

Title: INCIDENCE OF ANIMAL BITES EXPOSURES AND RABIES:
COMPARISON OF DATA FROM REPORTING UNITS AND
HOUSEHOLD SURVEYS IN A RURAL AREA IN SOUTH INDIA

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Original Article

Incidence of animal bites exposures and rabies: Comparison of data from reporting units and household surveys in a rural area in South India

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ABSTRACT

There are no global estimates of dog-bite incidence, however studies suggest that dog-bites account for tens of millions of injuries annually.

Materials and Methods: This prospective interventional study was conducted in a rural area of Karnataka in South India over a period of two years in six villages. Two approaches were followed, one was the information obtained through local reporting units (surveillance) and other was through household surveys.

Results: The incidence of dog bite among those individuals in study and control villages was 1.9% and 2.5% in in the household survey and from the local reporting units was only 0.34% and 0.36%. Similarly, the reporting units and household surveyed did not report any case of human rabies in the project villages.

Conclusion: There is huge difference in the information obtained between animal bite/exposure and rabies (human and animal) incidence measured by reporting units and household surveys.

Key Words: Rabies, reporting units, one health, dog bite, surveillance

INTRODUCTION

There are no global estimates of dog-bite incidence, however studies suggest that dog-bites account for tens of millions of injuries annually¹. Data from low- and middle-income countries are more fragmented, however some studies reveal that dogs account for 76–94% of animal bite injuries. Dog bite fatality rates are higher in low- and middle-income countries than in high-income countries as rabies is a problem in many of these countries, and there may be a lack of post-exposure treatment and appropriate access to health care. An estimated 55 000 people die annually from rabies, and bites from rabid dogs account for the vast majority of these deaths². An estimated 20,000 people die of rabies in India and 17.4 million exposures to animal bite are reported every year in India, which corresponds to an incidence rate of 1.7%².

Ninety five percent of human rabies deaths are due to dog bites. Majority of human rabies victims are from rural areas and belong to lower socio economic status. Two thirds of Indian population live in rural areas and are at risk to dog bites and rabies³. However it is a well known fact that the reporting and recording of animal bite and rabies

(human and animal) is very weak and nonexistent in many of the developing countries. Most of the information on rabies and animal bites available in India are from the special survey⁴.

There are no published information available on comparison of data between reporting units (surveillance) and household surveys. The medical, veterinary and animal welfare professionals in a joint effort had come together in a novel project for the prevention and control of rabies in a rural community with the concept of one health experiment, where information on animal bite/exposure in humans and rabies (human and animals) incidence was obtained by both local reporting units and households survey⁵. In this background, the objectives of the paper is to compare animal bites/exposures incidence in humans based on local reporting units (surveillance) and reporting by individuals at household surveys and to compare the human and animal rabies incidence based on local reporting units (surveillance) and reporting by individuals at household surveys.

MATERIALS AND METHODS

This prospective interventional study was conducted in a rural area over a period of two years

(01 December 2009 to 30 November 2011). The project area was situated 25 kilometers away from Bangalore city, Karnataka, South India and consisted of six villages (project villages). Three villages having a population of 10,220 were identified as study villages (Implementation of rabies awareness activities, post exposure prophylaxis, pre exposure intradermal rabies vaccine) and three village having a population of 6023 were identified as control villages without any active interventions¹. For the purpose of estimation of animal bites/exposures in humans and rabies (human and animals) incidence two approaches were followed. One was the information obtained through local reporting units (surveillance) and other was through household surveys.

In the local reporting units, Information regarding animal bites/exposures and rabies (human and animals) incidence of one year for entire population living in the study villages was obtained prospectively from the reporting units activated after the project had started, which included sources like public health centre's (PHCs), subcentre's, private hospitals, private practitioners, veterinary dispensaries, pharmacy, primary care workers and women self help groups (N= 20), however from the control villages information was obtained only through passive reporting (N=11) as there was no intervention¹. In the households survey, Information regarding animal bites /exposures and rabies (human and animals) incidence of past one year was obtained from a sample of the households selected by probability proportionate to size (PPS) sampling technique and same households were followed up for one year to know the incidence of animal bites/exposures prospectively. In each village, the first household was selected randomly and subsequently every fifth household was selected by systematic random sampling technique till the required sample size was reached. From 20% of the households selected, 1735 and 1080 population were available for follow up of one year in the study and control villages respectively. From the households, a baseline survey (Beginning of the project) information on animal bites/exposures and rabies (human and animals) incidence was obtained from an adult responsible respondent in the family aged

between 18 to 60 years using pre tested structured questionnaire in local language (Kannada) by interview technique. At the end of one year, the same households (same person was interviewed as far possible) were revisited and end line survey on information regarding animal bites/exposures in humans and rabies (human and animals) incidence during the year was obtained¹. The institution ethical clearance was obtained before the start of the project. The descriptive statistics viz. percentages are computed to describe the data.

RESULTS

At the beginning of the project, there was no information on incidence of animal bites/exposures from local reporting units in the project villages (study & control). Similarly, at the beginning of the project information from an initial household survey on a sample of 1735 & 1080 individuals in study and control villages had revealed that the incidence of dog bite (past one year) among these individuals in study villages was 2.7% and 2.8% in control villages.

One year after the project was implemented, the annual incidence of animal bites/exposures in humans reported from the local reporting units of the study and control villages was only 0.34% and 0.36% and among them those attributed to suspect and confirmed rabid animal bites/exposures² was 85.5% and 14.5% respectively. Similarly, at the end of one year, the same initial households surveyed were revisited and same people reassessed for animal bites/exposures and annual incidence of animal bites /exposures in humans observed in the study and control villages was 1.9% and 2.5% respectively. However from the household surveyed the annual incidence of animal bite/exposure attributed to suspect rabid or confirmed rabid animal bite was not available.

At the beginning of the project, there was no information on human rabies in the reporting units, however, two cases of human rabies in the study villages that were reported in the last decade was obtained only from the Isolation hospital, Bangalore and then subsequently traced back to the project villages. There were fifteen animal rabies cases reported in the last three years and the information available was incomplete from the reporting units. No case of rabies (human and

animal) was reported from the initial household survey in the project villages.

One year after the project was implemented, the reporting units and household surveyed did not report any case of human rabies in the project villages. However, from the reporting units more number of animal rabies was picked up in the study than control villages and no case of animal rabies was reported from household survey.

An interesting observation was that out of the cases reported in the household survey, 94% of the same cases were also picked up by the reporting unit indicating that the surveillance system was able to pick up most of the cases of the household surveyed.

In the study villages, from the reporting unit majority of the cases reported were in the age group of 15-44 years, males 22, low income group, category III, wound washed with soap and water, all the cases received ARV and those with category III received ARS. In the control villages, from the reporting unit majority of the cases reported were in the age group of 15-44 years 10 (45.4%), males 14 (63.6%), category II 18 (82.0%), only one case received ARS and 10 (45.4%) subjects received ARV.

In the study villages, from the household survey majority of the cases were also picked up by the reporting unit as mentioned above. In the control villages, from the household survey, majority of cases reported were in the age group of 15-44 years 13 (48.2%), males 18 (66.7%), category II 22 (81.5%), No case has received ARS and 15 (55.5%) cases received ARV.

The difference between reporting unit and household survey is given (Table I).

DISCUSSION

Initially at the start of the project, the local reporting reporting units like government public health centre/sub centre did not have information on animal bite /exposure and human rabies cases indicating nonexistence of surveillance system at the project villages, however the Isolation hospital did have information only on human rabies cases and no information on animal bites /exposures. Human rabies may not have been reported in the households survey due to long interval after the

Table I
Comparison of of animal bite/ exposure and rabies (human and animals) reported between

	Study village*		Control village**	
	Household survey	Reporting unit	Household survey	Reporting unit
Incidence of animal bite	13 (1.96)	15 (1.34)	23 (2.30)	22 (1.36)
Age				
0-14 years	11 (33.3)	10 (28.6)	08 (28.6)	07 (31.8)
15-44 years	12 (36.4)	16 (45.7)	13 (48.2)	10 (45.4)
45 and above	10 (30.3)	09 (25.7)	06 (22.2)	05 (22.8)
Sex				
Male	19 (57.6)	22 (62.9)	18 (66.7)	14 (63.6)
Female	14 (42.4)	13 (37.1)	09 (33.3)	08 (36.4)
SLI†				
High	09 (27.3)	09 (25.7)	04 (14.8)	05 (13.7)
Medium	11 (33.3)	12 (34.3)	07 (26.0)	07 (31.8)
Low	13 (39.4)	14 (40.0)	16 (59.2)	12 (54.5)
Category of Bites				
I	10 (30.3)	09 (25.7)	22 (81.5)	18 (82.0)
II	23 (69.7)	26 (74.3)	05 (18.5)	04 (18.0)
Biting Animal				
Dog	25 (75.3)	25 (71.4)	27 (100.0)	22 (100.0)
Others***	08 (24.4)	10 (28.6)	NA	NA
Prevalent bites				
Wound wash with soap & water	31 (94.0)	24 (68.5)	16 (59.2)	10 (45.4)
Anti Rabies Vaccination ARV††††	31 (94.0)	31 (100.0)	15 (55.5)	10 (45.4)
Anti Rabies Serum ARS†††††	23 (69.7)	26 (74.3)	0	01 (4.5)
Incidence of Human rabies	NA	0	NA	0
Incidence of Animal rabies	NA	0	NA	1

*Study Villages : Household survey population = 1755, Reporting unit population=19,226, ** Control villages : Household survey population=1091, Reporting unit population=6,003, ***Others :Cows, Calf, ****Administration of full course of ARV as recommended 3, *****Administration of ARS as recommended 5, NA: Not Available.

event had occurred. Animal rabies was also not picked up in household survey rabies indicating low level of awareness about the problem.

At the end of the project there was no case of human rabies reported in the project villages. More animal rabies cases were reported from study villages and only large animals (Cow, calf) where the owners had volunteered to report were confirmed as to have died due to rabies indicating

that they were more of value to people probably because of commercial value of these animals. No case of rabies was confirmed in the dogs in the project villages even though deaths in stray dogs were observed and are considered as main reservoir of rabies in India⁷. These may be due to the fact that the stray dog are ownerless and not of importance to people.

The reporting units in the study villages even though activated and with active intervention of the project team was still not able to pick up all animal bite /exposure cases though when compared to control villages was more successful in picking up the cases. An interesting observation was that from the household survey, the annual incidence of animal bite/exposure was higher i.e six and eight times more number of cases were reported than those reported by the reporting units in study and control villages⁴. The reporting units was poorly developed in the control villages and there was no active intervention from the project team. This observation of state of affairs of surveillance /reporting system available in control villages maybe indirectly informing about situation that may exist in the rest of the country.

The animal bite/exposure cases had variety of choices for seeking the antirabies prophylaxis due to the wider availability of private and government health facilities outside project villages, which the bite victims may have visited for reasons such as being comfortable with the health care provider, familiarity, etc. This may explain why in spite of project implementation people may not necessarily report to the surveillance system.

The annual incidence of animal bites was 1.7 %, more in rural areas (1.8%), children (2.6%), low income groups (75%).The main biting animal was dog (91.5%), mostly stray (63%), followed by cat (4%)¹.

The numbers of bites /100 000 population were 125.7 (1.25%) and 93.4(0.93%) in children and adults respectively. Most bites occurred on the lower limbs. Dog bite was the most frequent (75.3%) followed by cat bite (22.7%) and unidentified in 2.0%. 54.2% cases were by free-roaming ownerless animals, 43.0% by free-roaming owned animals and 2.8% by wild animals. The bites were provoked and unprovoked in 13.3%

and 75.5% cases, respectively. 56.2% washed the site with water only, 18.8% washed it with soap, 16.4% applied antiseptic after washing with water and/or soap⁸.

Dog bites caused maximum morbidity (92%), monkey (3.2%), followed by cat (1.8%), fox (0.4%) etc. Most bites (64.3%) were unprovoked bites by stray (64.7%) animals. 72.4% animal bite victims were males and 47.5% were children in age group of 2-18 years. 63% had Category III exposure as per the WHO classification. 58.5% people had washed the wound with water/soap at the anti rabies clinic⁷. The dog bite rate was 0.25/1000 population per year. More in males, half of the bites occurred in summer, 40% did not go for any prophylaxis, half of the victims treated their wounds with chilli powder. Eighty per cent of the bites were class II or III and leg bites were most common⁸.

The most important observation about cases picked up from the reporting unit was, all of them were classified as suspect rabid or confirmed rabid category of bites unlike households survey where no categorization was possible as there was no documents in terms of record, reports, etc available and was mainly based on oral history. This is the limitation observed from household surveys. This shows that there is need to create awareness in the lay public to maintain records/reports.

There are very few epidemiological studies of similar nature being done in the field and there are no published articles. Given the neglected nature of the disease and assuming that a similar situation like that observed in the project villages may be existing in a vast country like India, this research study has thrown light on the limitations of measurement of epidemiological data on animal bites and rabies (human and animal) based on household survey or reporting units and such information obtained needs to interpreted very carefully. However we do recommend a similar exercise involving a larger sample and covering wider geographic area for generalization of the results.

The hope is that with the proposed introduction of a national programme for rabies ,the situation on recording and reporting of animal bites/exposure and rabies (human and animals) will see drastic

improvement. To conclude there is huge difference in the information obtained between animal bite/exposure incidence measured by reporting unit and household survey.

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