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Original Research Article

Epidemiological and clinical profile of dog bitten children and side effects of anti rabies vaccine

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ABSTRACT

Background: Rabies is one of the commonest zoonotic diseases due to Lyssa virus. Rabies is a 100% fatal disease. Understanding the epidemiological and clinical profile of the victims helps in the prevention of dog bite. But rabies is 100% preventable by pre and post exposure prophylaxis vaccination. Evaluation of side effects of anti-rabies vaccine (ARV) is helpful in the pre and post exposure prophylaxis.
Methods: Authors did a descriptive study of 1450 dog-bitten children. Using the pro-forma, authors interviewed the parents, examined the children. Using W.H.O classification, authors classified the dog bite wounds. Anti-rabies vaccination was administered to category 2 dog bite wounded children. Side effects of vaccination are recorded.
Results: Out of 1450 children, significantly more number of boys (67%) in the age group of 10-12 years (31%), from class IV socioeconomic category (52%), nuclear families (80%), sustained category III dog bite (52%) in the lower limb (48%) by unvaccinated (82%) stray dogs (60%) while playing or walking (52%) in the street (60%) during night (72%). Purified Vero cell culture rabies vaccine is having rare mild local side effects (2%), rare mild systemic side effects (4.16%) and very rare systemic allergic reaction (0.14%) but no major side effects.
Conclusions: Dog bites can be prevented by not allowing the children to play or walk alone in the street especially during night. The severity of wound can be minimized by wearing fully covered extremities. Vaccination of dogs and population control of stray dogs will reduce rabies. There were no major side-effects or adverse events following vaccination (AEFI) with anti-rabies vaccination. Rare mild local side effects and very rare mild systemic side effects may happen.

Keywords: Adverse events following immunization, Dog bitten children, Post exposure prophylaxis, WHO classification of dog bite wounds

INTRODUCTION

Rabies is endemic in many countries in Asia, Africa and South America.[1] Rabies is practically 100% fatal zoonotic disease caused by Lyssa virus of Rhabdoviridae.[2,3] Dogs are the major reservoir (99%) and vector of the rabies virus. Other vectors are warm blooded animals like cats, jackals, wolves, bats. Humans are end hosts.

Dog bite injuries are common with an annual incidence of 12.9 per 10,000 persons and it is more common during childhood.[4] Globally 59000 are dying due to rabies annually out of which 30-50% is children.[5]

World health organization classified the dog bite wounds as category-1, which is touching or feeding animals, licks on intact skin, category-2 for nibbling of uncovered skin, minor scratches or abrasions without bleeding and category3 for transdermal bites or scratches,

contamination of mucous membrane with saliva from licks, licks on broken skin, exposure to bat bites or scratches.[6]

Rabies is preventable with wound care, vaccine and immunoglobin. Post exposure prophylaxis (PEP) is given for category-2 dog bite wounds as 4 doses of ARV, intramuscularly on days 0,3,7, and 14 if previously unvaccinated and 2 doses intramuscularly on days 0 and 3 if previously vaccinated. For category-3 doge bite wounds, should also receive rabies immunoglobulin (RIG, 20 IU/kg), with half of the dose infiltrated around the wound site. Category-1 dog bite wounds don't require vaccination.[7]

The aim of present study was to know about the social and epidemiology of dog bitten children and to analyses the side effects of anti-rabies vaccine.

METHODS

Present study is a descriptive and prospective study. Approval from the institutional review board of the university was obtained for this study. Children with a diagnosis of category 2 and category 3 dog bites, who were admitted for ARV and RIG, are included in present study. Data including patient demographics, owner, and circumstances surrounding the bites and clinical course for minimum 24 hours were recorded in an Excel spreadsheet.

Present study was conducted from October 2015 to September 2017 at a tertiary care hospital in Chennai, Tamil Nadu, India. Sample size was calculated from previous studies. 1450 children who have received anti-rabies vaccine during the study period, who have given consent are included in present study.

Sampling technique

Systematic random sampling technique was used in present study.

Inclusion criteria

- All dog bitten children who received ARV and admitted for minimum 24 hours during study period are included in present study.

Exclusion criteria

- Other animal bitten children are excluded,
- Using the pro-forma every caretaker and children are interviewed separately.

Statistical analysis

Data are reported with standard descriptive statistics such as raw numbers with percentages, mean, standard deviation, z-score as appropriate. Proportion test is used. Independent sample t-tests were used to test for differences between groups for continuous variables. Chi-square test of independence was used to test for differences in distributions of categorical variables. P-value of <0.05 was considered significant.

RESULTS

Age distribution of dog bitten children

There is significantly decreased incidence of dog bite in 0-3 years age group (P<0.001). More children of school going age are bitten by dog (Table 1).

Table 1: Age distribution of dog bitten children.

Age group	Dog bitten children	Percentage
0-3 years	213	15
4-6 years	389	27
7-9 years	391	27
10-12 years	457	31

Sex distribution

Significantly a greater number of boys (973) was bitten by dogs than girl (466), (p<0.001) (Figure 1).

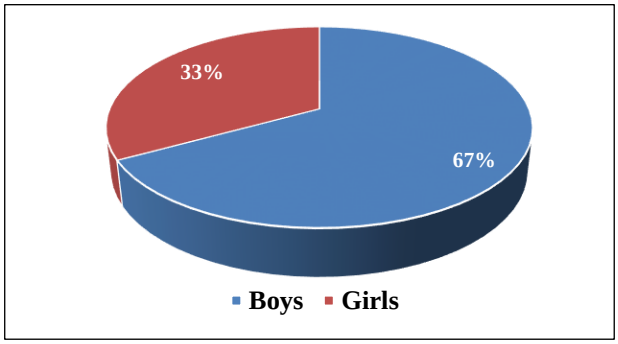

Figure 1: Sex distribution of dog bitten children.

Socioeconomic distribution of dog bitten children

About 754(52%) of dog bitten children belong to class IV modified Kuppusamy scale, 464(32%) belong to class V and 232(16%) belong to class III (Figure 2).

Family type distribution of dog bitten children

About 1160 (80%) children are cared in nuclear family and 290(20%) are from joint family which is statistically significant p (0.001), Z score 32.3 difference 60% (95% CI 57-63) as shown in the (Figure 3).

Place distribution of dog bite

Statistically significant number of children is bitten by dogs in the Street 870(60%) than at home 580(40%). P<0.001 Z=10.7 difference 20% (95% CI 16-24).

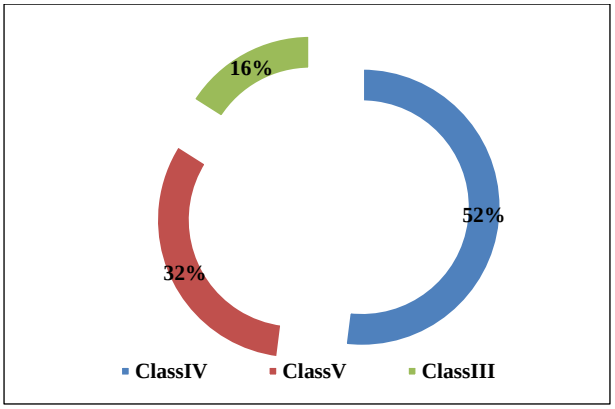

Figure 2: Socioeconomic category.

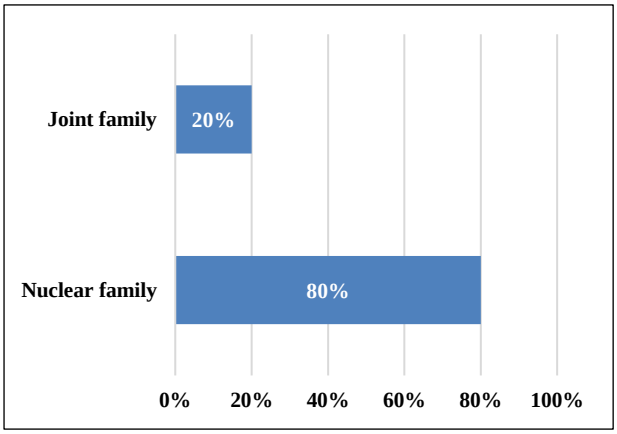

Figure 3: Family type distribution.

Time distribution of dog bite

Statistically significant number of children is bitten by dog during night 1044(72%) than during daytime (28%) as per the (Figure 4), p<0.001, Z score of 23.7, difference 44% (95% CI 41-47).

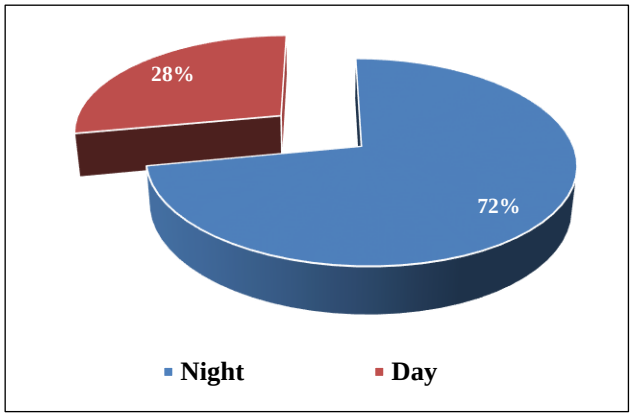

Figure 4: Time of dog bite.

Dog bite site distribution

Anatomical distribution of dog bite site: 696 (48%) children are bitten in lower limb, 580 (40%) in upper limb, 16 (8%) in trunk and 58 (4%) in head and neck (Figure 5).

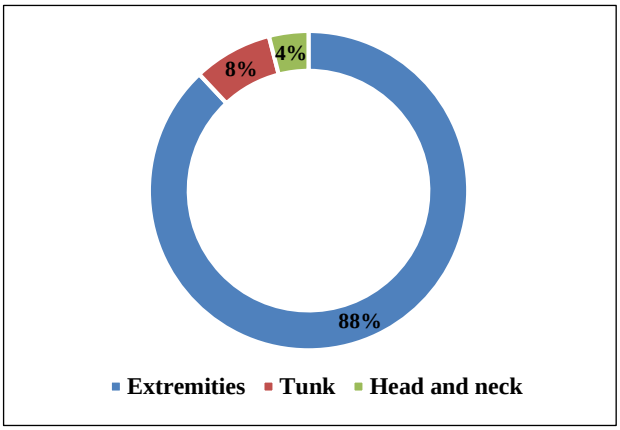

Figure 5: Anatomical distribution of dog bite.

Dog type distribution

About 870 children are bitten by stray dogs and 580 by pet dogs which is statistically significant (p<0.01, Z10.7, 20% CI 16-24) (Figure 6).

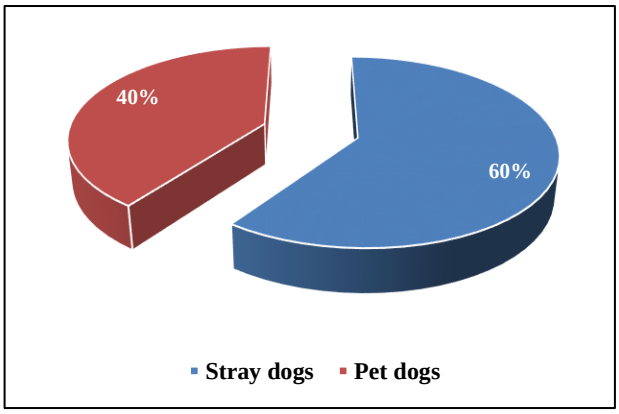

Figure 6: Distribution of type of dog.

Dog vaccination status

Significant number of children are bitten by unvaccinated dog than vaccinated dog as shown in the (p<0.001, z-36.6, difference 68% CI 65-71) (Table 2).

Dog bite category distribution

Out of 1450 study population, 753 children sustained category III bite and 697 sustained categories II (Figure 7).

Table 2: Vaccination status of the dog.

Types		Percentage
Vaccinated dogs	232	16%
Unvaccinated dogs	1218	84%

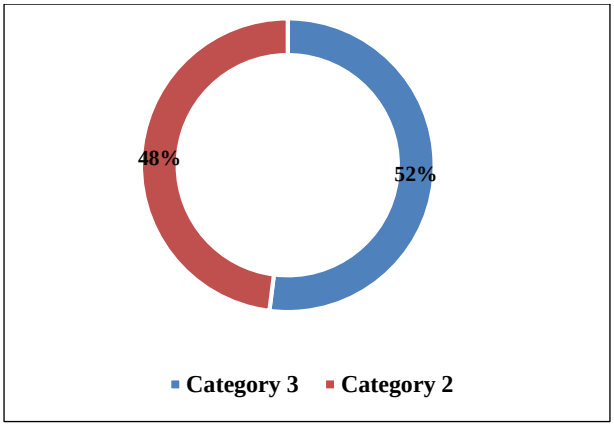

Figure 7: Distribution of dog bite wounds.

Anti-rabies vaccine side effects

About 14 (2%) children developed mild local side effects at the site of vaccination like pain, erythema and tenderness following the administration of ARV.

About 29 (4.16%) children developed mild systemic side effects like fever and myalgia and 1 child developed systemic allergic reaction in the form urticarial rashes (Table 3).

Table 3: Side effects of ARV.

Local side effects	Mild Systemic side effects	Systemic allergic reactions
14 (2%)	29 (4.16%)	1 (0.14 %)

DISCUSSION

Out of 1450 dog bitten children, significantly more number of boys (67%) in the age group of 10-12 years (31%), from class IV socioeconomic category (52%), nuclear families (80%), sustain category III dog bite (52%) in the lower limb (48%) by unvaccinated (82%) stray dogs (60%) while playing or walking (52%) in the street(60%) during night (72%). Purified Vero cell culture rabies vaccine is having rare mild local side effects (2%), mild systemic side effects (4%) and very rare systemic allergic reaction. No major side effects. Annually 15 million of Indians sustain animal bite mostly due to dogs (95%) with general incidence of 0.5%.[8] In present study the incidence is 0.4%

Age group distribution

Increased incidence is seen in 5-12years age group in the study conducted in infectious diseases hospital, Delhi and 7-10 years age group in the study conducted at institute of child health, Chennai by Parthasarathy A et al.[9,10]

And in the study conducted in USA, by 12th grade, 46% of students had been bitten by a dog.[11]

In present study, 32% are bitten by dog in 10-12 age group may be due to the increased play and activity in street. Only 15% toddlers are bitten by dog since they remain mostly in home.

Sex distribution of dog bitten children

In the previous study by Parthasarathy A et al, the dog bitten boys: girls' ratio is 2:1 and in present study 2/3rd are boys and 1/3rd are girls. Statistically significant increase in boys is due to the preference of outdoor play by boys.

Socio economic distribution of dog bitten children

Poorer socio-economic children are bitten by dog 52% from class-IV, 32% from class-V and 16% from class-III since more chances for children playing in the streets.

Type of family distribution

Significantly a greater number of children from nuclear family (80%0 are bitten by dog than from joint family (20%) since lesser family members are taking care of them.

Place of dog bite and types of dogs

More dog bites are at street (60%) than in home (40%) since more bites are by stray dogs (60%) than pets (40%)

Activity at the time of bite

Significantly more number (52%) is bitten during play or walk or running in the street since children are easily accessible by stray dogs.

Anatomical distribution of dog bite

Face is bitten mostly (70%) in the American study since pet dogs are more there.[12]

Lower limb sustained more dog bites (48%) in present study as well as in other Indian studies since stray dogs are more than pets in India.

Dog vaccination status

More number of children is bitten by unvaccinated dogs (84%) since a greater number of unvaccinated stray dogs are here also it is not a rule or mandatory to vaccinate the pet dogs also there is no NGO as well as government agency vaccinate all stray dogs.

Dog bite category distribution

In the epidemiological study of patients attending anti-rabies vaccination clinic of tertiary care hospital by Alka

C. Karware et al, 67% sustained category II bite and in present study 48% sustained category II bite.

Anti-rabies vaccine side effects

In present study using Purified Vero cell culture vaccine rare (2%) mild side effects, mild systemic side effects (4%) occurred but in the study done at Wuhan, China, local side effects happened in 27.4% and mild systemic side effects like fever in 7.6%.[13]

CONCLUSION

Dog bite remains second most common injury and rabies remains 10th commonest cause of death. Dog bite prevalence is 200-800/100000. In India, 3 people die of rabies per 1, 00,000 even after the free availability of anti-rabies vaccine in all government hospitals without major side effects and with very rare mild side effects

In present study more number of boys from 10-12years from nuclear or poor families sustain dog bite in extremities by stray or unvaccinated dogs during night while playing or walking alone in the street so it can be prevented by not allowing the children not playing or walking alone during night and to wear fully covered shirts and trousers or pyjamas to prevent class II bite in extremities. This study emphasised the need to vaccinate all dogs and to control stray dog population.

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Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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