

Human Rabies incidences in selected Areas of Tanzania: Implications for Community Awareness and Training

E. K. Batamuzi,¹⁵ M. M. A. Mtambo,¹⁵ A. D. Maeda-Machang'u,¹⁵
S. B. P. Bittegeko,¹⁵ C. A. R. Mpelumbe-Ngeleja,¹⁶ and E. Aris¹⁷

ABSTRACT

This paper discusses the status of rabies and control strategies in Morogoro and Iringa regions in Tanzania. There has been an increasing number of reported cases of rabies in both humans and animals in the country. This study utilizes old and new data from the veterinary and medical records to examine the perpetuating factors for human rabies and also assesses the impact of the present control measures. From the records, the study has shown that a total of 9,150 people have been exposed to rabies suspect animals between 1986 and 1999 in Iringa and Morogoro regions. It was further observed that the incidence of rabies was higher in males, children between one and 12 years and young people with ages ranging between 21 and 39 years old. In most human victims, dogs were responsible for causing injuries (6,834 that is 96% of the cases) but other causes of rabies were monkeys 111(1.6%), cats 74 (1%), Man 57 (1%) and hyenas 18 (0.03). There was also a strong correlation ($P<0.01$) between canine, wildlife and human rabies. The findings of this study indicate that the situation of rabies in the study area and possibly in Tanzania is alarming and requires serious control strategies. Participation of local communities in rabies control may be a key to success. Early reporting of cases, participation in vaccination programmes and improvement of dog management to reduce the number of strays should be emphasised. Educational programmes should also be organized to sensitize communities on the gravity of the problems and to expose them to remedial measures. On the other hand the government has an important role to play through imposing and enforcing quarantines. The government should also set aside a budget for post-exposure treatment of humans exposed to rabies. Concerted collaborative efforts between livestock, wildlife and medical authorities are required in order to appropriately be able to control rabies in Tanzania.

Key Words: Rabies, control strategies, improved management, community sensitization

Introduction

Rabies is a highly fatal nervous disease of humans and all other warm-blooded vertebrates. The disease is caused by a virus, which is present in saliva transmitted by a bite of a diseased animal, most commonly dogs and other carnivores (WHO 1991). Rabies, which is enzootic in many parts of Tanzania, is believed to have entered Tanzania through Mara region from Kenya and spread southward and finally established itself in the Southern highlands causing severe outbreak in 1956 in Mbeya and Iringa regions (Rweyemamu *et al.*, 1973). From there, it appears that the disease spread to other districts in the southern part of Tanzania including Njombe and Rukwa. Efforts to contain and eradicate rabies in these areas were made without success and the disease spread northwards to Kilosa (1961), Mpwapwa (1961) Singida (1963), Tanga (1970), Kilimanjaro (1975), Dar es salaam (1976/77)

¹⁵ Faculty of Veterinary Medicine, SUA, Morogoro

¹⁶ Animal Diseases Research Institute, Dar-es-Salaam

¹⁷ Muhimbili Medical Center, Dar-es-Salaam

and by 1976 virtually the whole country was reporting cases of rabies. Apparently none of the virus isolated showed any antigenic variation from rabies virus serotype 1 (Loretu, 1985, Loretu, 1988).

The core endemic areas are situated in the regions comprising of Iringa, Mbeya and Morogoro, these regions are permanently under quarantine. Currently, the rabies situation in Tanzania is alarmingly high (1992 Tanzania Veterinary Association Annual general meeting zonal reports). This is the result of the economic depression of the past two decades, which has affected diagnosis, surveillance and control strategies of many animal diseases including rabies. Presently, most cases are not confirmed because of lack of funds for shipping specimen to the Animal Diseases Research Institute (ADRI) in Dar es Salaam. There have been numerous human exposures to rabies-suspected dogs since the first reports of this disease in Tanzania. There have also been a number of deaths of people due to rabies. For example, in 1976, suspected rabid dogs bit 2417 people and 81 of these died of rabies (Loretu, 1988). Two years later 2354 dog bites were reported and 58 of these resulted into death due to rabies (Loretu, 1988). The current situation is no better. The exact number of human deaths due to rabies is not clearly known since many people do not get full treatment and follow up information of individual cases is practically impossible.

The mortality rate after rabies exposure also varies. For example, a report from Morogoro Township indicated that 253 people were exposed to suspect rabid dogs in 1993, but only three of these were reported to have died of rabies (Regional Hospital report 1993). This is in contrast to a case in Bukoba where one rabid dog bit eleven school children and all of them were reported to have died of rabies (Musasa 1993). Similarly, one dog in Same district in Kilimanjaro region had bitten 21 people and 15 of them died of rabies (Anon, 1975). In most cases of fatal disease, appropriate medical management has not been available to the victims.

From the large number of human exposed to rabies it is safe to conclude that human rabies exposure for the whole country is considerably large. In addition, a substantial fraction of people who are exposed to rabies does not report for treatment and therefore are not recorded (Loretu et al., 1991). Therefore human mortality from rabies although not consistently quantified in available records can be substantial.

Compared to other diseases on a global scale, losses caused by rabies are quite significant (Kaplan, 1969, Bogel and Meslin 1990). It is reported that 35,000 human deaths occur per year and about 3.5 million undergo post-exposure treatment in the world (Bogel and Meslin, 1990). Rabies in humans and animals is invariably fatal and apart from losses caused by deaths. There is also economic loss in terms of treatment cost as well as loss of productive time on the victims' part. Moreover, there is psychological effect on the exposed individuals, which often outweighs the economic cost. Thus there is a need of concerted efforts to step up the control of rabies in dogs as well as in human beings.

Apart from the public health aspects, the cost of controlling rabies in the form of imported biological remedies can be economically significant (Magembe 1987). For the control measures to be effective, rabies surveillance must be revived and more centres for diagnosis should be established (Magembe, 1985).

The present study reports on potential cases of rabies in human beings reported at the Regional hospitals of Iringa and Morogoro for the past fourteen years. The paper puts on record the magnitude of human rabies problem and the need for concerted effort aimed at controlling it.

Research Methodology

The data on incidence of rabies in humans based on rabid animal bites in Iringa between 1986 and June 1999 and Morogoro between 1991 and 1999 were obtained from the respective regional hospitals. Some information was also obtained from Zonal veterinary Investigation Centre, Iringa and Sokoine University's veterinary clinic. A questionnaire was prepared for collecting information on cases of rabies, the number of dog bite cases treated and their fate. The respondents were medical personnel handling the cases.

The choice of Morogoro and Iringa was based on the fact that rabies is endemic and are close to wildlife protected areas, a potential source of rabies. The recorded data included the year of case reports, age and sex of the exposed humans for each of the study area as well as the source of exposure. Data was analyzed by the statistical package Statistix^R ((1998)

Results

In Iringa region, a total of 7,092 suspected rabid animal bite cases were reported to the regional hospital between 1986 and mid 1999 (Table 1 and Figures 1 and 2). Of these 3,760 (53%) involved males, and the rest of the victims were females. Although there were slightly more male victims as compared to females, there was no significant difference between sexes. Of the 7,092 rabid animal bite cases, 2,334 (47%) were children with ages ranging between 1 and 12 years, while the secondary school age group between 13 to 20 years of age accounted for 1,277 (18%) of the cases. Victims within the age group of 21 to 39 years were 1,915 (27%) while those who were 40 years and above were the least affected with only 566 (8%) cases being reported during the period under study. Thus there was a significant difference in the number of animal bites by age ($p < 0.001$), where 1-12 years age group had the highest number of victims (mean 278 cases) and those above 40 years experienced the lowest number of bites (mean 47).

Majority of bites were caused by dogs (6,834 that is 96% of the cases) but other causes were monkeys 111(1.6%), cats 74 (1%), Man 57 (1%) and hyenas 18 (0.03). Records revealed that rabies was a common problem in all districts in Iringa,

however, there were more cases in Iringa district. Majority of dogs, which inflicted injuries to human victims, were stray 6,181 (90.4%), while 149 (2.2%) were dogs owned by the victim's family and 504 (7.4%) belonged to victim's neighbours.

Table 1: Rabid animal bite cases by age and sex (Human victim) in Iringa Region between 1986 and June 1999

Year	Total Bite cases	Bites by sex		Bites by age (Years)			
		Male	Female	1- 12	13-20	21-39	≥40
1986/87	702	372	329	330	126	190	56
1988	484	257	227	227	87	131	39
1989	612	324	288	288	110	165	49
1990	560	297	263	263	101	151	45
1991	543	288	255	255	98	147	43
1992	642	340	302	302	116	173	51
1993	700	371	329	329	126	189	56
1994	805	427	378	378	145	217	64
1995	619	328	291	291	111	167	50
1996	490	260	230	231	88	132	39
1997	550	292	259	259	99	149	44
1998/99	385	204	181	181	70	104	30
TOTAL	7092	3760	3332	3334	1277	1915	566

Source: Survey data

Majority of bites were caused by dogs (6,834 that is 96% of the cases) but other causes were monkeys 111(1.6%), cats 74 (1%), Man 57 (1%) and hyenas 18 (0.03). Records revealed that rabies was a common problem in all districts in Iringa, however, there were more cases in Iringa district. Majority of dogs, which inflicted injuries to human victims, were stray 6,181 (90.4%), while 149 (2.2%) were dogs owned by the victim's family and 504 (7.4%) belonged to victim's neighbours.

In Morogoro region a total of 2,058 people were victims of suspected rabid dog bites that were all reported at the Morogoro regional hospital between 1991 and June 1999 (Table 2 and Figure 3 and 4). All the cases were mainly from Morogoro urban and rural districts. Of the 2058 reported human rabies suspect cases, 1,214 (59%) were males while 844 (41%) were females. Therefore, there were more predominantly male than female victims ($p < 0.05$). Of the 2,058 rabid animal bite cases, 889 (43.2%) were children with ages ranging between 1 and 12 years, while the secondary school age group from 13 to 20 years of age accounted for 409 (19.9%) of the cases.

Victims within the age group of 21 to 39 years were 609 (29.6%) while those who were 40 years and above were the least affected as only 151 (7.3%) cases were reported during the period under study. Thus there was a significant difference in the number of animal bites by age ($p < 0.001$), where the 1-12 years age group had the

highest number of victims and those above 40 years experienced the lowest number of bites

Table 2: Dog bite cases by age and sex (Human victim) in Morogoro: 1991- 1999

Year	Total bites	Bites by sex		Bites by age (Years)			
		Male	Female	1 - 12	13 - 20	21 - 39	≥40
1991	120	71	49	51	23	35	11
1992	248	149	99	107	49	73	19
1993	211	115	96	91	41	63	16
1994	273	149	124	118	55	81	19
1995	266	168	98	114	53	79	20
1996	200	120	80	87	39	60	14
1997	255	155	100	110	50	75	20
1998	305	208	97	131	61	91	22
1999	180	79	101	78	35	53	14
TOTAL	2058	1214	844	889	409	609	151

Source: Survey data

For Morogoro region, many rabies suspect cases were from high density areas in which households are very close to each other in Morogoro Municipality, accounting for 41.8% (861) of the total number of cases. The second highest number of cases was from areas with sugar cane plantations in Kilombero valley and Mtibwa as well as the wildlife protected areas including Mikumi National Park, Udzungwa Mountain National Park and part of Selous game Reserve and bordering areas. There were 598 (29%) cases from those areas. The Turiani, Mvomero and Wami areas, which are famous for sugarcane growing (Mtibwa) and have many adjacent forest reserves, had a total of 336 (16.3%) rabies suspect cases. The other area with a significant number of cases was the Uluguru Mountains, Ngerengere and Kisaki. These areas taken together had 263 (12.8%) rabies suspect cases.

Discussion

In this study, it is indicated that cases of humans exposed to rabies suspect animals are numerous in Iringa and Morogoro regions. There were a total of 9,150 human victims in the two regions during the study period (1986- 1999). If all these people were to receive post exposure treatment it would cost approximately Tshs 686,250,000. Assuming each victim came from a different family, these amounts to Tshs 75,000 per family, which means, a family with multiple victims would have to bear even higher cost. Considering that majority of the victims belong to the low-income families this is a considerable amount of money that would otherwise be used gainfully. Although the number of people exposed to rabid animals appears to be high in the study area, numerous cases remain unreported. Low reportage is probably due to ignorance on the part of the victims or their relatives, the distance from rural areas to health centres as well as the cost of post-exposure treatment. In addition popular belief in some parts of Morogoro that cases reported to hospitals

almost always result in death, might also contribute to poor reporting of rabies cases (Jumbe, 1999).

Increased number of dog bite cases in recent years may be a result of many factors. One of the factors is the rising number of stray dogs, due to lax control that was in the past achieved through control of dog movement, especially at times of quarantine. Dogs found roaming were trapped and killed or held in quarantine. Public awareness campaigns, vaccination programmes and dog control was in the past spearheaded by the Central government. Currently, all veterinary related services including rabies control campaigns have been left to private practitioners and the government has only remained with the regulatory role. Since such services are without obvious incentive to private veterinary practitioners, rabies control activities have largely been ignored and hence the current state of affairs.

Another factor that may have contributed to increase in cases of dog/animal bite and consequently rise in incidence of human rabies is the human-wildlife interaction. Human activities including crop production and settlements in areas close to wildlife habitats have increased, such that contacts between domesticated animals and wild animals particularly Canidae species has been enhanced. Such interaction facilitates the transmission of zoonotic diseases, including rabies.

The high incidence of human rabies is also a consequence of economic depression that started in the eighties. Since then, many people can hardly afford providing their required dog feed or paying for their dogs' vaccination and spraying their animals as required. Most families cannot also afford to pay for post-exposure human vaccination. All these had a negative influence on rabies control and eradication programmes.

The present data indicate that the domestic dog is the most common source of human rabies. As seen dogs were responsible for all the cases in Morogoro and accounted for 96% of the cases in Iringa. This finding is consistent with reports from other parts of Southern Africa (Fernandes and Arabulo, 1985; Bogel and Motschewiller, 1986). Stray dogs caused the most harm, accounting for about 90% of the cases in both regions. In Morogoro and Iringa, there are many stray dogs roaming around freely in residential and business areas. Under such circumstances there exist favourable conditions for rabies transmission to man and other animals. To contain the disease there is need of reducing the risk of human exposure and this can be achieved by controlling the disease in the dog as well as increased awareness among the population about the disease, including how it is transmitted, clinical signs in both humans and animals, and remedial as well as preventive measures.

Direct human exposure to rabid wildlife is relatively rare but as seen in the present study hyenas and monkeys were reported as sources in 129 rabies cases in Iringa region. As stated earlier, Morogoro and Iringa regions have many wildlife protected and semi protected areas as well as forest reserves. In Morogoro most of the suspect cases in the Kilombero valley and Kilosa could be attributed to a high wildlife concentration in Mikumi National Park, Udzungwa Mountain National Park and Selous Game reserve. Sugar cane plantations are known to harbour a number of wild animals some of which may have a role in rabies transmission.

During the present study respondents to a questionnaire on wild animals sighted in their area listed Bats, Ratel, Bat-eared fox, Spotted Hyena, Leopards, Mongoose, Vervet Monkey, and Baboon as commonly sighted animals. In the Uluguru Mountains from which, there were many rabies suspect cases, animals that are commonly seen include, Bats, Clawless Otter, Tree Hyrax, Elephant Shrew, Suni, Genet, Bush Pig, Flying squirrel, Duiker, Bush Baby, Mongoose, Leopards, Uluguru one horn chameleon and Forest snakes. Some of the animals may have a role in the epidemiology of rabies. These might partly contribute to the endemicity of rabies in these regions. It is most probable that cases of humans being exposed to wildlife rabies are higher in the area. It is therefore important to include wildlife in the control of human rabies (Gascoyne 1992).

In general this data sheds some light on the magnitude of the problem in young people. Of concern is the fact that children (1-12 years) were found to be at a higher risk of contracting rabies. About 47% of the cases from Iringa (2,334 out of 7,092) and 43% from Morogoro (884 out of 2,058) involved children. Also at high risk was the 21-39 years age group representing 27% and 29.6% of the cases in Iringa and Morogoro respectively. While children are more likely to be at risk because of being in close contact with dogs coupled with their inquisitive nature.

For young people especially school age children, cases of dogs bites might follow provocation. The 20 – 39 years age group is also at risk because it is the age group most involved in work in the fields, hunting, herding domesticated animals and many other activities. Thus the two groups deserves due attention in rabies control programmes. Also males were at a higher risk compared to females. Young people and males are known to be in close association with dogs as companions, or while working. The higher incidence of rabies in young children and the most economically productive age group, calls for immediate attention in order to control the disease.

Currently there is less monitoring of rabies in Tanzania. As a result there is high number of human victims due to sub optimal management of the resultant cases. Given the magnitude of the problem, campaigns against rabies should be carried out routinely in urban as well as rural areas in order to control the disease. Mass media, such as radio, television and newspapers are the best tools for educating the general public on rabies control strategies and how to operationalize hem.

Posters and leaflets on rabies in Kiswahili should be prepared and distributed widely through experts in veterinary medicine, community medicine, and social science. The government on its part should take deliberate efforts to control the disease, working in collaboration with Wildlife Managers, Health workers, NGOs and veterinarians. Furthermore, the government is urged to initiate rabies awareness campaigns in schools. Health education on communicable and zoonotic disease could be gradually introduced in the curriculum.

Participation of local communities in rabies control may be a key to success. In this regard community based animal health systems should to be employed. Community based health workers are individuals selected by their community are trained to provide primary health care and/or animal health care to their communities. In addition communities can participate in surveillance and control of rabies. Communities should be encouraged to report suspected cases and they should be required to report potential exposure incidences. Communities should also participate in vaccination programmes. But, more important, community members should be educated and required to improve the management of their domestic animals so as to reduce the number of stray animals. Concurrently, the government should review and step up efforts to eradicate from streets and residential areas such stray animals

In order to ensure effective community participation in such programmes, they need to be aware of the dangers posed by rabies and know the factors associated with the spread of rabies. This implies that regular educational programmes should be provided on the dangers of rabies and the prevention or control procedures, as a long term strategy of eradicating the disease, particularly focusing in areas where rabies is endemic

Conclusion

Disease control authorities and the community need to understand the socio-economic factors in order to control this deadly disease. In this respect, District Councils, Local communities, village governments and the Central government as well as training institutions, the media, NGOs have an important role to play. In addition to training, the government is required to impose quarantines and put in place proper control strategies with teeth to effect them. Furthermore, the government is requested to set aside a budget for post-exposure treatment of humans exposed to rabies. Meanwhile, local communities are urged to adhere to laid down procedures regarding the management of domestic animals, reducing economic activities in the proximity of wildlife areas and taking necessary control and preventive measures where rabies cases occur. Community members are also obliged to participate in education programmes about the disease that are offered by various sources, and share such information with their neighbors and other community members for wider dissemination.

Acknowledgement

The authors are greatly indebted to Health Officers in Morogoro and Iringa regions for their proactive role in data collection. Special thanks are due to Veterinary Officers at VIC Iringa, Morogoro District Veterinary Office and the Veterinary Clinic, Sokoine University of Agriculture for giving information on domestic animals. Last but not least we thank NORAD for the financial support.

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