

## Original Research Article

# Pattern of exposure among victims of suspected rabid animal attending anti-rabies clinic of tertiary care hospital

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### ABSTRACT

**Background:** Rabies, a neglected tropical disease, is vaccine preventable and occurs in more than 150 countries. It is almost always fatal. About 40% of deaths due to rabies occur in children under the age of 15 years. Objectives were to study the pattern of injury following exposure to canine bite, bear maul and rabid cow among the attendees of Antirabies clinic of SMHS hospital, Srinagar and to classify the type of exposure using WHO guidelines for initiation of post exposure prophylaxis.

**Methods:** The study was conducted over a period of three months from 1<sup>st</sup> June 2016 to 31<sup>st</sup> August 2016, in Anti Rabies Clinic of Department of Community Medicine, Government Medical College, Srinagar. It was a descriptive Study and included all victims of canine bite and rabid cow. A total of 134 patients were received.

**Results:** Most [83 (61.9%)] of the patients were males with mean age of 36.63 years. Legs were the most common [57 (43.2%)] site of exposure followed by hands [15 (11.2%)] and thigh [13 (9.7%)]. Contact with a rabid cow was present in 5 (3.7%). Class II exposure was most frequently encountered [83 (61.9%)]. Class III exposure was seen in 49 (36.6%). All patients who attended anti rabies clinic for post exposure prophylaxis received free Antirabies Vaccine. Combined Antirabies vaccine and immunoglobulin was received by 49 (36.6%).

**Conclusions:** Dog bite related injuries happen frequently in Srinagar. There is proper post exposure prophylaxis in place in SMHS hospital. There is need for curbing the ever increasing dog population and enforcing rabies vaccination in dogs.

**Keywords:** Rabies, World Health Organization, Post exposure prophylaxis, Antirabies vaccine

### INTRODUCTION

Rabies is an acute progressive encephalitis caused by RNA viruses in the family *Rhabdoviridae*, genus *Lyssavirus*.<sup>1,2</sup> It is almost always fatal following the onset of symptoms. Rabies is a neglected tropical disease that predominantly affects the most vulnerable humans-children.<sup>3</sup> Children are especially at risk because they are more likely to approach animals without caution, including apparently tame wild animals, and therefore to be attacked and bitten, especially on the arms and face. About 40% of deaths occur in children under the age of 15 years. Considerable geographical variation exists

worldwide, with 95% of rabies cases in humans occurring in Africa and Asia; 84% of these in rural areas. Dogs are the source of infection in more than 99% of cases in humans.

Half of the human population worldwide lives in countries endemic for canine rabies.<sup>4</sup> Vampire bats have been associated with several rabies outbreaks in South America. Rabies gets into the body through wounds or direct exposure of mucous membranes, usually as a result of bites from infected animals, or through transplantation of tissues or organs from someone who died from rabies. Humans are an end host. The incubation period is

variable, with a mean incubation time in one study of 273.6 days (median 80 days, range 12 days to 10 years).<sup>5</sup> The longer incubation periods emphasize that post-exposure prophylaxis is always indicated even if exposure occurred months or years earlier, provided neurological symptoms have not developed. Death is almost always inevitable in unimmunized patients.<sup>6</sup>

Many countries have successfully reduced the impact of the disease by tackling the gap between public and animal health through a concerted “one health” approach.<sup>4</sup> Countries predominantly affected by rabies often have poor diagnostic and reporting capacities, leading to a lack of accurate data and considerable uncertainty around estimates of global burden. In 2011 the World Health Organization reporting database Rabnet closed, as limited data and under-reporting contributed to a lack of priority for this disease.<sup>5</sup>

The global economic burden of rabies has been estimated at \$6bn (£3.8bn; €5bn), comprising the cost of both disease in humans, domestic animals, and wildlife and prevention through control measures in animals and post-exposure prophylaxis in humans.<sup>4</sup> From a health policy maker perspective, control of canine rabies is highly cost

effective and even cost saving.<sup>7</sup> In India, the country with the highest number of deaths from rabies, only one in six patients receives appropriate post-exposure prophylaxis.<sup>4</sup>

The World Health Organization (WHO) supports targets for elimination of human rabies transmitted by dogs in South-East Asia by 2020. Around 15 million animal bites requiring post exposure rabies prophylaxis, occur in India every year.<sup>8</sup> There is little data on the incidence of animal bites from India. The available studies on dog bites and rabies in India are mostly hospital-based, and limited to disease management.<sup>9,10</sup>

The canine bite exposures are categorised as per WHO guidelines.<sup>11</sup>

The estimates of suspected rabid animal bite victims from Kashmir are available from a single hospital based data. In Kashmir, victims of suspected rabid animal bite are mainly managed at SMHS hospital which is a tertiary care hospital situated in District Srinagar. It has been reported that in three years (2011-2013) a total of 13852 victims of canine bite victims were managed at Anti rabies clinic of SMHS hospital.<sup>12</sup>

**Table 1: Categorization of bite cases as per WHO guidelines.**

Category	Type of contact	Type of exposure	Recommended post exposure prophylaxis
<b>I</b>	Touching or feeding of animals Licks on intact skin	None	None, if reliable case history is available
<b>II</b>	Nibbling of uncovered skin Minor scratches or abrasions without bleeding	Minor	Local treatment of wounds Administer Antirabies vaccine
<b>III</b>	Single or multiple transdermal bites or scratches Licks on broken skin Contamination of mucous membrane with saliva (i.e licks)	Severe	Local treatment of wounds Administer Antirabies vaccine

With this backdrop the present project was undertaken to know the pattern of injury, type of animal involved and the site of injury among the patients attending Antirabies clinic for post exposure prophylaxis.

**Objectives of the study**

1. To study the pattern of injury following exposure to canine bite, bear maul and rabid cow among the attendees of antirabies clinic of SMHS hospital, Srinagar.
2. To classify the type of exposure using WHO guidelines for initiation of post exposure prophylaxis among the individuals attending antirabies clinic of SMHS hospital.

**METHODS**

The present study was conducted in Anti rabies clinic of SMHS hospital which is under the administrative control of Department of Community Medicine Government

Medical College Srinagar. The study was carried out over a period of three months from 1<sup>st</sup> June 2016 to 31<sup>st</sup> August 2016, in a single institutional unit (anti rabies Clinic) of Department of Community Medicine. It was a descriptive Study and included all victims of canine bite or exposure to rabid cow or bear maul attending Anti rabies clinic of SMHS hospital.

The study included patients of different age groups and both sex who were attending antirabies clinic during the study period. All those patients attending the clinic who gave consent for being included in the study irrespective of sex, age, severity of bite and treatment taken were included in the study. The patients were evaluated for the site of exposure, class of exposure and modalities of management.

A total of 134 patients attended antirabies clinic for receiving post exposure prophylaxis against rabies following exposure to canine bite, bear maul or any other suspected rabid animal. All patients attending the

antirabies clinic were given proper wound care, vaccination with modern anti-rabies vaccines and administration of rabies immunoglobulins. The attending physician provided correct post-exposure rabies prophylaxis (PEP). After receiving initial management the subjects were interviewed after taking consent. The interview was carried by using a structured questionnaire. History included name, age, sex, occupation, educational status. Socioeconomic status of the patient was assessed by below poverty line certification and economic parameter was assessed by taking into account to family income. A detailed examination of the wound was performed to get the information about type of exposure, site of exposure and class of exposure.

Ethical clearance was sought by the Ethical Committee of Government Medical College, Srinagar.

### Statistical analysis

The collected data was entered in Microsoft excel and analyzed using Statistical software for Social Sciences SPSS 20. Categorical data was summarized as frequency and percentages and continuous data was summarized as mean with standard deviation.

## RESULTS

A total of 134 patients who attended the clinic were given wound management and vaccination. Mean age of the patients was 36.63±26.5 standard deviation. Most of the patients 67 (49.8%) were from age group of 21 to 50 years of age group. Most of the attendees of the Antirabies Clinic were males 83 (61.9%). Most of the patients were illiterate 43 (32.1 %). Only 23(17.1%) had completed higher secondary level and graduation. 25 (18.7%) of patients were dealing with business and equal number were unskilled laborers. School goers and Government employees were also equal in number 18 (13.4%). A total of 70 (52.2%) of patients had a family size of five to seven. In most of the cases 91 (67.9%) patients had only one earning member in the family followed by 29 (21.6%) who had two earning members. Legs were the most common site of exposure in 57 (43.2%) of patients followed by hands in 15 (11.2%) and thigh in 13 (9.7%) patients. Contact with a rabid cow was present with 5 (3.7%) cases. Class II and Class III exposure was most frequently encountered with 83 (61.9%) and 49 (36.6%) of cases. Out of 134 patients 49 (36.5%) reported bleeding of varying degree at the site of exposure. All of the patients 134 (100%) who attended anti rabies clinic for post exposure prophylaxis received free antirabies vaccine. Combined antirabies vaccine and immunoglobulin was received by 49 (36.6%) of patients. All the patients with Category III exposure received equine immunoglobulin as a part of post exposure prophylaxis.

**Table 2: Sociodemographic profile of patients attending antirabies clinic of hospital for post exposure prophylaxis against rabies.**

Characteristics	Frequency	Percentage (%)
<b>Age group</b>		
<10	29	22.0
11-20	15	11.1
21-30	23	17.1
31-40	25	18.6
41-50	19	14.1
51-60	14	10.4
61-70	7	5.2
71-80	2	1.5
<b>Sex</b>		
Male	83	61.9
Female	51	38.1
<b>Educational status</b>		
Illiterate	43	32.1
Primary	30	22.4
Middle	21	15.7
Secondary	17	12.7
Higher Secondary	6	4.4
Graduate and above	17	12.7
<b>Occupational status</b>		
Government employee	18	13.4
Private/self employed	17	12.7
Business	25	18.7
School goers/students	18	13.4
Homemakers	21	15.7
Nil	10	7.4
Unskilled laborer	25	18.7
<b>Total family members</b>		
<4	37	27.6
5-7	70	52.2
8-10	23	17.2
>12	4	3.0
<b>Total earning members</b>		
1	91	67.9
2	29	21.6
3	10	7.5
4	1	0.7
Information not available	3	2.2
<b>Below poverty line certified</b>		
Yes	25	18.7
No	109	81.3
<b>Income in Rupees</b>		
≤7000	36	26.9
7001-11000	31	23.1
11001-20000	39	29.1
≥20001	28	20.9

Intradermal up-dated Thai regimen (2 -2 -2-0-2) was used for PEP whose safety and immunogenicity is well documented in Indian population. This involves injection of 0.1ml of reconstituted vaccine per ID site and on two

such ID sites per visit (one on each deltoid area, an inch above the insertion of deltoid muscle) on days 0, 3, 7 and 28. The day 0 is the day of first dose of administration of IDRV and may not be the day of rabies exposure/animal bite. The dose was drawn by aseptic technique and the vaccines were stored in a refrigerator at 2°C to 8°C. The

reconstituted vaccines was utilized within 6 to 8 hours if kept at 2°C to 8°C. All unused reconstituted vaccine was discarded. Wound toileting was done in all the patients and all of them received tetanus toxoid injection irrespective of the previous immunization status. In 64 (47.8%) of patients antibiotics were prescribed.

**Table 3: Distribution of patients as per the site of exposure to bite including contact with rabid cow.**

Site of exposure	Frequency	Percentage (%)
<b>Leg</b>	57	43.2
<b>Hand</b>	15	11.2
<b>Thigh</b>	13	9.7
<b>Buttock</b>	11	8.2
<b>Arm</b>	10	7.5
<b>Foot</b>	9	6.7
<b>Contact with rabid cow</b>	5	3.7
<b>Back</b>	4	3.0
<b>Head</b>	4	3.0
<b>Abdomen</b>	1	0.7
<b>Chest</b>	1	0.7
<b>Elbow</b>	1	0.7
<b>Face</b>	1	0.7
<b>Flank</b>	1	0.7
<b>Total</b>	134	100.0

**Table 4: Characteristics of exposure and wound management.**

	Frequency	Percentage (%)
<b>Type of animal</b>		
Dog bite	126	94.0
Cow	5	3.7
Bear	3	2.2
Total	134	100.0
<b>Class of exposure</b>		
Class I	2	1.5
Class II	83	61.9
Class III	49	36.6
Total	134	100
<b>Bleeding</b>		
Yes	49	36.6
No	85	63.4
Total	134	100
<b>ARV expense</b>		
Free	134	100
Out of pocket	0	0
Total	134	100
<b>Line of management</b>		
Anti-rabies vaccine and immunoglobulin	49	36.6
Antirabies vaccine only	85	63.4
Total	134	100
<b>Type of immunoglobulin</b>		
Equine immunoglobulin	49	100
Human immunoglobulin	0	0
<b>Antibiotics received</b>		
Yes	64	47.8
No	70	52.2
Total	134	100

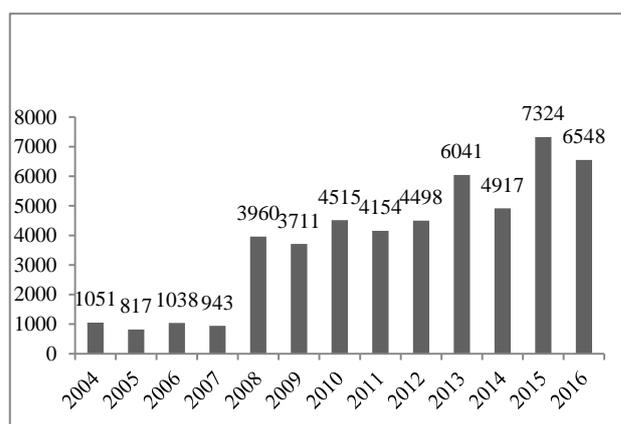
## DISCUSSION

The present study was conducted in antirabies clinic of SMHS hospital, a tertiary care hospital. The antirabies clinic is run by the Department of Community Medicine, Government Medical College Srinagar.

A total of 134 patients attended the clinic to receive post exposure prophylaxis against rabies. The mean age of the patients was  $36.63 \pm 26.5$ . Most of the patients (49.8%) were in the age group of 21 to 50 years. Most [83 (61.9%)] of the attendees of the antirabies clinic were males. Studies conducted in other parts of India including Kashmir have shown similar findings. A study from Haryana has reported 23.9 years as a mean age of patients who present themselves at the clinic with male preponderance 70.4%.<sup>13</sup> A study from Kashmir has reported mean age of patients as 27.69 years and 68% as males.<sup>12</sup> This section of population represents the most productive age group and those who are outside to earn their livelihood; therefore at a higher risk of exposure.

Out of total attendees, 43 (32.1 %) patients were illiterate and 30 (22.4%) had completed primary level. Only 23(17.1%) had completed higher secondary level and graduation. 25 (18.7%) patients were dealing with business and equal number were unskilled laborers. School goers and government employees were also equal in number; 18 (13.4%). Most [39 (29.1%)] belonged to Rs 11001-20000 income range. Only 25 (18.7%) of patients were certified Below Poverty Line as per their economic status.

Legs were the most common site of exposure followed by hands and thigh, a finding also documented by Abubakar et al.<sup>14</sup> The most frequently encountered animal exposure was dogs; seen in 126(94%) patients followed by cow in 5 (3.7%) and bear in 3 (2.2%). There are more than 150,000 dogs in the city, meaning 36 dogs for every human resident.<sup>15,16</sup> Class II and Class III exposure was most frequently encountered with 83 (61.9%) and 49 (36.6%). Out of 134 patients; 49 (36.5%) reported bleeding of varying degrees at the site of exposure. Almost all of the patients [133 (99.3%)] who attended anti rabies clinic for post exposure prophylaxis received Antirabies Vaccine, which was remarkably higher than documented by Abubakar et al.<sup>14</sup> This is probably connected with the availability of the antirabies vaccine free of cost in the hospital. Combined antirabies vaccine and immunoglobulin was received by 49 (36.6%) of patients. The present observations fall close to the previous observations made from the secondary data collected from the same clinic over a period of three years. In that retrospective survey it was observed that out of 13852 canine bite injuries, the lower limb was the leading site affected (46.5%) followed by hand & feet (32%). A total of 10250 (74%) sustained severe wounds (class III). 96% of patients had received combined vaccination and immunoglobulin.<sup>12</sup>



**Figure 1: Number of persons receiving post exposure prophylaxis from period 2004 to 2016.**

Figure 1 is showing the number of persons receiving post exposure prophylaxis from period 2004 to 2016.

In the present study all the patients with Category III exposure received equine immunoglobulin as a part of post exposure prophylaxis, despite the fact that immunoglobulin was to be purchased out of pocket. The fear of consequences of rabies forces patients to get this medicine from market, however given a choice they are unable to purchase costlier human rabies immunoglobulin.

All patients received antirabies vaccine free of cost except for immunoglobulin which patients had to procure from the market as it is not in the hospital supply. The patients have to bear the expenses for immunoglobulin. It is a costly medication.

## CONCLUSION

Dog bite related injuries happen frequently in Srinagar. There is proper post exposure prophylaxis in place in SMHS hospital. There is need for curbing the ever increasing dog population and enforcing rabies vaccination in dogs.

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