi-centric study conducted in 2003 (i.e. 15 years back) also showed that, the incidence of animal bites was 1.7%.<sup>13</sup> Another study by S Sharma et al, showed that the total dog bite rate for the previous year was 2.5%.<sup>14</sup> All these studies showed that, the animal bites are still a substantial burden for both the community as well as the health care delivery system.

The present study showed that, the biting animal was dog in all the subjects and majority of them were stray dogs (78.9%) whose fate was not known. Among the exposed individuals; 55.1% had category III exposures; majority of the exposed had on the limbs (97.7%) and abrasion/ lacerations were the most common type of exposures.

Likewise, a study conducted by Ganasva et al, showed that 95.8% of the exposures were from stray dogs.<sup>15</sup> Similarly, a study conducted by S Sharma et al. showed that, 84.2% of the exposures were on lower limbs.<sup>14</sup> A study by Trivedi et al, showed that 82.85% of bites were by dogs, 52.06% were by stray animals, 78.41% was unprovoked bites, 62.59% of bites were over lower limbs, 70.74% suffered from multiple bites/scratches and 73.01% were category III bites.<sup>16</sup> A study by Venkatesan et al, showed that 78% bites were unprovoked, 53.3% were over lower limbs, 66.6% had bleeding at the site of bite.<sup>17</sup> A study by Umarigar et al, showed that 94.1% bites were by dogs, 64.7% were unprovoked bites, lower limb was the most common site (84.3%), majority were category II exposures.<sup>18</sup> All the studies showed that, most of them were category III exposures, which were severe exposures and need immediate and complete post exposure prophylaxis in the health care facility.

The present study showed that, only 73.4% of the study subjects washed their wound/s with either water or soap & water. 96.1% of them sought medical care from a medical doctor, mostly (61.7%) from a Government hospital and most of them (51.2%) travelled to the health care facility which was located at 5-10km distance from their residence and majority of them (89.4%) reported to health care facility within 4 hours after exposure. Likewise a study by S Sharma et al. showed that 57.9% of the animal bite victims washed wound with soap and water.<sup>14</sup> Similarly, a study by Ganasva et al. showed that 93.8% approached Government health care facilities for post exposure prophylaxis and 64.1% travelled <10kms to approach the health care facility.<sup>15</sup> A study by Anshuli Trivedi et al, showed that, 53.01% washed their wound with soap and water.<sup>16</sup> A study by Venkatesan et al, showed that only 36% washed their wounds with soap and water, 65% received treatment from primary health centre.<sup>17</sup> In a study by Dhiman et al, 43.07% washed their

wounds with soap and water, 42.38% animal bite victims opted for rational treatment.<sup>19</sup> The above studies showed that, wound wash, which is the first and most important step to remove all the virus deposited on the surface of the wound is not followed by every exposed individual; similarly, few of the animal bite victims are still not reporting to health care facility for post exposure prophylaxis which is of important concern.

The present study showed that 96.1% got wound wash and anti-rabies vaccination as a part of post-exposure prophylaxis at the health care facility. Likewise, a study from S Sharma reported that, only 79.2% of the animal bite victims received anti rabies vaccine at the health care facility.<sup>14</sup> The above studies showed that, many of them had not received anti rabies vaccine, which is the primary step for prevention. Similarly, the present showed that, only 14.5% of category III exposures received rabies immunoglobulins at the site of bite; likewise a study by S Sharma et al. also showed that only 29% received rabies immunoglobulin.<sup>14</sup> A study by Venkatesan et al, showed that 70.4% bite victims received anti-rabies vaccine and only 3.8% received rabies immunoglobulin.<sup>17</sup> A study by Umarigar et al, showed that 97% category III exposures did not receive rabies immunoglobulin.<sup>18</sup> Rabies immunoglobulin is a life-saving immune-biological in all category III exposures, since any modern cell culture vaccine will take about 7-14 days to produce the protective immune response and these rabies immunoglobulins are readymade antibodies which will neutralize the virus at the site of deposition and thereby important for prevention of rabies.

The present study showed that, the compliance rate for complete course of anti-rabies vaccine was only 85.9%. Similarly, a study by Ravish et al. showed that, the compliance was only 60% for intramuscular rabies vaccination and 77% for intradermal rabies vaccination.<sup>20</sup> All these studies showed that the compliance for anti-rabies vaccination was poor. It is essential for all the bite victims to complete the full course of vaccination as recommended by the physician for full protection, as those who do not complete the full course of vaccines

The present study also showed that reasons for not completing the full course of vaccination were negligence (38.4%), lack of transportation (15.4%), cost involved (15.4%), loss of wages (15.4%) and interferes with school timings (15.4%). Similarly, a study by Ravish et al. showed that, the constraints for non-compliance to ARV were loss of wages, forgotten dates, cost incurred, distance to the hospital and interfering with school timing.<sup>10</sup>

To facilitate the completion of PEP and to improve compliance to ARV, anti-rabies vaccines should be made continuously available at all government hospitals and have to be provided free of charge to all animal bite victims, so that they can continue their course in any hospital, near their house/school/work place without interfering with their working hours/school timings and they need not lose their wages. Similarly, telephonic reminders can be given to all animal bite victims

regarding their next dose of vaccination. A coordinated effort should be made by all concerned, in order to complete the PEP to prevent rabies and to eliminate the disease as a public health problem.

**Conclusion:** In conclusion, the post exposure prophylaxis seeking behaviour of the population was inadequate and it has to be further improved by IEC activities; since early and correct post exposure prophylaxis is necessary to prevent rabies. This will help in preventing rabies among the vulnerable group and to minimize the disease burden, which in turn helps in eliminating the disease by 2030 as declared by WHO.

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