Research Article

Rapid evaluation of rabies control program: 30-cluster survey in rural area of Perambalur district, Tamilnadu, India

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Received: 20 July 2016

Accepted: 13 August 2016

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ABSTRACT

Background: Rabies is a fatal and neglected zoonotic disease transmitted mostly by dog bites. Recently, Tamil Nadu, India has made a coordinated effort involving public health and animal husbandry agencies and put in place interventions like ABC – AR and universal vaccine supply to address this problem. With this background the following study was done to study the effect of rabies control efforts by Tamil Nadu government on incidence of dog bite and on the knowledge, attitude & practice of dog care & management of dog bite.

Methods: A 30-cluster survey was done to study 300 subjects. Information was collected using structured questionnaire regarding history of dog bite in past one year and its management practices, knowledge on pet dog care, activities done by government for control of dog population, disease transmitted by dog bite and regarding management of dog bite. The data was entered and analyzed in epi_info 6.04.

Results: Study found a high incidence of dog bite in general population with incidence being 31.1 per 1000 population/year. Children less than 15 years (RR =1.86) and low SES (RR=2.54) are more vulnerable to dog bite injuries.

Conclusions: From present study it was found an unsatisfactory pet care practices & very low awareness regarding rabies, dog population control program and management of dog bite injuries. Management of dog bites injuries was grossly inadequate.

Keywords: Dog-bite, Rabies, Dog-care, Zoonoses, Epidemiology, Management

INTRODUCTION

Rabies is a fatal and neglected zoonotic disease that is caused by a virus. The disease affects domestic and wild animals, and is spread to people through close contact with infectious material, usually saliva, via bites or scratches. It occurs mainly in remote rural communities where measures to prevent dog to human transmission have not been implemented.¹

Rabies is present on all continents with more than 55 000 people death occurring of rabies every year mostly in

Asia and Africa. Although all age groups are susceptible, rabies is most common in children aged less than 15 years. India continues to report every year 20 000 human rabies deaths which today accounts to 40% of the all human deaths.¹

Majority of these deaths (about 97%) are attributed to bites from dogs, but dog bites are neither notifiable nor reported in the routine surveillance system. Consequently, the data on dog bites in the country is scanty, unreliable and controversial due to poor surveillance/reporting system.²

The dog are ubiquitously distributed in India and population is estimated to be 25 million, most of which are ownerless and are not immunized against rabies.³ Most of the rabies deaths are preventable. As per the World Health Organization, the most cost effective strategy for prevention of human rabies is the elimination of rabies in dogs through animal vaccinations.

A combined effort by the public health delivery system and the animal welfare/ veterinary departments can lead to the control of rabies in dogs and thereby impact the transmission of the virus to the human population.¹ Wound cleansing and immunization within a few hours after contact with a suspect rabid animal can prevent the onset of rabies and human death.¹ Most of the deaths are due to ignorance and lack of access to affordable services. It does not attract as much attention as it should either from the government or from the public.⁴ In India, there are no organized national rabies control programme and the health system has not been able to provide quality treatment to majority of the dog bite cases.⁵

Most of the studies on dog-bites and rabies in India are hospital-based, in urban areas and limited to their management only. Recently, Tamil Nadu has made a coordinated effort involving public health and animal husbandry agencies and put in place interventions like ABC – AR and universal vaccine supply to address this public health challenge.⁵ With this background the following study was done to study the effect of rabies control efforts by Tamil Nadu government on incidence of dog bite and on the knowledge, attitude & practice of dog care & management of dog bite.

Objectives

1. To study the incidence of dog bite among residents of villages under field practice area of RHTC.
2. To assess the knowledge, attitude & practice of residents on prevention & management of dog-bite

METHODS

Study setting

A cross sectional study was done during August 2015 in villages falling under rural field practice area of Department of Community Medicine, DSMCH, Perambalur (Tamilnadu) during September 2014. There are 2420 houses in these villages with total population of 12765. These villages have been adopted by the medical college for training of under graduate in community medicine and for provision of health services to the villagers.

Study subjects

Sample size required for the study is 1200 assuming incidence of dog- bite as 1.5%, desired precision of 1%,

alpha error as 5% and 10% as non- response rate. Design effect is taken as two as cluster sampling was used for sampling. Assuming that the average family size for the study area is four, it is decided to survey 300 houses to achieve the required sample size. Thus, a total of 300 houses were selected for the study by (30X10) cluster-sampling. Village was selected as a cluster unit. Clusters were selected by probability proportionate to population size (PPS) method. In each cluster, 10 houses were selected by methodology as adopted by WHO for estimation of immunization coverage by cluster sampling. In each selected house, one responsible adult person was interviewed.

Data collection

The data was collected by final year MBBS students who were trained in data collection by the investigator in 4-hour session prior to study. Students visited the houses in pairs and interview one of the responsible adult people (preferably the head of the family) present in the house. A structured questionnaire was used for interview. The questionnaire included the three parts. First part included question pertaining to socio-demographic and income information. Second part included assessment of knowledge and attitude of respondent regarding pet dog care, knowledge on activities done by government for control of dog population, knowledge on disease transmitted by dog bite and regarding management of dog bite. Third part included questions regarding history of dog bite in past one year, management and practices that followed dog bite injury. The questionnaire was translated in local language (Tamil) and validated by back translation by different person. The questionnaire was pre-tested and piloted before actual survey.

During each interview which lasted approximately 15-20 minutes, the purpose of the study was explained and written informed consent was obtained before the start interview. Field survey was supervised by investigator and a team of medical social worker.

Socio-economic status was assessed using modified B.G Prasad classification.⁶

Data analysis

Investigator checked all collected data for completeness and accuracy before the entry into software. Double data entry was done to validate the data entry. The data was entered and analyzed in epi_info 6.04. Suitable statistical tools were applied to draw inference.

RESULTS

Mean age of respondents was approx. 45 years. Most of them were female 160 (53.3%). Almost 30% of respondents were illiterate i.e. there were not able to read or write in any language. Common occupations in which they engaged were agriculture (29.3%), labour (20.0%),

self-employed/business (15.3%) and service (8.7%). More than one quarter (26.7%) were either unemployed or doing housework.

Table 1: Knowledge about dog care and rabies control program.

Knowledge about dog care and rabies	Yes (%)	No (%)	Total
Owens a pet dog	29 (9.7)	271 (90.3)	300
Care provided to pet dog	18 (62.0)	11 (38.0)	29
Veterinary consultation	7 (24.1)	22 (75.9)	29
Anti-rabies vaccination	10 (34.5)	19 (65.5)	29
License	0 (0.0)	29 (100.0)	29
Dog collar	3 (10.3)	26 (89.7)	29
Presence of stray dog in immediate neighbourhood	180 (60.0)	120 (40.0)	300
Menace of stray dogs	74 (41.1)	106 (58.9)	180
Knowledge about any effort done by government for control of dogs?	50 (16.7)	250 (83.3)	300
Knowledge about disease caused by dog bite?	74 (24.7)	226 (75.3)	300
Knowledge regarding management of dog bite			
Wound treatment with soap & water	28 (9.3)	272 (90.7)	300
TT vaccination	190 (63.3)	110 (36.7)	300
Anti-rabies vaccination	62 (20.7)	238 (79.3)	300
Indigenous treatment	0	300 (100)	300

In present study 29 (9.7%) of respondents were having pet dogs in their houses. Veterinary consultant was provided to 24.1% of pet dogs while 34.5% of them were vaccinated. Only 3 (10.3%) of dog was having dog collar while none of respondents had obtained license. Presence of stray dog was reported by 180 (60%) of respondents near their houses, out of them nearly 74 (40%) created menace. Only 50 (16.7%) of respondents had some awareness about activities done by government for control of dogs. Only 74 (24.7 %) of respondents reported having some knowledge regarding about the disease caused by dog-bite (Table 1).

When asked what treatment should be done in case of dog- bite only 28 (9.3%) reported that wound should be treated with soap & water; 190 (63.3%) reported that TT

injection should be received in hospital; and only 62 (20.7%) told that anti rabies vaccination will be required (Table 1).

Overall percent of dog bite cases was 3.1%. Among children <15 years 13 (37.1%) had dog bite. Females 19 (54.3%) had higher percent of dog bite as compared to males 16 (45.7%) (Table 2). Most of (94.3%) of cases received treatment for dog-bite. Most of them had WHO exposure Category III (62.9%) and category II (37.1%). Most of them received treatment from government 31 (93.9%) hospital as compared to private hospital 2 (6.1%). This could be due to free treatment offered by government hospital. Average number of visit for treatment was three which suggest that treatment was incomplete (Table 2).

Table 2: Profile and management practices of dog bite cases.

	Number	Percent
History of Dog bites in past one year?	35/1125	3.1
Age of dog bite cases		
≤ 15 years	13/35	37.1
>15 years	22/35	62.9
Sex of dog bite cases		
Male	16	45.7
Female	19	54.3
WHO category of wound/exposure		
Cat I	0	0
Cat II	13	37.1
Cat III	22	62.9
Whether treatment received?		
Yes	33	94.3
No	2	5.7
Where treatment is received?		
Government Hospital	31	93.9
Private hospital	2	6.1
Average number of visits (± 2S.E)	3±0.6	
Nature of treatment received		
Wound treatment with soap & water	4	12.1
TT vaccination	12	36.6
Anti-rabies vaccination	24	72.7
Rabies immunoglobulin	2	6.1
Indigenous treatment	1	3.0

Pertaining to the treatment received at the hospitals only 4 (12.1%) washed their wound with soap and water; TT vaccination was given to only 12 (36.6%) of dog bite cases; Anti rabies vaccination was received by 24 (72.7%); Rabies immunoglobulin by only 2 (6.1%) and one case (3%) also applied chilli powder to its wound (Table 2).

Overall incidence of dog bite cases was 31.1/1000 general population/year. A higher incidence of 57.8/1000 children/year was found among children less than 15 years as compared general population. Children < 15 years are 1.86 time higher risk of getting dog bite as compare to general population which is statistically significant (p value <0.05) (Table 3). Persons in lower SES had higher incidence of 40.5 /1000 general

population/year of dog bite injury than those of high SES with 20.7 /1000 general population/year. Risk of dog bite is 1.96 times higher in low SES than high SES though it was not statistically significant (Table 3). On adjustment for age by doing stratified analysis we found that low SES has 2.52 times higher risk of dog bite than high SES which was statistically highly significant (p<0.01) (Table 4).

Table 3: Incidence of dog bite injury.

	Number of dog bite	Total population	Incidence (per 1000 population per year)	Relative Risk	P- Value
Overall incidence (General population)	35	1125	31.1	1	
Incidence in under 15 years children	16	277	57.8	1.86 (1.04-3.31)	0.03
Socio-economic status					
Overall (general population)					
High SES (Class I,2 & 3)	11	532	20.7	1	
Low SES (Class 4 & 5)	24	593	40.5	1.96 (0.97-3.96)	0.056
Under 15 children					
High SES (Class I,2 & 3)	7	125	56.0	1	
Low SES (Class 4 & 5)	9	152	59.2	1.06 (0.41-2.76)	>0.05

Table 4: Association between SES & dog bite injury after age adjustment by stratified analysis.

	≤15 year children		> 15 years children		Total	RR	P-value
	Dog bite present	Dog bite absent	Dog bite present	Dog bite absent			
High SES	7	118	4	403	532	2.52	0.004
Low SES	9	143	15	426	593	(1.32-	
Total	277		848			4.72)	

DISCUSSION

The present study was an attempt to find the incidence and important determinants of dog-bite which itself gives an indirect measure of rabies in our country in the absence of a surveillance system and lack of political commitment, adequate funding & inter-sectoral coordination. Majority of studies reported an incidence of dog-bite among general population in the range of 18-36/1000 population/year which is comparable to our finding of 31.1/1000 population/year.^{2,4,7,8}

A high incidence of 31.1/1000 population/year dog bite reported in the present and several other studies calls for an attention by various stakeholder to address this fatal zoonotic disease. Few study found the incidence to be very low as 2.7-4.1/1000 population/year.^{9,10} Some variation could be explained by the difference in study setting and definition used for study of animal bite incidence. Most of study reported that children are mostly affected with percent varying from 26 to 66 percent but

none tried to estimate the risk involved in children as compared to general population.^{4,9-13} We couldn't find any study with incidence in the children less than 15 years and various social classes. The study found that age and socio-economic status are important determinants of dog bite exposure.

A higher incidence of 57.8/1000 children/year and also the higher risk of 1.86 times dog bite among these children as compared to general population along with poor dog care including dog vaccination makes these children increasingly vulnerable. Low SES group has 2.52 time higher risk of dog bite than high SES. In addition to poverty other factors like ignorance, unawareness among these groups places them at high risk. There is variation in different studies regarding the gender mostly affected by dog bite.^{4,7,9,10,13}

The ownership of pet dog (9.7%) is relatively low in present study area as compared to other studies.^{12,14} Bust most importantly care of pet dog is grossly unsatisfactory

whether it veterinary consultation (24%), use of dog collar (3%) or dog vaccination (34%). This is in accordance with other studies.^{2,8,14} Stray dogs were present near 60% of houses and menace was reported by 40 percent of respondents in present study. Sudarshan MK reported stray dogs in 83 percent of housed with menace (26%).

Several other studies reported that most of the dog bites are due to stray dogs.^{2,4,8,11,13-15} Apart from host factors like age & socio-economic class these important environment factors like poor care of pet dog and menace of street dogs puts further strain on efforts for combating this challenge. In addition, poor awareness regarding rabies (24.7%) in contrast to few studies which reported good awareness about rabies makes the dog owners as well as other people vulnerable to dog-bite injury and subsequent rabies.^{4,14} Also awareness regarding the dog control program is low in the present study (16.7%) as well as in another study (34%). These all make a point for needs to create awareness regarding pet care, control of stray dog population through community participation & inter-sectorial coordination.

Poor knowledge and practice regarding management of dog-bite cases as reported in this study and several other studies will only lead to an increase in morbidity and mortality from rabies. Awareness regarding wound treatment with water & soap (9.7%) in present study was even lower than other study (31%).¹⁴ Many people are aware about the need of injection (84%) following dog bite but most of reported that single injection or TT vaccine is enough (66.3%).

A very low (20.7%) reported correctly that they require multiple injections of Anti-rabies vaccine. This result differs from other studies.^{4,14} None reported of any home remedies. For the dog bite cases wound treatment was very low (12.1%) in present study which is even lower by finding of some other study.^{2,10,13,16} Anti rabies vaccines were received by 72.7 percent of dog bite cases but most of them received incomplete treatment (63.3%) which is in accordance with finding from other studies done.^{4,7,8,10,11} Percent of people receiving immunoglobulin is only 6.1%.

The study is subject to some limitation. Firstly study population is small so the result may be carefully applied to other regions. However, we ensured a proper sampling technique and adequate sample size is taken to ensure the validity of data in the study population. Secondly, it is based on recall of the respondents of their dog bite injury and other questions.

CONCLUSION

From the present study it was found that a high incidence dog bites in general population with incidence being 31.1 per 1000 population/year and grossly inadequate management of dog bite injuries. Children less than 15

years (RR=1.86; 1.04-3.31) and low SES (RR=2.54; 1.32-4.72) are more vulnerable to dog bite injuries. An unsatisfactory pet care practices & very low awareness regarding rabies, dog population control program and management of dog bite injuries.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Rabies. 2014. [updated 2014 Sep; cited 2015 Jan 28]. Available from: <http://who.int/mediacentre/factsheets/fs099/en/>
2. Sudarshan MK. An Epidemiological Study of Animal Bites in India: Results of A WHO Sponsored National Multi-Centric Rabies Survey. *J Commun Dis*. 2006;38(1):32-9.
3. APCRI & WHO. Assessing burden of Rabies in India, WHO sponsored national multi-centric rabies survey. 2003. Final report. 2004:3. [cited 2015 Jan 28]. Available from: <http://rabies.org.in/rabies/wp-content/uploads/2009/11/whosurvey.pdf>
4. Agarwal N, Reddaiah VP. Knowledge, attitude and practice following dog bite: a community-based epidemiological study. *Health & Population Perspectives and Issues*. 2003;26(4):154-61. Available from: <http://medind.nic.in/hab/t03/i4/habt03i4p154.pdf>
5. Public Health Foundation of India. Rabies Control Initiative in Tamil Nadu. Analysis of intervention strategies and model documentation. 2010. [cited 2015 Jan 28]. Available from: <http://zoonoses.phfi.org/pdf/Tamil-Nadu-Rabies-Report.pdf>
6. Dudala SR, Reddy KAK, Prabhu GR. Prasad's socio-economic status classification- An update for. *Int J Res Health Sci*. 2014;2(3):875-8. Available from <http://www.ijrhs.com/issues.php?val=Volume2&iss=Issue3>.
7. Sudarshan MK, Mahendra BJ, Narayan DH. A community survey of dog bites anti-rabies treatment, rabies and dog population management in Bangalore city. *J Commun Dis*. 2001;33(4):245-51.
8. William RF, Logaraj M. A Community based Study on Dog Care, Dog Bite and Anti- Rabies Treatment in a Selected Rural Block in Tamil Nadu. *Indian Journal of Rural Health Care*. 2012;1(2):147-50.
9. Masthi NRR. Epidemiology and prevention of animal bite and human rabies in a rural community-One health experiment. *Asian Pac J Trop Dis*. 2014;4(1):S486-90. Available from: www.apjtc.com/zz/2014S1/88.pdf
10. Lai P, Rawat A, Sagar A, Tiwari KN. Prevalence of dog-bites in Delhi: Knowledge and practices of residents regarding prevention and control of rabies. *Health & Population Perspectives and Issues*.

- 2005;28(2):50-7. Available from: <http://medind.nic.in/hab/t05/i2/habt05i2p50.pdf>
11. Masoud SG, Ghodratollah R, Farshad R, Amin F. An epidemiologic study of animal bites in Ilam Province, Iran. *Archives of Iranian Medicine*. 2012;15(6):356-60.
12. Shen J. A Multi-Site Study on Knowledge, Attitudes, Beliefs and Practice of Child-Dog Interactions in Rural China. *Int J Environ Res Public Health*. 2013;10:950-62.
13. Ichhpujani RL. Epidemiology of animal bites and rabies cases in India- A multicentric study. *J Commun Dis*. 2008;40(1):27-36.
14. Singh US, Choudhary SK. Knowledge, Attitude, Behaviour and Practice Study on Dog-Bites and Its Management in the Context of Prevention of Rabies in a Rural Community of Gujarat. *Ind J Com med*. 2005;30(3):81-3.
15. Wankhede V. Epidemiological Study of Dog Bite Cases Reported at ARV Clinic of Rural Hospital Panvel in Raigad District of Maharashtra, INDIA. *International Journal of Recent Trends in Science And Technology*. 2013;8(1):52-5.
16. Shah V, Bala DV, Thakker J, Dalal A, Shah U, Chauhan S. Epidemiological determinants of animal bite cases attending the anti- rabies clinic at V S General Hospital, Ahmedabad. *Health line*. 2012;2(1):66-8. Available from: http://www.iapsmgc.org/index_pdf/17.pdf.

Cite this article as: Kumar R, Sinha SP. Rapid evaluation of rabies control program: 30-cluster survey in rural area of Perambalur district, Tamilnadu, India. *Int J Community Med Public Health* 2016;3:2627-32.