Local people knowledge of dogs and cats care and a report of community dog health project activities in underprivileged areas of Morogoro, Tanzania

Ng'umbi, N.H[1], Muhairwa, A.P[2], Bennett, A.[4] Margarethe, H[3], and Duncan, F.[3]

[1*]Department of Veterinary Microbiology and Parasitology, College of Veterinary Medicine and Biomedical Sciences, Sokoine University of Agriculture, Box 3015, Chuo Kikuu, Morogoro. [2]Department of Veterinary Medicine and Public Health, College of Veterinary and Medicine and Medical Sciences, Sokoine University of Agriculture, Box 3015, Chuo Kikuu, Morogoro. [3]Department of Veterinary Clinical Medicine, Veterinary Teaching Hospital, University of Illinois, USA. [4]Lauderdale Veterinary Specialist, a 24 hour Emergency, Critical Care, Referral Hospital and Imaging Center, USA.
Email:nicksnonn7@gmail.com

INTRODUCTION

Dogs and cats are most common domestic animals and pets to many people around the globe. Dogs are kept for various reasons, security being the most important one. Like many animals dogs and cats are affected by various conditions and diseases one being rabies. Studies by Sambo et al. (2014) shows that the majority of people across Tanzania had heard about rabies and knew that it is transmitted by dog bites, but most lacked comprehensive knowledge about key practices, such as the need for wound cleansing, which could prevent unnecessary deaths from the disease. In Tanzania, majority of people keeping dogs and cats allow cats to move freely in the house for the primary purpose of catching mice and rats and dogs for security with a fewer portion having pens or dog houses and seeking veterinary care. Rabies is endemic in low income countries, causing an estimated 55,000 human deaths each year with over 98% of these deaths following bites from rabid dog (Knobelet *al.*, 2005).

Dog and cat keeping results into serious health, financial and social problems. One major problem being loss of lives for people (Sambo *et al.*, 2013) both dog and cats and other animals especially wild animals (Lembo *et al.,* 2008). Serious financial implications being the cost of post-exposure prophylaxis (PEP) to exposed individuals (Sambo et al., 2013). Echinococcosis and larva migrans are some other zoonotic conditions caused by presence of dogs and cats. (Macpherson et al.,1989; Huttner et al. 2009).

The most effective way to control diseases in dogs and cats is through mass vaccination for diseases with vaccines available. The elimination of canine rabies in Tanzania and Africa is feasible, even in wildlife-rich areas, through mass vaccination of domestic dogs and without the need for indiscriminate culling to reduce dog population density (Cleaveland *et al.,* 2014). Controlling canine rabies, especially in free-ranging dogs, is the first priority to reduce the burden of human disease (Ashley *et al.,* 2013).Other measures includes regular dipping or spraying to control ectoparasites, deworming every 3 months and seeking veterinary care when animals are sick. Little work has been done on aspects of dogs and cats welfare and/or knowledge of people in terms of management and prevention of diseases especially zoonoses like rabies. To address the problem one

effort was to apply a participatory One Health approach in some underprivileged areas of Morogoro Region, Tanzania as Tanzania is a low income country where canine rabies is endemic, with around 1,500 human rabies deaths estimated to occur annually (Cleaveland *et al.,* 2002). The study reported here was aimed at assessing management knowledge of dogs and cats in poor families and their understanding of rabies as a zoonotic disease plus a participatory one to one education on how to prevent and manage rabies as One Health tool in action. Specifically, to vaccinate dogs and cats against rabies and distemper, to deworm and control ectoparasites such as fleas and ticks. Also to sterilize and spay dog and cats to reduce population and to ascertain if there is correlation between rabies vaccination and residence of a household (village and town), plus relation of rabies and where the animal is kept (have a pen/living inside the house and street or wondering dogs). Lastly was to attend any possible miscellaneous or emergency case such as bite wounds and advising animal keepers on handling and/or what to do.

MATERIALS AND METHODS

The study was conducted in purposely selected villages and townships of Morogoro Region in June-July for two weeks each year from 2013-2017. In each village or township field officers informed the households with dogs and cats and selected a station where the team was based on a particular day. Every dog and cat brought was attended after a household representative had one to one questionnaire filled. Surgery was done in the field with every effort taken care off to avoid contamination. Post-surgery, each animal was taken home walking after recovery or carried to home recovery where field officers had to monitor their recovery. Every dog above 3 months of age was vaccinated against rabies and a government certificate/record was made to certify. Canine distemper vaccine was given as well. All dogs and cats were sprayed with Imidacloprid to control fleas and injected with ivermectin to control worms. Puppies were given levamisole syrup orally. Each dog with bite wounds, hernia, flea allergy dermatitis or tumour like lesion was attended on the spot. From 2014 the same locations were visited to manage new cases and attend previous ones with booster vaccinations and any other new cases.

RESULTS

From a total of 213 households representatives, 14.1% were females (n=30) and 85.9% were males (n=183). The mean age of respondents was 34±17 years and 26±13 was mean age of a respondent when he/she started keeping dogs. Deworming using ivermectin was done by 65% of respondents (n=135) while 35% (n=78) did no deworming. Vaccination against rabies was done by 153 respondents (n=73) and 60 individual household representatives did not. A proportion of 93.4% (n=199) kept dog(s) for security purposes, 2.3% (n=5) for hunting and 4.7% (n=10) as a hobby and/or pets. Majority of representatives (n=165) equating to 77.5% kept their dogs inside the house compounds' and/or dog pen and 22.5% (n=48) had no dog pens and allowed the dogs to roam around. A total of 66% (n=142) of respondents have ever heard that a dog may be surgically operated to control population and eventually rabies while 44% (n=71) never heard. It was evident that relationship existed between vaccination in dogs and where they are kept or live (x^2=196.2, P <0.05), whether inside the house and/or dog's pen or without defined dog's pen or roaming dog. Also rabies vaccination and place of

residence of family members keeping dogs was related (x^2=17.5, P <0.05). Individuals living in the village settings had less knowledge regarding vaccination against rabies and rabies as a zoonotic disease compared to those in small township. Vaccination against canine distemper using DHLP was less common than rabies.

A total of 1219 and 1557 dogs were vaccinated against rabies and Canine Distemper (DHLP). Nevertheless 275 animals were neutered which constituted 26 cats. One hundred ninety eight dogs and cats were spayed. Every animal operated was sprayed with imidacloprid for fleas control and injected with ivermectin for control of worms. Ivermectin was given to adult dogs and cats and a total of 518 dogs and cats were sprayed with imidacloprid. Puppies (n=195) were dewormed using levamisole syrup given orally. A total of 11 dogs with Transmissible Venereal Tumours (TVT) were surgically managed. Other cases included 9 dogs with flea allergy dermatitis, 6 dogs with fresh wounds, 16 dogs with bite wounds, cases of 3 abdominal hernias and 2 inguinal hernias with unspecified tumours like lesions in three dogs. Details of activities done each year are summarized in Table 1 and Table 2.

Table1. Summary of activities done to dogs and cats during the study period

Activity/Year	2013	2014	2015	2016	2017	Total
Animals vaccinated against rabies	280	292	96	117	434	1219
Neutered animals	41	58	53	58	65	275
Spayed animals	35	38	50	34	41	198
Ivermectin injected	332	263	81	311	481	1468
Imidacloprid sprayed to dogs and cats	157	152	83	126	307	825
Puppies given levamisole	60	34	23	28	50	195
Dogs vaccinated against DHLP	300	320	200	335	402	1557
Total per year	1205	1157	586	1009	1780	5737

Table 2. Distribution of emergency and/or miscellaneous cases

Activity/Year	2013	2014	2015	2016	2017	Grand Total
Dogs with TVT managed	1	4	1	4	1	11
Flea allergy dermatitis managed to dogs	3	5	0	1	0	9
Fresh wounds attended	1	1	0	1	3	6
Dog bite wounds attended	2	2	3	4	5	16
Abdominal hernia managed	1	1	0	1	0	3
Inguinal hernia managed	2	0	0	0	0	2
Tumor like lesion removed and managed	0	0	3	0	0	3
Total per year	10	13	7	11	9	50

DISCUSSION

The objective of this study was assessing management knowledge of dogs and cats in poor families and their understanding of rabies as a zoonotic disease plus a participatory one to one education on how to prevent and manage rabies as One Health tool in action. In this study, it was evident that rabies vaccination and place of residence of family members keeping dogs was related. This implies that people in the rural settings knew little about rabies (approximately 30) as a zoonotic disease, importance of vaccination and how to control it. This may be attributed by the fact that people in the urban or township settings have a greater chance of vaccinating their dogs and getting education about it through media access like television and newspaper unlike those in the rural settings. Also they are unlikely to acquire veterinary services from state veterinarians and/or have information of rabies vaccination campaigns. In this study majority (87%) of individuals had heard about rabies, slightly corresponding to a study by Ali *et al.* (2011) in Ethiopia (83% had heard about rabies) but the details were lowly understood in both studies, like how it is prevented and method of spread. More than 50% knew that the only preventive measure was through vaccination. These findings corresponds in some aspects to those of Sambo *et al.* (2014) who found that, the majority (96%) of respondents had heard about rabies, 37% of respondents were classified as knowledgeable about rabies in their study. Their results indicated that rabies knowledge was greater among respondents with more education, in areas with long-term research interventions (urban areas), originating from households that had experienced suspect rabid bites, that were male and that owned dogs. This was also observed by Guadu *et al.* (2014) where a strong association between KAP scores and sex and educational level was significant, having more males aware than females.

Previous studies have shown that helminthosis prevalence varies, for example a study by Makau *et al.* (2005) in Kenyan Kawangware suburbs showed that the prevalence rate for helminthosis was 40.3% in the slum dogs. The present study neither did not quantify nor qualify prevalence of helminhosis but has shown that many respondents reported to spot worms in dogs' fecal materials. Although more than 77% of respondents kept their dogs inside, still it was observed that majority of them are kept roaming or freely moving in a compound fence or enclosure. Some were tethered in a pole around the compound and left free at night. Very few actually had a dog house or pen. Some similarities were observed by Sambo *et al.*(2014) where they found that it is commonly perceived that many African communities are characterized by low levels of responsible dog ownership. Indeed, in their study very few dog owners indicated that they would restrain their animals, indicating that existing legislation is not enforced and possibly not felt as a responsibility for majority dog owners. Rabies was linked to place of residence or where dogs are kept. Dogs without a pen or not living in the households are more exposed to bite people and/or be bitten by rabid street or wondering dogs compared to those kept indoor and do not wonder around. Roaming dogs in places like Mikumi township are also likely to encounter rabid wild dogs from the Mikumi National Park as cases of wild to domestic animal encounter are reported as well as encounters of people and wild animals.

In this study the surgical operations were freely provided along with vaccinations. Under normal circumstances vaccination against rabies is provided by the

government through respective municipal councils or townships authority. Birth or reproductive control methods like neuter and spay are the responsibility of the animal owner being dog or cats arranged by a state veterinarian which he/she has to pay. The study found that very few owners would require their dogs or cats to be operated because of low knowledge and cost of the procedure, especially individuals in the rural areas and marginalized poor families. Responsibility among dog owners has been clearly demonstrated in the study by Sambo *et al.* (2014) that most owners feed their dog, reported a willingness to contribute to dog vaccination costs, and showed an interest in reproductive control of dogs. Responsible dog ownership is therefore likely to reflect the availability and affordability of interventions, as much, if not more than a lack of awareness. Enforcement of rabies legislation or educational programs is likely to be effective only if implemented hand-in-hand with increased availability of affordable interventions, such as vaccination, primary health care or reproductive control.

The major source of information about rabies for respondents was from a neighbor or a friend, (75%) followed by media, (19%) (mainly radio and television) and lastly by a state veterinarian (6%). Information from a friend, neighbour, seeing someone bitten by a dog and from school kids hearing from parents was having a higher proportion than from the rest of the sources. A study by Sambo *et al.* (2014) revealed that most common source of information about rabies was through personal contacts (neighbours, parents and friends, 70%), while 15% of respondents received information from the media (television, radio and newspapers) and 12% from professionals such as health workers (for bite patients), researchers (during their research activities), or teachers at school.

It was observed that any member of the family can feed dogs with males being frequently taking the role. A study by Ali *et al.* (2011) in Ethiopia observed that higher scores in practices to prevent rabies were recorded in males as observed in this study more males were engaged in dogs care than females. School kids and children in the family (boys) are the ones frequently doing the task. In some cases owners (mother and father or grandparents) may not come in contact with the animal for long such that children are the ones who can give lots of true details about the dogs. No wonder school kids and individuals to around 30 years of age are the most victims of dog bites.

Rabies remains an important public health problem in Tanzania, where canine rabies is not controlled on a large scale in most cases, and the bite of an infected dog is the most common means of transmission. Mass dog vaccination is the most effective measure to control rabies and prevent human deaths. As per this study, more education and awareness to dog and cat keepers is needed. The governments in Tanzania should ensure availability of the rabies vaccine and that all dogs are vaccinated. Stray dogs are to be humanely disposed off and dog owners should be registered by local authorities to trace their vaccination records. Veterinarians and field officers should be enabled to deliver vaccines and do vaccinations in the rural areas. It is commonly perceived that many African communities are characterized by low levels of responsible dog ownership; this has to change through education and practice of One Health approach to local communities. Spay and neuter will reduce number of dogs in families that probably may become stray dogs and reduce exposure to humans safeguarding public health.

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REFERENCES

Ali A, Ahmed EY, and Sifer D.A Study on Knowledge, Attitude and Practice of rabies among residents in Addis Ababa, Ethiopia. *Ethiopian Vet J*. 17: (2), 19-35, 2011.

Ashley C, Banyard C, Horton D, Freuling C, Müller T, Fooks AR. Control and prevention of canine rabies: The need for building laboratory-based surveillance capacity. *Antiviral Res.* 98: 357–364, 2013.

Cleaveland S, Beyer H. Hampson K, et al. 'The changing landscape of rabies epidemiology and control'. *Onderstepoort J Vet Res,* 81(2), 2014

Cleaveland S, Fevre EM, Kaare M, Coleman PG. Estimating human rabies mortality in the United Republic of Tanzania from dog bite injuries. *Bull WHO*, 80: 304–310, 2002.

Guadu T, Shite A, Chanie M, Bogale B, Fentahun T. Assessment of Knowledge, Attitude and Practices about Rabies and Associated Factors: In the Case of Bahir Dar Town. *Global Veterinaria,* 13 (3): 348-354, 2014.

Huttner M, Siefert L, Romig T. A survey of *Echinococcus* species in wild carnivores and livestock in East Africa. *Int J Parasitol,* 39(11): 1269-1276, 2009.

Knobel DL, Cleaveland S, Coleman PG, Fevre EM, Meltzer MI. Re-evaluating the burden of rabies in Africa and Asia. *Bull WHO,* 83: 360–368, 2005.

Lembo T, Hampson K, Haydon DT et al. Exploring reservoir dynamics: a case study of rabies in the serengeti ecosystem. *J Applied Ecol,* 45: 1246-1257, 2008.

Macpherson CNL, Craig PS, Romig T, Zeyhle E, Watsghinger H. Observations on human echinococcosis (hydatidosis) and evaluation of transmission factors in the Maasai of northern Tanzania. *Ann Trop Med Parasitol,* 83(5):1989.

Makau DN, Mulei CM, Mutembei M, Muraya J, Aleri JW. Assessment of fecal parasitism for decision making in continued deworming of slum stray dogs in Nairobi areas of Kenya. *J Vet Med Anim Helth*, 7(11): 328-330, 2015.

Sambo M, Cleaveland S, Ferguson H, et al. The Burden of Rabies in Tanzania and Its Impact on Local Communities. *PLoSNegl Trop Dis*, 7(11): 2013.

Sambo M, Lembo T, Cleaveland S, Ferguson HM, Sikana L. Knowledge, Attitudes and Practices (KAP) about Rabies Prevention and Control: A Community Survey in Tanzania. *PLoS Negl Trop Dis*, 8(12), 2014.