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Treatment seeking behaviour of animal bite among a rural population in Trichy district: A cross sectional community-based study

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ABSTRACT

Introduction: Animal Bite is a major health problem. The people most affected by these bites live in poor rural communities, who are mostly ignorant in this regard. So this study was carried out to know the prevalence of animal bite, epidemiological risk factors and treatment seeking behaviour in the rural population of a south Indian district. **Methodology:** A cross-sectional study was conducted among 342 subjects (N=342) in Punjai Sangenthi village in Pullambadi Block in Trichy district, Tamilnadu during May 2016. A structured Questionnaire was used to collect data. Period prevalence of any animal bite in past 3 months and treatment seeking behaviour were the primary outcome variables. It was analysed with SPSS 20.0 trial version. Bivariate analysis was done. p vale <0.05 was considered statistically significant. **Results:** Majority of the study population were in the age group of 20-39 years (41.8%), followed by 40-59 years (26.6%).The prevalence of animal bite in the past 3 months was 14.3% (95% C.I. of 10.79% to 18.5%). Dog bite (87.8%, 43/49) was the most common animal bite. 63.3% (31/49, 95% C.I. of 49.8% to 76.8%) of those with animal bite went to hospital for treatment. Sleeping outside the house (12.6%,43/342, p=0.0003) and having a pet animal (9.4%,32/342,p=0.004) were factors significantly associated with animal bite. **Conclusion:** 36.7% of population did not seek treatment for animal bite. Considering the prevalence of different animal bites and treatment seeking behaviour among them, there is a need for administering behavioural change education through anti-rabies clinics and attached primary health care centres to eventually improve their attitude and practice towards animal bite.

Key word: Animal bite, Dog bite, Treatment seeking behavior, Prevalence, Rural population, Rabies, Pet animal.

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INTRODUCTION

Animal Bite is a major public health problem.[1] Of all the animal bites, rabies is an important zoonotic disease. An estimated 59,000 human deaths occur every year globally due to rabies from around 150 countries.[2] Dog bites are the major cause of deaths in rabies.[3] 95% of human deaths from rabies occur in Asia and Africa. 99% of all rabies transmission in humans occur by dogs.[3] Around 29 million people receive a post-bite rabies vaccination globally.[3] Annually dog bites account for tens of millions of injuries.[1] 76 to 94% of animal bites in low income countries are by dogs.[1] But data is lacking in most of the developing countries where dog bite is very common. In the United States of America alone,

annually, 4.5 million people experience dog bites. This figure is comparable to that of other developed countries such as Australia and france.[1] Rabies kills an estimated 20,000 people in India every year. It is endemic throughout the country except Andaman & Nicobar and Lakshadweep Islands.[4] Animal bites can be prevented by providing proper health education and accessible medical services can prevent further complications. Most of deaths can be prevented by simple wound washing, proper treatment, vaccination, anti-rabies immunoglobulin. Unfortunately, at risk populations are not well informed about the risk and what to do in case of animal bites.[5-7] The people most affected by these bites live in poor rural communities. Although the impact of these health issues are significant there is a lack of awareness among rural population with regards to prevention of these bites. This area needs to be attended to make rabies come out of the tag of a neglected global health problem. Hence this study was conducted with objectives of finding period prevalence of different bites, its epidemiological risk factors and its treatment seeking behaviour in a rural population.

OBJECTIVES: To describe the period prevalence of animal bites during February to April 2016 and its epidemiological risk factors**;** To describe the treatment seeking behaviour (hospital visit) of rural population after animal bite

MATERIAL AND METHODS

A community based descriptive cross-sectional Study was conducted on the month of May 2016 in Punjai Sangenthi village in Pullambadi Block in Trichy district, Tamilnadu which is located around 25 km from Trichy city. The Rural Health Training Centre located in Sangenthi is the peripheral center of department of Community Medicine of a Tertiary teaching hospital in Trichy. The sampling frame included 2750 people living in the village contributed by nearly 650 families. The final sample size was estimated as 354 considering both the objectives. All members belonging to all age groups and both sexes were included in this study. Subjects not willing to participate or not giving consent were excluded from the study.

Sample size was estimated as 338 for the period prevalence objective. Sample size was calculated assuming the proportion of dog bite as 6.9% as per the study by Krishnamoorthy Y et al.[8] The other parameters considered for sample size calculation were 2.75% absolute precision and 95% confidence level. A finite population correction was applied for 2750. The formula was used for sample size was as reported by Daniel WW et al.[9] Sample size calculation was done using coGuide software, V.1.0.[10] The required sample size as per the above-mentioned calculation was 292. To account for a non-participation rate/ loss to follow up rate of about 10%, another 30 subjects will be added to the sample size. Hence the sample size would be 322.

For the treatment seeking behavior objective, sample size was calculated assuming the proportion of Health seeking behaviour as 82% as reported in the study by Penjor K et al.[6] The other parameters considered for sample size calculation were 4% absolute precision and 95% confidence level. A finite population correction was applied for 2750. The required sample size as per the above-mentioned calculation was 314. To account for a non-participation rate/ loss to follow up rate of about 5%, another 16 subjects were added to the sample size. Hence the final required sample size would be 330. Sample size calculation was done using coGuide software, V.1.0.[10] A systematic random sampling technique was used to recruit the subjects. Assuming an average of 4 members per household, sample was taken from 90 households. Every 7th house was interviewed in the village. All the family members in the house were interviewed. If that house was locked, we moved on to the next 7th house according to our list. Data was collected for a period of one month by house to house visits in all villages. After obtaining verbal consent, questionnaire was given to the respondents. A total of 342 subjects were interviewed at the end of the data collection. Socio Economic Status was classified according to Modified BG Prasad scale updated for January 2016 All India Consumer Price Index (AICPI=269, Multiplication factor=2.69).[11, 12]

Data collection: Data were collected using a pre-tested structured questionnaire by interview method. It contained Socio demographic details (like age, gender, education, occupation and socio-economic status), housing type, sleeping habits, history regarding animal bite in the past 3 months, pet animals, treatment seeking behaviour, treatment taken after bite and their satisfaction with treatment.The purpose of the study was explained to each participant individually before starting the survey. In order to avoid recall bias, House wife or Head of the family were also enquired in detail about

the bites caused to all family members during past 3 months. Each question was explained to the participant in local language and their response to the question was collected. All the information was collected as per recall period of 3 months. To ensure the quality of data, filled up questionnaire was randomly rechecked in the field for accuracy.

Statistical Analysis: Data were entered in Microsoft excel sheet. Data was double checked after entry and cleaned. Data was analysed with SPSS 20.0 trial version. Period prevalence of any animal bite in past 3 months and treatment seeking behaviour were the primary outcome variables. Socio-demographic and other factors constituted the explanatory variables. The normality of the data was checked by comparing against the standard *normal* distribution. Descriptive analysis was carried out for quantitative variables by expressing data in mean with standard deviation. For qualitative variables and variables with a non- normal distribution, frequency and proportion were used. Primary outcome variables were expressed with 95% confidence intervals (C.I.). p value of <0.05 was taken as statistically significant.

RESULTS:

A total of 354 subjects were included in the final analysis.

Table 1 describes the baseline socio-demographic and environment related details of the study population. Majority (41.8%) of the study population were in the age group between 20-39 years. The gender distribution was equal (Males=49.7%). Majority of the study population had an educational qualification of high school (40.1%). 1.8% were professionals. Majority of the population (53.8%) were semi-skilled followed by students (22.5%). Socio economic status, according to Modified BG Prasad scale (CPI 2016 Jan) showed 50.3% of population occupying lower middle class. Majority (62.3%) of the population were residing in semi pucca house. 43 (12.6%) of the population slept outside the house. Few families (9.4%) had pet animals in their house of which most (3.8%, 13/49) of them were dogs.

Table 2 describes the prevalence, type, place of animal bite and treatment seeking behavior among the study population. 14.3% (49/354, 95% C.I. of 10.79% to 18.5%) had experienced animal bite in last 3 months and in that 26.5% (13/49) were by pet animals. Dog bite (87.8%, 43/49) was the most common animal bite. Snake (1), Scorpion (3) and Cat (2) were the other reported bites. It happened mostly around evening (36.7%) and night hours (36.7%). Most (59.1%) of the incident took place outside and around the house. 44.9% of the population didn't take any action immediately following animal bite. 26.5% of population were given home treatment. Majority (63.3%, 95% C.I. of 49.8% to 76.8%) of those with animal bite went to hospital for treatment. 38.7% of

Table 1: Baseline Sociodemographic Characteristics

Characteristics	Categories	Number(%)
Age group	< 10 years	43(12.6%)
	Oct-19	44(12.9%)
	20-39	143(41.8%)
	40-59	91(26.6%)
	> 60	21(6.1%)
Sex	Female	172(50.3%)
	Male	170(49.7%)
Education	Professional	6(1.8%)
	Graduate	49(14.3%)
	High school	137(40.1%)
	Mid school	33(9.6%)
	Primary	100(29.2%)
	Illiterate	3(0.9%)
	Not eligible	14(4.1%)
Occupation	Professional	1(0.3%)
	Semi skilled	184(53.8%)
	Skilled	44(12.9%)
	Unskilled	10(2.9%)
	Student	77(22.5%)
	Unemployed	12(3.5%)
	Not eligible	14(4.1%)
Socio economic status	Upper middle	35(10.2%)
	Middle	48(14%)
	Lower middle	172(50.3%)
	Lower	87(25.4%)
Housing type	Pucca	66(19.3%)
	Semi pucca	213(62.3%)
	Katcha	63(18.4%)
Sleeping outside	No	299(87.4%)
	Yes	43(12.6%)
Pet animal	Yes	32(9.4%)
	No	310(90.6%)
Name of pet animal	Dog	13(3.8%)
	Cat	10(2.9%)
	Cow	2(0.6%)
	Goat,cow	5(1.5%)
	Goat	2(0.6%)

the total subjects with dog bite went to the Primary Health Center for treatment. 61.2% of the subjects were satisfied with the treatment they had received. In total, only 46.9% of the subjects with animal bite had received Tetanus Toxoid with Anti-rabies vaccine and 16.3% had received only Tetanus Toxoid.

Table 2: Animal Bite and Treatment Seeking Behaviour

Characteristics	Categories	Number (%)
Animal bite in last 3months	Yes	49(14.3%)
	No	293(85.7%)
Is it pet animal	Yes	13(26.5%)
	No	36(73.5%)
Type of animal	Dog	43(87.8%)
	Other animals	6(12.2%)
Time of animal bite	Morning	11(22.4%)
	Afternoon	2(4.1%)
	Evening	18(36.7%)
	Night	18(36.7%)
Activity during bite	Sleeping	21(42.8%)
	Working	15(30.6%)
	Returning home from work	4(8.2%)
	Playing	9(18.4%)
Place	Inside house	20(40.8%)
	Outside and around house	29(59.1%)
Immediate action after bite	No action	22(44.9%)
	Hospitalisation	18(36.7%)
	Wound washing	9(18.4%)
Home treatment	Yes	13(26.5%)
	No	36(73.5%)
Went to hospital	Yes	31(63.3%)
	No	18(36.7%)
Which hospital	Phc	19(38.7%)
	Gh	9(18.4%)
	Private hospital	3(6.1%)
Time to hospital	Immediately	12(24.5%)
	After 2 hours	3(6.1%)
	After 3 hours	5(10.2%)
	After 4 hours	2(4.1%)
	After 5 hours	2(4.1%)
	After 8 hours	3(6.1%)
Treatment	Tt and anti rabies vaccine	23(46.9%)
	Tt	8(16.3%)
Satisfaction with treatment	Yes	30(61.2%)
	No	19(38.8%)

Table 3 shows the association between animal bite in last three months and various baseline characteristics of the study population. Though the prevalence of animal bite among males was higher than in females, it was not statistically significant. None of the socio-demographic variables had significant association with Animal bite. Sleeping outside the house (12.6%,43/342, p=0.0003) and having a pet animal (9.4%,32/342,p=0.004) were factors significantly associated with animal bite.

DISCUSSION

Bite of animals, especially dogs are a serious problem to the rural community. Medical services are not readily accessible to them like in urban areas. Also, the mindset of people in rural areas prevent them from seeking immediate treatment. In the present community based cross sectional study, the period prevalence of animal bite during February to April 2016 was 14.3% with 95% confidence interval of 10.79% to 18.5%. Dog bite was the most common animal bite prevailing at the rural areas. 36.7% of the affected individuals did not seek treatment for animal bite. Sleeping outside the house and having a pet animal were factors significantly associated with animal bite.

The baseline characteristics of our study population were similar to that of Krishnamoorthy Y et al (2018).[8] Our study included 342 subjects similar to 386 individuals from four villages in their cross sectional community based study. Similar community based studies were doen by several authors.[7, 13-15] Hospital based studies with similar objectives also were done by several authors in india[16, 17] and other countries.[5] Majority (41.8%) of our study population were in the age group between 20-39 years. Similarly Krishnamoorthy Y et al[8] also observed that majority (63.2%) of their participants were in the age group 31-60 years. Panda M et al[17] (2020) in their study in new delhi also observed that majority were aged between 20-59 years. Sardar J[7] (2020) in their house to house visit survey in west Bengal also observed that 71.95% of the victims were between 15-60 yrs of age. There was an equal distribution of males and females in our study. 29.2% of our population had only primary education while 0.9% were illiterate. Krishnamoorthy Y et al[8] in their study observed 26.7% had no formal-education. This difference could be due to the difference in the cultural and social factors between the study population.

Table 3: Association Between Animal Bite In Last 3 Months And Characteristics Of The Study Population

Characteristics		Animal bite within last 3 MONTHS			CHI SQUARE	P VALUE
		NO	YES	TOTAL		
Sex	Male	140(82.4%)	30(17.6%)	170(100%)	3.035	0.082
	FEMALE	153(89%)	19(11%)	172(100%)		
Age group	<10	38(88.4%)	5(11.6%)	43(100%)	8.767	0.067
	10-19	36(81.8%)	8(18.2%)	44(100%)		
	20-39	128(89.5%)	15(10.5%)	143(100%)		
	40-59	77(84.6%)	14(15.4%)	91(100%)		
	>60	14(66.7%)	7(33.3%)	21(100%)		
Ses	LOWER	74(85.1%)	13(14.9%)	87(100%)	2.733	0.435
	LOWER MIDDLE	151(87.8%)	21(12.2%)	172(100%)		
	MIDDLE	41(85.4%)	7(14.6%)	48(100%)		
	Upper middle	27(77.1%)	8(22.9%)	35(100%)		
	Katcha	52(82.5%)	11(17.5%)	63(100%)		
Housing type	SEMI PUCCA	186(87.3%)	27(12.7%)	213(100%)	1.271	0.53
	PUCCA	55(83.3%)	11(16.7%)	66(100%)		
Sleep ing Outside	No	264(88.3%)	35(11.7%)	299(100%)	13.317	0.0003
	Yes	29(67.4%)	14(32.6%)	43(100%)		
Pet animal	No	271(87.4%)	39(12.6%)	310(100%)	8.236	0.004
	YES	22(68.8%)	10(31.2%)	32(100%)		

The period prevalence of animal bite in the past 3 months in our study was 14.3% with 95% C.I. of 10.79% to 18.5%. Krishnamoorthy Y et al[8] in their study observed that only 6.9% had history of dog-bite in last one-year. Ghosh S et al[15] (2016) in their study observed 5.2% reported a history of dog bite in any one of the family members. Sardar J[7] in his survey observed that the prevalence of animal bite was only 2.1%. Hence the prevalence of animal bite was more in rural areas compared to urban areas. This could be due to the lifestyle of the people in rural areas, where animals play a major role in their day to day activities.In our study, animal bite was more common among males (17.6%) compared to females (11.1%). In some countries, males have a higher frequency of dog bites than females. Dog bites account for over 50% of animal-related injuries in people who are travelling.[1] Ganasva A et al[16] (2015) in their hospital based study in gujarat also observed that majority of the dog bite victims were males (71.7%). Sardar J[7] in his study also observed that mostly males (62.5%) were affected and dog bite (59.4%) was the most common animal bite. Dog bite (87.8%, 43/49) was the most common animal bite in our study. Panda M et al[17] also observed that dogs (88.1%) were the most common biting animal and that 79% of the bites were provoked in their study. In the present study, 63.3% (31/49) of those with animal bite went to hospital for treatment. Sleeping outside the house (12.6%,43/342, p=0.0003) and having a pet animal (9.4%,32/342,p=0.004) were factors significantly associated with animal bite in our study. Beyene TJ et al[13] (2018) in their community based study on a combined urban and rural population observed that about 77% of victims of animal bite seeked the health care centre for treatment. Ahmed T et al[14] (2020) in their community based study in Pakistan on 1466 subjects observed that 60% of the victims did not seek treatment after a suspected animal bite. Ghosh S et al[15] in their community based study observed that 59% of victims seeked treatment from traditional healers before going to hospitals. Beyene TJ et al[13]

observed that overall likelihood of seeking medical services was higher for people bitten by dogs without owners or stray dogs, severe bites. Penjor K et al[6] (2019) in their case register based study observed that 82% of the victims went to the hospitals for seeking treatment within the first 24 hours. They also observed that compared to people living in rural areas, urban people (were more likely to complete the PEP. 36.7% of population did not seek treatment for animal bite in the present study. In total, only 46.9% of the subjects with animal bite had received Tetanus Toxoid with Anti-rabies vaccine and 16.3% had received only Tetanus Toxoid in our study.Liu Q et al[5] (2017) in their cross-sectional hospital based study on 1,015 animal bite victims observed that 81.2% had improper wound treatment. Males , residents without college education , habit of playing with animals were risk factors for improper wound treatment after animal bite. Sardar J[7] in their study observed 21.9% did not wash wounds after the bite. Krishnamoorthy Y et al[8] in their study observed that only 62.9% took first-aid measures after bite and although all (100%) visited the hospital , only 88.8% of them adhered to vaccination schedule. Ganasva A et al[16] in their study observed 37.6% did not apply anything on the wound site before coming to the hospital. Penjor K et al[6] in their case register based study observed that common reasons for not seeking health care were minor bites or bitten by an owned or vaccinated dog.

The main advantage of this study is that we directly went to the houses of people and survey was conducted. The recall time of bite was only 3 months and therefore the chances of recall bias may be very low. The disadvantage is that this study does not involve the site of bite area, vaccination status of the study subjects and reason for preferring the treatment at various health centres. Although, training was given to the interviewers (interns) to overcome the investigator bias, it cannot be fully ruled out. The method of survey was interviewing rather than self-administered questionnaire which may have influenced some results.

The present study highlights the treatment seeking behaviour and traditional belief among rural population for animal bite which indicates a need for health education program for animal bites. Immediate, thorough wound washing with soap and water after contact with a suspect rabid animal is crucial and can save lives. Engagement of multiple sectors and One Health collaboration including community education, awareness programmes and vaccination campaigns are critical. We need to make significant progress in order to reach the goal of "Zero human deaths from dog-mediated rabies by 2030". Only effective Information Education and Communication activities can encounter the false beliefs about the disease and erase the widespread misconceptions about treatment. The need of the hour is effective knowledge, which has to be communicated to public using mass media and other measures like health education. Considering the prevalence of different animal bites and treatment seeking behavior ,there is a lack of awareness regarding all forms of animal bites in the rural community. The existing program of rabies control has reduced the number of rabies deaths, but community awareness about different animal bites, its personal protective measures and treatment seeking must be strengthened.

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