



Original article

Assessment of current burden of human rabies in Sir Ronald Ross Institute of Tropical and Communicable Diseases (SRRIT&CD) – Five year study

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Article history

Received 15 September 2016
Revised 03 December 2016
Accepted 04 December 2016
Early online 30 December 2016
Print 31 January 2017

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Abstract

Human rabies has been still endemic in India. There are an increasing number of studies estimating the burden of human rabies, but the true incidence of the disease and endemicity were rarely reported in the literature. The main objectives of the present study were to determine the endemicity and to estimate the current burden of human rabies in and around Sir Ronald Ross Institute of Tropical and Communicable Diseases (SRRIT & CD), Nallakunta, Hyderabad. All cases admitted at SRRIT & CD with signs and symptoms of rabies were studied during the period of January 2009 and December 2013. The annual incidence of human rabies in this hospital was estimated to be 152. It is endemic mainly in urban areas that include many areas in Hyderabad and Secunderabad and also adjacent districts. The majority of the patients were children and adult male, from urban areas, and had not taken post exposure prophylaxis (PEP) i.e. wound care, active immunization (ARV) and passive immunization (RIG). The main animals responsible for bites were dogs (99%), most of which were stray and the most common bite sites were the extremities. Most common clinical feature was hydrophobia. About 92.76% of these patients had not taken PEP. Human rabies continues to be a dreadful disease in India and the dogs are the principal reservoir, mainly stray dogs. This study provides strong evidence that human rabies is still an endemic disease even in urban areas. This is mainly due to lack of awareness about proper PEP. Improved coverage with modern rabies vaccines, control of rabies due to dogs and other animals and intensifying public education about the disease play main role in the reduction of the disease.

Key words: Anti rabies vaccine, Dog bite, Hydrophobia, Rabies

DOI: 10.5455/jmas.242763

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Rabies is a fatal viral infection that can infect all mammals, but stray dogs cause over 99% of all human deaths from rabies¹. Human rabies can be prevented through administration of post-exposure prophylaxis (PEP) to victims

of bites by rabid animals, and it can also be eliminated through sustained mass vaccination of reservoir populations. Though most of the industrialized countries have eliminated rabies, it remains endemic and poorly controlled in domestic dog

populations in the majority of the developing countries.

A major challenge to estimating the burden of rabies is the absence of reliable surveillance data for countries where the disease is most prevalent². Basic information on how many lives are lost to rabies and the economic costs of preventing disease amongst those exposed are mandatory to implement sustainable control programmes.

Death is inevitable following clinical onset and therefore a large number of rabies victims never report to health facilities and are never diagnosed. Misdiagnosis to other neurological syndromes is frequent. In spite of PEP provision these problems particularly increase the risk of disease among poor, mainly in rural areas. Moreover, poor infrastructure and a lack of personnel and facilities for rabies surveillance and diagnosis in most developing countries means that only very limited data of questionable reliability are available.

In this study we sought to find the burden of rabies and awareness of PEP i.e. wound care, active immunization by anti-rabies vaccine (ARV), passive immunization by rabies immunoglobulin (RIG) in and around Sir Ronald Ross Institute of Tropical and Communicable Diseases (SRRIT & CD), Nallakunta, Hyderabad and also its endemicity.

Materials and methods

This was a hospital based study and all cases admitted at SRRIT & CD, Hyderabad during the period of five years (January 2009–December 2013) with signs and symptoms of human rabies were taken as study population.

All cases with the history of dog bite but without any specific signs and symptoms of rabies, patients who had signs and symptoms of encephalitis mimicking rabies clinically were excluded from the study. All dog bite cases that had psychological

fear of rabies but without clinical evidence of rabies were also excluded.

Patient data was documented for each case in a prescribed proforma meeting the objectives of the study including the early symptoms of rabies like fever, headache and general weakness or discomfort. More specific signs and symptoms of human rabies like insomnia, anxiety, confusion, slight or partial paralysis, excitation, hallucinations, agitation, hypersalivation (increase in saliva), difficulty swallowing, hydrophobia (fear of water), aerophobia and photophobia were also noted.

The details like occupation, locality, vaccination history and the history of animal bite injuries (biting animal-dog / monkey / cat / others, rabid / non-rabid, number bites, site of bite, duration of the diseases from the dog bite, vaccination of animal, death of animal) and history of PEP like wound care, ARV and RIG were also taken. The patients were clinically examined for the presence of relevant signs of animal bite etc. to arrive at the provisional diagnosis. They were further categorized according to WHO criteria. In this study, we also identified the most recent human rabies deaths both from rural and urban areas.

Results

In this study, rabies was found to be endemic during all these 5 years (2009–2013). Hospital incidence of human rabies during these five years is shown in the table 1 and figure 1. This study revealed that the majority of human rabies victims were adult men (61.84%) and from urban areas and mostly had not taken PEP (Table 2 & 3). As over two thirds of the population lives in urban areas, nearly 80.92% cases were from the urban population. Among the total of 152 cases, 91 (59.86%) deaths were noted. Rest of the patients 61 (40.41%) left the hospital against medical advice.

Table 1: Year wise admission of rabies patients

Year	Left against medical advice (LAMA)		Death	
	Number	Percentage	Number	Percentage
2009	0	0.0%	40	43.97%
2010	29	47.54%	7	7.69%
2011	17	27.88%	15	16.48%
2012	7	11.47%	17	18.68%
2013	8	13.11%	12	13.18%
Total	61	100.00%	91	100.00%

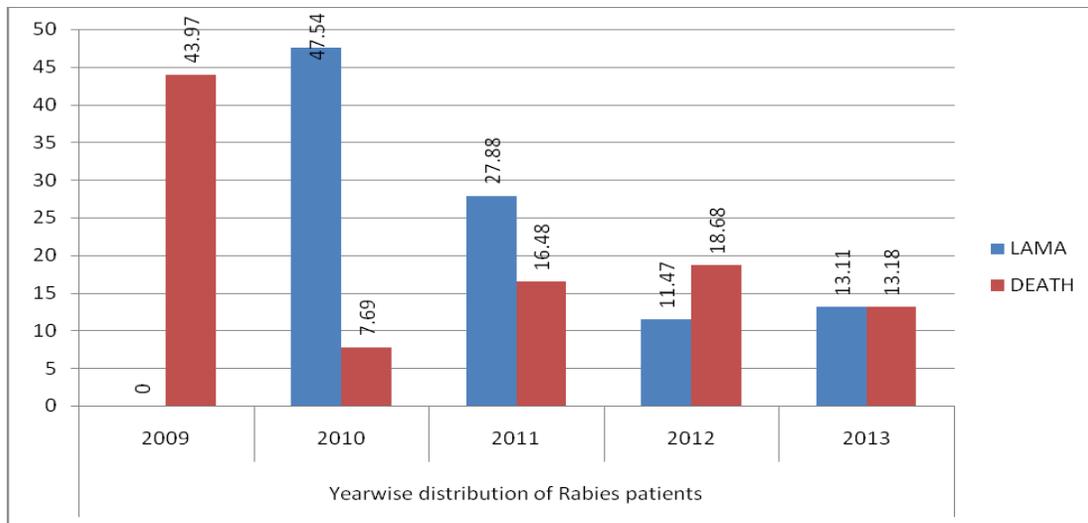


Fig 1: Year wise distribution of rabies patients (Percentage)

Sex	Left against medical advice (LAMA)		Death	
	Number	Percentage	Number	Percentage
Male	35	57.38%	48	52.75%
Female	26	42.62%	43	47.25%
Total	61	100.00%	91	100.00%

Age group (years)	Left against medical advice (LAMA)		Death	
	Number	Percentage	Number	Percentage
0-10	17	27.87%	17	18.7%
11-20	3	4.92%	13	14.3%
21-30	13	21.31%	21	23.07%
31-40	11	18.03%	23	25.27%
41-50	10	16.39%	7	7.69%
51-60	5	8.2%	4	4.39%
61-70	1	1.64%	4	4.39%
71- 80	1	1.64%	2	2.19%
Total	61	100.00%	91	100.00%

ARV/ RIG	Left against medical advice (LAMA)		Death	
	Number	Percentage	Number	Percentage
No ARV/ RIG	53	86.88%	88	96.7%
ARV complete /No RIG	4	6.56%	3	3.3%
ARV Partial / No RIG	4	6.56%	0	0.00%
Total	61	100.00%	91	100.00%

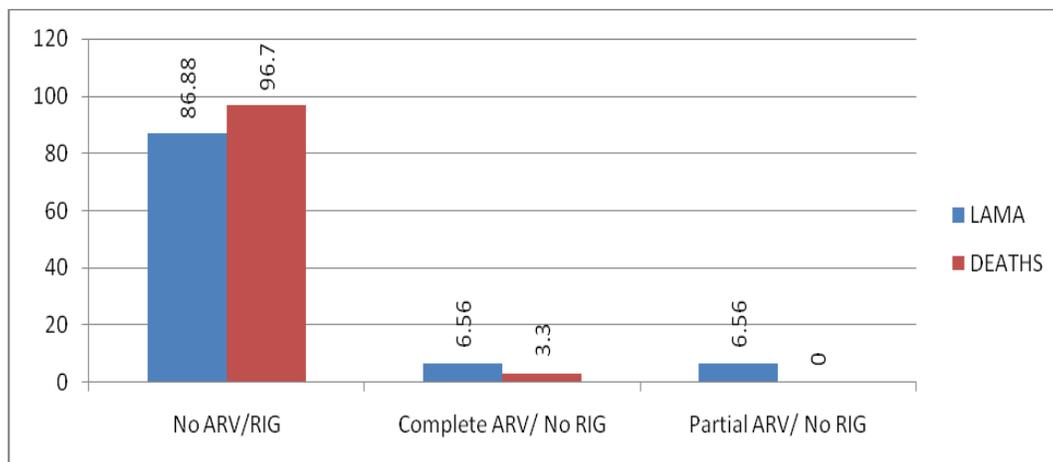


Fig 2. Post exposure prophylaxis (PEP) received by rabies patients (Percentage)

Table 5: Area wise distribution of rabies patients

Year	Urban				Rural			
	LAMA		Deaths		LAMA		Deaths	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
2009	0	0.00%	32	45.72%	0	0.00%	32	38.10%
2010	23	47.90%	4	5.71%	6	46.16%	4	14.29%
2011	15	31.25%	11	15.71%	2	15.38%	11	19.06%
2012	5	10.42%	14	20.00%	2	15.38%	14	14.28%
2013	5	10.42%	9	12.86%	3	23.08%	9	14.28%
Total	48	100.00%	70	100.00%	13	100.00%	21	100.00%

More deaths were noted in urban areas. Few patients had paralysis apart from the specific symptoms of hydrophobia, aerophagia and photophobia. Details of PEP received by the patients were shown in the table 4 and figure 2. The detailed information about the incidence in all areas is presented in the table 5. However, medical autopsy was not undertaken in any of the cases, and hence no laboratory confirmation was possible.

Discussion and conclusion

Despite of increasing mortality of rabies in the countries like India, human rabies is still considered as low public health priority and there is no national program established for its control and prevention till now. According to this study, the incidence of the disease appears to be constant and is endemic in mostly urban areas. The majority of human rabies victims (80.92%) were from urban areas, and adult men constituted 61.84%. The majority were poor and belonged to low socioeconomic status. Majority of them had not taken PEP. Among the total of 152 cases, 91 (59.86%) deaths were noted. Rest of the patients 61 (40.41%) left

the hospital against medical advice. More deaths were noted in urban areas. Few patients had paralysis apart from the specific symptoms of hydrophobia, aerophagia and photophobia.

Similar studies were done recently³⁻¹². Our results were comparable to other hospital based studies^{4,5}. According to the study done by Sudarshan et al⁴ the annual incidence of human rabies was estimated to be 17,137 (95%). The majority of the victims were male adult. The main animals responsible for bites were stray dogs (96.2%), similar to our study. Dog bites (stray dogs) (99%) were mainly responsible for these deaths, but one case died of rabies due to monkey bite in this study. Majority was from rural areas, and unvaccinated. But in our study majority were from urban areas. The most common bite sites were the extremities. The disease incubation period ranged from two weeks to six months. Hydrophobia was the predominant clinical feature. Approximately 10% of these patients had taken a partial course of either Semple or a cell culture vaccine. In the study done by Gohil et al⁵, majority (63.3%) of patients were in the

16-59 years age group. In our study majority of the patients were of age group 21-30 years. 75% of patients had attended the SRRIT & CD for rabies post-exposure prophylaxis (PEP) within 24 hours. In our study only 6.56 % of the cases had taken the PEP with complete ARV and 6.56% cases with partial ARV. In most cases, human rabies was diagnosed primarily on the basis of clinical symptoms and signs, and a corroborative history of or evidence of an animal bite, death of an animal and incomplete or no PEP following exposure. The facility for pre-mortem laboratory diagnosis and confirmation of rabies in humans is available in only a few institutions in India.

As per WHO criteria⁶ of human rabies, our cases were classified as 'suspected cases' (compatible with clinical description only), and 'probable cases' (suspected cases plus history of contact with suspected rabid animals). None of the human rabies cases belonged to the 'confirmed' category (i.e., laboratory confirmed), as no autopsies were performed. The majority of victims (92.76%) neither received PEP nor completed PEP (6.56%). This reflects gross negligence on the part of both the bite victim as well as the healthcare system.

The present study has some limitations. Most importantly there was no laboratory confirmation of the disease in any case. The cases were diagnosed based on clinical features like hydrophobia that is not found in any other disease. Thus, diagnosis based on epidemiological and clinical findings should be sufficient. Large scale surveys as well as hospital based studies are needed to provide the valuable data for prevention and control of rabies in future.

Most of the recent human rabies cases in India have been caused by rabies virus from dogs but other animals like monkeys and cats can also cause human rabies. Thus prevention and control of human rabies is possible by the successful control of the stray dog population and also other animals causing human rabies and awareness of the facts about dogs and rabies can help people protect themselves, their families and their pets. In spite of significant improvement in overall healthcare in this country, prevention and control of rabies has been a low priority for the health authorities. Simultaneously, extensive public education for both rural and urban community is equally important for reducing rabies mortality. It is recommended that all dog bite victims should receive the life-saving modern rabies immunization from the health institutions. It is very important to educate the people about the need for PEP in order to pre-

vent deaths due to rabies as there is no treatment for rabies till date. Majority of bite victims had resorted to different indigenous treatment practices due to the desperate need of treatment of cases with poor prognosis. In addition, it is well known that availability and affordability of modern rabies immunization still needs to improve, and that the facilities and services are poor in various health centers.

The other major factor for increased mortality in human rabies is the lack of data on the incidence of dog bite and rabies deaths, particularly from the India. Surveillance system needs to be strengthened in the countries like India in order to obtain accurate data before taking appropriate control measures. Epidemiological surveys to estimate the burden of human rabies and its mortality rate were done in few countries based on dog bite injuries⁸. This type of hospital based studies can help in developing the new strategies to reduce the number of human rabies and to plan for its elimination. Hence we made an attempt, this kind of study in our hospital mainly to estimate the burden of human rabies and its endemicity.

Acknowledgments: None

Conflict of interest: No conflict of interest to declare.

References

1. WHO/Department of Communicable Disease Prevention, Control and Eradication. World survey of rabies, 1999. WHO Weekly epidemiological record 2000; 23(75):189-192. Available from http://www.who.int/rabies/resources/who_wer7523/en/
2. Ichhpujani RL, Bhardwaj M, Chhabra M, Datta KK. Rabies in humans in India. In: Dodet B, Meslin F-X, Haseltine E (eds). Proceedings of the fourth international symposium on rabies control in Asia 2001. London: Montrouge, John Libbey Eurotext; pp. 212-213, 2001.
3. Singh J, Jain DC, Bhatia R, Ichhpujani RL, Harit AK, Panda RC, Tewari KN, Sokhey J. Epidemiological characteristics of rabies in Delhi and surrounding areas, 1998. Indian Paediatr. 2001 Dec; 38(12):1354-1360.
4. Sudarshan MK, Nagaraj S, Savitha B, Veena SG. An epidemiological study of rabies in Bangalore city. J Indian Med Assoc. 1995 Jan; 93(1):14-16.
5. Gohil HK, Dhillon R, Tiwari KN. Human rabies situation in and around Delhi. J Assoc Prev Control Rabies India. 2003; 182:11-15.
6. World Health Organization. WHO recommended surveillance standards, Second edition. Available from http://www.who.int/csr/resources/publications/surveillance/WHO_CDS_CSR_ISR_99_2_EN/en/
7. WHO Expert Consultation on rabies. Technical report series 931, 2005. Available online: www.who.int/rabies/ExpertConsultationOnRabies.pdf/
8. Cleaveland S, Fevre EM, Kaare M, Coleman PG. Estimating human rabies mortality in the United Republic of Tanzania from dog bite injuries. Bulletin World Health Organization. 2002; 80(4):304-310.

9. WHO-APCRI National multi-centric rabies survey, 2004. Available from www.apcri.org
10. WHO/Department of Communicable Disease Prevention, Control and Eradication. Rabies vaccines. *Wkly Epidemiol Rec* 2002; 77(14):109–120.
11. Knobel DL, Cleaveland S, Coleman PG, Fèvre EM, Meltzer MI, Miranda ME, Shaw A, Zinsstag J, Meslin F-X. Re-evaluating the burden of rabies in Africa and Asia. *Bulletin World Health Organization*. 2005; 83(5):360–368.
12. Sudarshan MK, Madhusudana SN, Mahendra BJ, Rao NS, Narayana DH, Rahman SA, Meslin F-X, Lobo D, Ravikumar K, Gangabaraiah. Assessing the burden of human rabies in India: results of a national multi-center epidemiological survey. *Int J Infect Dis*. 2007 Jan; 11(1):29-35.