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Retrospective study on rabies at selected districts of Tigray Region, Northern Ethiopia

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A retrospective study was conducted on the prevalence of rabies at selected districts of Tigray (Gantafeshum, Enderta, Mekelle, and Adigrat) from 2008 to April 2009 for human and animals. In addition to the retrospective study, a questionnaire was also prepared and circulated to 420 study participants. As per the information collected, 267 animals and humans died of rabies and the highest percentage of cases was in dogs (70.8%) followed by bovine (9.80%), human (7.10%), equine (6.75%), hyena (3.75%) and ovine (1.87%). On comparing the rabies cases in the areas, it was noticed that maximum cases occurred in Gantafeshm (32.58%), followed by Enderta (27.34%), Mekelle (25.1%), and Adigrat (14.98%). Year wise data collected indicated that the maximum cases of rabies in animals occurred in the year 2006 (25.0%) followed by 2007 and 2008 (19.44), 2004 (13.9%), 2003, and 2005 (11.1%). From the post bite treatment, it is indicated that in Mekelle out of a total of 2798 cases, 59.4% (n=1662) belong to male and 40.6% (n=1136) to females indicating that cases were more in males than females and maximum cases coming to hospitals were in the year 2007 (21.94%) followed by 2006 (20.8%), 2008 (19.2%), 2005 (17.9%), 2004 (11.4%) and 2003 (8.60%). In Adigrat, out of a total of 864 cases, 60.3% (n=521) were in males and 39.69% (n=343) in females and maximum number of cases coming to hospitals were in the year 2006 (21.8%) followed by 2007 (17.5%), 2004 (17.1%), 2008 (16.4%), 2005 (14.7%) and 2003 (12.5%). The study revealed that rabies was prevalent in the districts. Rabies cases in human being were observed to be more in people living in villages than those living in urban areas. Thus, awareness creation about the disease should be recommended in order to design effective prevention and control methods.

Key words: Animal, human, rabies, retrospective, Tigray, Ethiopia.

INTRODUCTION

Rabies, hydrophobia, mad dog, lyssa, and tollwut are different terms usually applied interchangeably to coin, the highly feared zoonotic, infectious, and highly fatal disease caused by virus that belongs to the genus lyssavirus, which is transmitted mainly by the bite of rabid animal to human and other susceptible hosts. The disease affects humans and all other warm-blooded vertebrates and the agent is present in saliva of infected

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animals, most commonly dogs and other wild carnivores (Buxton and Fraster, 1997). It is one of the main zoonotic diseases caused by viruses.

The clinical disease is manifested by excitability, furious behavior, inability to swallow, salivation, convulsions, paralysis, comma and death. Rabid patients often exhibit fear of water and this has given rise to the alternative name of hydrophobia for the disease. Humans acquire rabies when bitten by wild and domesticated carnivores. These animals also transmit the disease to cattle, horses and sheep, which however, seldom spread the disease to human and other warm-blooded animals (Ayele et al., 2001). World wide, it is estimated that approximately 55 thousand people die of rabies each year. This figure, however, suggested that only 3% of human rabies deaths are recorded by central health authorities. Although, 99% of all human deaths from rabies occur in the developing world, the disease still remains neglected in most of these countries (knobel et al., 2005). In addition, millions of persons, primarily in developing countries of the subtropical and tropical regions undergo costly post exposure treatment (PET). The disease constitutes a significant economic burden, especially, in developing countries of Africa and Asia, which is estimated to millions of dollars per annum (Meslin et al., 1994).

In Ethiopia, the first and only recorded rabies epidemic was made in 1903 in Addis Ababa (Pankhurt, 1990). The early 19th century travelers including Edward Ruppel and Sir Samuel Baker have reported either seeing a rabid dog or people bitten by apparently rabid dogs in various parts of Ethiopia and mentioned that rabies was enzootic throughout the country (WHO, 1999). Rabies is of significant economic importance in areas where it is endemic. It was included in the list of transmissible diseases considered to be of socio-economic and economic and/or public health importance within countries (Hemachudha et al., 2002). The discovery of unique strain of rabies virus in the saliva of healthy looking dogs, the isolation of two rabies related viruses (Mokola and Lagos bat viruses) and the possibility of human to human transmission recorded for the first time in Ethiopia indicates the high risk of acquiring the disease (Yimer et al., 2002). There is no well organized information about rabies in Ethiopia, therefore, this study was conducted to depict the prevalence of rabies in the selected districts of Tigray Region, Northern Ethiopia and to assess community's knowledge about rabies and its prevention and control methods.

MATERIALS AND METHODS

Study area

The study was carried out in selected districts of Tigray from November 2008 to April 2009.

Mekelle city is located in 785 km far from the capital city of Ethiopia, Addis Ababa, to North. Geographically, it is located between 33° 24' 13" to 13° 36' 52" North altitude and 39° 25' 30" to 39° 38' 39" east longitude. It lies in an altitude range of 2150 to 2270 m above sea level. The average temperature per year is between10 and 24°C. The weather condition is hot and humidity conditions share among the Ethiopia "Woynadega" areas with total annual rainfall of 5 79 mm.

Enderta is one of the nearest districts to Mekelle city. It encircles the Mekelle city in all directions. It is located 39° 30' 30" to 47° 30" east longitude and with altitude of 13° 00' to 13° 30" North with a total 88055 hectares. The agro climates of the areas are 1% Degas, 96% Woynadega and 3% Kola and with a land formation of 35% plain and the remaining 65% are mountain and valleys. The mean annual rainfall lies between 450 and 500 mm and the average temperature per year is 10 to 24°C.

Adigrat is located on the northern Ethiopia in Tigray. It is in the north east of Tigray. It is about 120 km from the state capital (Mekelle). The area is at an altitude of 2332 m above sea level with a temperature range of 10 to 26°C. The total surface area of the town is about 896.95 hectare and the average annual rainfall is 583 mm.

Gantafeshum is one of the districts in the eastern Tigray and it is located 110 km away from Mekelle city, which encircles the Adigrat town, and the area is at an altitude of 2008 to 2520 m above sea levels with a temperature range of 16 to 23°C and the average annual rainfall is 410 to 515 mm.

Study animals

Animal study was carried out based on the cases recorded in the governmental veterinary clinics in Adigrat, Mekelle, Enderta and Gantafeshum and a questionnaire was prepared concerning the disease information in Animals. Moreover, information about human cases was carried out based on the recorded cases obtained from governmental hospitals established at Adigrat and Mekelle cities.

Retrospective study

The study in humans was carried out based on the recorded cases in medical hospitals of Adigrat and Mekelle and a questionnaire was prepared concerning the disease information in humans.

Study design

The study design was a retrospective type of study and the information concerning the disease was collected from a six year (2003-2008) retrospect data about occurrence of rabies in animals and humans in these areas (Adigrat, Gantafeshum, Enderta and Mekelle). Questionnaire was also used to collect information concerning the various risk factors for the occurrences of the rabies disease. The peoples of these different areas were also asked about the disease.

Data analysis

The data collected from questionnaire survey was entered into Microsoft Excel 2010 Version spread sheet. The data was cleaned and then analyzed using STAT version 11. Descriptive statistics like percentage was used to summarize the data.

RESULTS

The present work was conducted to find out rabies cases in four different parts (Mekelle, Adigrat, and Enderta and

Table 1. Death due to rabies in different species of livestock and human beings at different districts of the region (2003-2008).

Species	Adigrat	Mekelle	Gantafeshum	Enderta	Total	%
Canine	30	49	60	50	189	70.78
Bovine	3	8	10	5	26	9.8
Equine	6	5	2	5	18	6.74
Ovine	-	3	-	2	5	1.87
Hyena	-	2	-	8	10	3.75
Human	1	-	15	3	19	7.1
Total	40	67	87	73	*267*	-
%	14.98	25.09	32.58	37.34	-	-

Table 2. Sex and age wise rabies cases in human being at different districts of the region (2003-2008).

Age	Males		Females		Total	%
	No	%	No	%		
0-14	0	0	1	100	1	5.26
15-44	2	33.333	4	66.666	6	31.58
>44	9	75	3	25	12	63.15
Total	11	57.89	8	42.105	19	-

Table 3. Post bite treatment of human in Mekelle hospital.

Year	Male				Female					%
	Up to 14	15-44	>44	Total	Up to 14	15-44	>44	Total	Grand total	
2003	31	30	40	101	25	75	40	140	241	8.6
2004	93	69	34	196	63	42	20	125	321	11.47
2005	199	131	38	368	72	44	18	134	502	17.94
2006	189	121	13	326	106	125	126	256	582	20.8
2007	194	112	33	339	114	126	35	275	614	21.94
2008	138	162	32	339	90	83	33	206	538	19.22
Total	844	625	193	1662	470	495	171	1136	2798	-
%	30.16	22.33	6.89	59.4	16.76	17.96	6.1	40.6	-	-

Gantafeshum) of Ethiopia. For this, the survey was conducted and a questionnaire was prepared. On the basis of these, the results are as follows:

The rabies cases in the aforementioned four places in different species of livestock and human beings are presented in Table 1.

From the table, it is clear that the highest percentage of case occurred in dogs (70.78%) followed by bovines (9.8%), humans (7.1%), equines (6.745%), hyena (3.745%) and ovine (1.87%). On comparing rabies cases in these different parts, it was noticed that maximum cases occurred in Gantafeshum (32.58%), followed by Enderta (27.4%), Mekelle (25.09%) and Adigrat (14.98%).

Further, the aforementioned data of human cases was analyzed age and sexes-wise which is presented in Table 2.

From Table 2, it is clear that among the reported human rabies cases, 63.15% were in age of >44 years followed by 15 to 44 years (31.6%) and up to 14 years (5.26%). It is also evident from the table that rabies cases were more in males (57.9%) than females (42.10%).

It is clear from Table 3 that in Mekelle out of a total of 2798 cases, 1662 (59.4%) belonged to male and 1136 (40.6%) belonged to females indicating that these cases were more in males than females It is also very clear from the table that maximum cases coming to hospitals were in the year 2007 (21.94%) followed by 2006

Table 4. Retrospective data on post bite treatment of human being in Adigrat hospital.

Year	Male				Female					%
	Up to 14	15-44	>44	Total	Up to 14	15-44	>44	Total	Grand Total	
2003	32	25	11	68	12	21	7	40	108	12.5
2004	24	52	19	95	25	20	8	53	148	17.12
2005	34	28	12	74	22	19	12	53	127	14.69
2006	72	33	8	113	41	26	8	75	188	21.75
2007	28	31	18	87	16	29	19	64	151	17.48
2008	31	43	10	84	22	27	9	58	142	16.44
Total	221	222	18	521	138	142	63	343	864	-
%	25.57	25.57	9.02	60.30	15.97	16.43	7.3	39.7	-	-

(20.8%), 2008 (19.22%), 2005 (17.94), 2004 (11.47%) and 2003 (8.6%).

Table 4 clearly indicates that in Adigrat out of a total of 864 cases, 60.3% (521) were in males and 39.699% (343) were in females. It is also very clear that maximum number of cases coming to hospitals were in the year 2006 (21.75%) followed by 2007 (17.476%), 2004 (17.129%), 2008 (16.435%), 2005 (14.69%) and 2003 (12.5%).

When comparing the results of both Mekelle and Adigrat, it is interesting to find out that the incidences was the lowest in the year 2003 whereas maximum in the years 2006 and 2007.

DISCUSSION

The present work was conducted in four different parts of Ethiopia by carrying out survey regarding rabies. For this, a questionnaire relating to rabies was prepared and circulated to 420 persons.

On the basis of these studies, it was observed that maximum rabies cases was in dogs indicating that this might have acted as the major source of infection to humans by their bite. This is also substantiated by our results that in humans, most cases were due to bite of dogs. More or less similar are the findings reported by Rodostits et al. (1994).

The current study showed that Mekelle and Adigrat towns had lower rabies occurrence. This may be due to the facts that since Gantafeshum and Enderta are the rural areas where people are not aware of the problem of the disease. The people of these areas also do not have education for prevention and treatment of the diseases compared to urban (Mekelle and Adigrat) areas. In the urban areas as our result indicate that some persons used vaccination against rabies, but not in rural areas.

The death due to rabies in human beings is higher in >44 aged persons followed by 15 to 44 and 0 to 14 years old. This may be because in old aged, less number of people goes for post bite treatment as compared to young ones is evident from our data in Table 4. From this, it is clear that the highest death and the lowest post bite treatment is in people of age >44 years which may be due to the traditional thinking in these old peoples.

As indicated from the questionnaire also, the community of these areas believed mostly in traditional medicine and holy water as they consider that these are helpful in treatment after bite of rabid dog; this is also indicated by Ayele et al. (2001).

The domestic livestock animals that are affected by this disease are bovine and equine, but rare ovine and caprine. This may be because of bovine and equine remain in contact with dogs, whereas ovine and caprine fear from dogs and remain away from dog, therefore, are less affected by rabies as compared to bovine and equine.

As per the information gathered from the people using a questionnaire that the carcass of rabid animals is thrown into free land, which act as a source of infection. When rabid animals bite persons, most of them go for holy water treatment (spiritual mechanism of treatment) and traditional medication instead of allopathic treatment. Therefore, these aggravate the distribution of the disease and death of the persons without having any post bite treatment.

Population of bats in these areas are high and contact to humans especially at the night, therefore bats can be a source of infection to animals and humans as indicated by Davis et al. (1990), that vampire bats and insectivorous bats are important reservoirs of rabies, because the virus remains latent in them for long periods of time, so that they disseminate the virus in their nasal secretions and saliva being apparently healthy. It was also observed that many stray dogs were collected from different areas due to improper disposals of animals' bones which led to easy collection of carnivorous.

Conclusion

The present work was conducted in four different parts of Ethiopia (Adigrat, Enderta, Gantafeshum and Mekelle) to find out rabies cases. Study revealed that rabies is

prevalent in all the four area, which may be because of large number of stray dogs that are not vaccinated. Secondly owned pets are also not vaccinated properly so dog population should be properly controlled, registered and vaccinated, and the community should be aware of the disease through community education.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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