

Epidemiological Distribution of Animal and Human Rabies in Ethiopia Based on Previous Reports

Gudeta Mojo Hawas¹, Usman Lelo Kebeto², Temesgen Tadesse Yitayih³

¹ Addis Ababa University College of Veterinary Medicine

² Paradise Valley University College, Department of Animal Health, Shashemene, Ethiopia

³ National Disaster Risk Management Commission, Addis Ababa, Ethiopia

Telephone: +251921726339; E-mail: gudetajambo.edu.aau@gmail.com

Abstract: Rabies is a viral disease that affects all warm blooded animals including humans and is common in many geographical locations of the world including Ethiopia. It is distributed all over the world affecting about 100 countries with more than 2.5 billion population except some rabies free island states like UK, Japan and some developed states like Spain, Portugal, Sweden, Finland, Norway, Greece, and some others. The most affected countries of the world are found in tropical Africa, Asia, South America, and Oceania. It is a subject of concern mainly because of its zoonotic importance. An estimated 50,000 to 60,000 humans die from rabies every year. Most of the deaths due to rabies occur in developing countries where canine rabies is endemic and dog biting is the main mode of transmission. Rabid Dogs are the major vectors responsible for the spread and transmission of rabies to humans and other animals in Ethiopia. The situation of rabies and the public's knowledge, attitude and practice (KAP) were studied and reported from different parts of the country including from North Gondar zone, Addis Ababa, Jimma town, Gomma district of south west of Ethiopia, Bahir Dar town and eastern Ethiopia of the Awash Basin. The current scenario in Ethiopia shows a serious threat of canine rabies virus transmission in the rapidly growing human population where a poorly controlled stray dog population is equally growing fast. Poor public awareness among the public towards rabies is considered as one of the bottle necks for the prevention and control of the disease in Ethiopia especially in canine rabies endemic cities. There is huge gap in knowledge, attitude and practice of the Ethiopian society with slight variability between regions, the least level of awareness being seen in pastoral community. The failure to receive PEP was a major factor in the number of human cases in Ethiopia. The study shows high canine rabies burden, and lack of sufficient awareness about the disease and high reliance on traditional treatment that interfere with timely post exposure management. Providing subsidized rabies vaccines for dogs and PEP treatment for humans is essential to improve coverage and utilization of modern, scientifically proven and effective rabies control methods especially for poor rural farming and pastoral communities. The practice of traditional healers must be closely scrutinized and scientifically tested for efficacy

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1. Introduction

Rabies is an acute encephalitis illness caused by rabies virus. Rabies virus is the prototype species of the genus *Lyssavirus* in the family of *Rhabdoviridae*. It is one of the most virulent diseases of humans and animals with worldwide distribution. Next to poliomyelitis and pox, rabies is one of the longest known infectious diseases in human history and may have been reported in the Old World before 2300 BC (Krauss *et al.*, 2003). It is a major viral anthroponosis highly fatal to humans and animals affecting nearly all mammals (Pal *et al.*, 2013).

Rabies is endemic in developing countries of Africa and Asia, and most human deaths from the disease occur in these countries. A recent global estimate indicates that rabies is responsible for around 60,000 human deaths annually (Hampson *et al.*, 2015). Human mortality from endemic canine rabies areas of the world was estimated to be 55, 000 deaths

per year, which is responsible for 1.74 million disability adjusted life years (DALYs) losses each year (Knobel *et al.*, 2005).

Being one of the developing countries where little attention is given to the disease, Ethiopia is also highly endemic for rabies experiencing several negative impacts of the disease. In Ethiopia, rabies has been reported as a potential problem for cattle production in free range production systems, such as the mixed crop livestock and pastoral production systems (Sillero-Zubiri and Switzer, 2004). Occurrence of rabies was also reported from other parts of the country including from Addis Ababa and its surrounding ascribed to the poor management of owned dogs and the presence of high population of unvaccinated stray dogs. Reports indicate that rabies is well established in Addis Ababa and it still continued to be major public health problems (Yimer *et al.*, 2002). A significant number of human rabies

exposure cases (261) were also reported from the Gondar Health Center from 2011 to 2013 (Deressa *et al.*, 2010). Rabies is an important disease with significant public health concern in the Northwestern zone of Tigray region from where the reported incidence of human rabies exposure per 100,000 populations was 35.8 in 2012, 63.0 in 2013, 89.8 in 2014 and 73.1 in 2015 (Tschopp *et al.*, 2016).

It is also becoming a major threat to the survival of some endemic wild animal species putting them on the verge of extinction. For example, at least two, possibly three, separate rabies epidemics have resulted in dramatic population declines of the endemic Ethiopian wolf (the Bale Mountains wolf), the rarest canid species in the world since the early 1990s (Randall *et al.*, 2004).

There is also awareness problem regarding rabies among the population of Ethiopia, where individuals who were exposed to rabies virus often see traditional healers for the diagnosis and treatment of the disease. These widespread traditional practices of handling rabies cases are believed to interfere with timely seeking of PEP, the scientifically proven and mainstay treatment protocol for victims exposed to rabies (Deressa *et al.*, 2010). There is lack of accurate quantitative information on rabies among the wider populations of humans and animals in Ethiopia and little information from limited geographical areas is available about the awareness of the people on rabies (Abebe *et al.*, 2003).

Nationwide data on rabies are not available to reveal the actual magnitude of the problem in Ethiopia. However, the distribution of vaccine to the various regions and the fragmented reports on human and animal rabies cases are strong indicators of the wide spread nature of the disease in the country (Deressa *et al.*, 2010). Nevertheless, there is no coordinated official rabies control program in Ethiopia and dog vaccination coverage is still very low due to the limited availability of vaccines, lack of awareness, and the perception of high vaccination costs. Devising a successful rabies control program greatly depends on the understanding of rabies epidemiology and distribution, dog ecology and community KAP (knowledge, attitude, and practice) towards dogs and control measures among other needed information (Ali *et al.*, 2010; Jibat *et al.*, 2015). Therefore, the aims of this paper are:

- ✓ To gather the limited and fragmented reports and depict the incidence and epidemiological distribution of the disease in Ethiopia.

- ✓ To demonstrate the gaps in knowledge, attitude and practice of the affected population from different parts of Ethiopia regarding rabies.

2. History of Rabies in Ethiopia

The term rabies was coined about 3000 B.C from the word 'rabha' meaning violence. It is one of the most typical zoonosis that has been well known since ages and has been known for more than 4300 years (Takayama, 2008). In Ethiopia it is an important disease known for centuries as a "Mad Dog Disease" (Fekadu, 1982). Hydrophobia, though not excessively prevalent, was fairly common in Ethiopia in former days, and on at least one known occasion reached an epidemic proportion (Rodinson *et al.*, 1967).

Early nineteenth-century travelers were the first to discuss and describe the incidence of rabies in Ethiopia some suggesting that rabies was common and fairly widespread (Ruppel, 1840) while others declared that rabies was 'very rare' (Plowden, 1863).

Thus in the 1830s the German explorer Eduard Riippell, who reports seeing a mad dog at Adowa, goes on to declare that rabies was 'by no means uncommon'. Pankhurst expressed that rabies was popularly considered so important by the Ethiopians that there was a traditional practitioner at the imperial palace widely reputed as having an 'imperial cure' for this disease (Pankhurst, 1965).

3. Epidemiology of Animal Rabies in Ethiopia

3.1 Canine rabies

Based on reported study a large dog population size in combination with poor dog management has resulted in a high endemicity of canine rabies in Ethiopia, accounting for an estimated death rate of 10,000 people a year (Jemberu *et al.*, 2013). Statistics on the dog population size is lacking, but a conservative estimation indicates an average of one owned dog per five households (Deressa *et al.*, 2010). Available studies on the incidence of rabies in the dog population indicated rates as high as 413 cases per 100,000 in dogs (Jemberu *et al.*, 2013). The reported results show that dog vaccination coverage is very low due to the limited availability of vaccines, lack of awareness, and the perception of high vaccination costs (Ali *et al.*, 2010; Jibat *et al.*, 2015). Yimer (2002) reported that the actual numbers of rabid dogs in and around Addis Ababa is under-estimated, because many ill dogs are never examined. According to this report, dogs constitute more than 89 % of the total samples examined and 76.2 % were positive (Yimer *et al.*, 2002).

3.2 Livestock rabies

Studies showed rabies as a potential problem for cattle production in free-range production systems, such as the mixed crop-livestock and pastoral production systems. In these systems dogs are kept in close contact with cattle, providing an opportunity to transmit the virus to cattle through a bite by infected dog (Sillero-Zubiri and Switzer, 2004). By affecting

cattle in subsistence systems, it may have extensive economic impacts at the household and country levels, in addition to the effects on human health (Okell *et al.*, 2013). Rabies in cattle causes direct losses due to mortality and reduced milk yield.

Incidence rate of 18.9 per 100,000 head of cattle was reported by Jemberu, (2013). The reported study analyzed the situation in an urban area in northern Ethiopia, where cattle are kept partly indoors and have, therefore, reduced contacts with dogs. The reported continent wide incidence estimation, derived from cattle samples submitted to central veterinary laboratories revealed an annual rabies incidence of 0.52 deaths per 100,000 head of cattle (Knobel, 2005).

By considering an under reporting rate of 10, the final incidence was estimated to be at 5–20 deaths per 100,000 head of cattle (Tefera *et al.*, 2002).

The results show that higher number of cattle rabies incidences in affected herds in the pastoral system compared to the mixed crop-livestock system. Consequently, the estimated economic losses per affected herd are also higher in the pastoral system indicating higher expected economic losses in affected households as well. This could be due to the fact that pastoral herds are larger in size and more animals are bitten once a rabid dog enters a herd (C.S.A, 2012). Studies reported show that it is uneconomical to vaccinate cattle against rabies, primarily because the risk of individual animals contracting rabies is low (Yakobson *et al.*, 2015).

3.3 Wild Animals Rabies

3.3.1 Rabies of Ethiopian wolf (*Canis simensis*)

The Ethiopian wolf or Simien jackal is probably the rarest canid in the world. Rabies is threatening this animal endanger in it to extinction. According to reports, 41 out of 53 (77%) known wolves in five study packs died or disappeared within four months in the Web Valley and three of these packs went extinct in 1991–1992 (Sillero-Zubiri *et al.*, 1996). Another report also mentioned that 72 out of 95 (76%) known wolves died or disappeared in 10 study packs in 2003–2004, in the Web Valley within six months. According to the report, clinical signs of rabies observed in several animals during both outbreaks were consistent with both the “dumb” and “furious” forms and included hind limb ataxia, anorexia, atypical ranging behavior, convulsions, loss of fear of humans and of other wolves, aggression, loss of coat, and excessive salivation (Randall *et al.*, 2004).

4. Epidemiology of Human Rabies in Ethiopia

4.1. Distribution and prevalence of human rabies

In Ethiopia, the dogs, cats, and wild life species are known to transmit rabies virus to both humans and livestock. Very recently, direct human to human

transmission has been described (Deressa *et al.*, 2011).

4.1.1 Distribution in and around Addis Ababa

From the reported results in Addis Ababa, rabies remains to be one of the most feared infectious diseases and has been diagnosed for several years at the Ethiopian Health and Nutrition Research Institute (Fekadu, 1972). However, systematic recording and organization of the results of diagnosis was rarely carried out. It is well established and still continued to be major public health problem. From the reports, available data during the years 2001 to 2009 at the institute showed that 35 to 58 annual human deaths were recorded in Addis Ababa, the capital city of the country (Deressa *et al.*, 2010).

The reports showed a total of 2,337 people received post-exposure prophylaxis in 2010/2011 against rabies as a result of exposure to rabid or rabies suspected animals and humans. The greater proportion of PEP was given to humans exposed to rabid or rabies suspected dogs. The majority, 72.3% (1653/2286), of the PEP was given to humans bitten by animals with an unknown rabies status. Some of the PEP vaccines were prescribed while the dogs were under quarantine and observation for the development of clinical rabies. The majority of the PEP (78%) was given to humans bitten by animals in which their rabies status was unknown while 28% (633/2286) of the PEP was given to humans bitten by animals in which rabies was confirmed (Reta *et al.*, 2014).

4.1.2. Distribution in and around Gondar

A significant number of human rabies exposure cases (261) were reported from the Gondar Health Center for 2011 to 2013 time period. The report showed that incidence of human rabies exposure cases calculated for the mid-year per 100,000 population was 4.6 in 2011, 2.61 in 2012 and 1.27 in 2013 (Kitalaa *et al.*, 2000).

The sex specific distribution showed that the majority (62.8%) of the rabies cases were among males. A large proportion human rabies exposure cases were reported among children under 15 years of age (38.5%) (Deressa *et al.*, 2010). The majority of rabies exposure cases were reported to occur during fall and winter (30.18%). A significant number of people exposed to rabies (24.7%) came to the health center for PEP late, which would hamper the efficacy of the PEP. Dog bite was the only source of rabies exposure in the reported study results (Kitalaa *et al.*, 2000). The reports indicated that being male and living in an urban setting to be a risk factor for human rabies exposure for the year 2011 (Deressa *et al.*, 2010).

4.1.3 Incidence and distribution of human rabies exposure in northwestern Tigray

Rabies is an important disease with significant public health concern in the Northwestern zone of Tigray region. Human rabies exposure cases (n = 2180) registered for and followed up their PEP at Suhul hospital during the respective study years (2012, 2013, 2014 and 2015) showed a sharp increase with the highest recorded in 2014. This observation might be either from the improvement of the coverage of dog vaccination or under reporting conditions occurred in 2015. Being male and children at age of 15 years old a risk (Yibrah and Damtie, 2015).

Reported study show that individuals exposed to rabies could not visit health centers due to distance to health facility, mistrust in the medical system and poor knowledge about the disease (Tschopp *et al.*, 2016). In Kafta Sheraro National Park wildlife might be reservoirs of the virus, as suggested in the Ethiopian Health and Nutrition Research Institute proceedings. Wildlife is often believed to play a major role in transmission (EHNRI, 2012).

Table 1: Summary of Epidemiological distribution and incidence of rabies in different parts of Ethiopia based on reported results.

Study area	Reported rabies cases	No of studied	No of Affected	Affected population per/100,000	Year/ Occurrence	Source
Addis Ababa	Human rabies	2,337PEPtaker	93	3.88%	2010/2011	Reta <i>et al.</i> , 2014
	Animal rabies	2,517	1936	76.9%	2003-2009	«
	Canine rabies:				«	«
	Male dogs	1727	1367	79.2%	«	«
	Female dogs	534	357	66.9%	«	«
In and around Gondar: Health center	Human rabies:	128146(risk)	261	2.33%	2011-2013	Yibrah and Damtie.,2015
	Male	226(PEPtaker)	142	62.8%	«	«
	Children	226(PEPtaker)	84	38.5%	«	«
	Rural area	220(PEPtaker)	161	73.2%	«	«
	Canine rabies	3149(risk)	412.83	0.41%(death)	«	«
North Gondar	Livestock Rabies	45256(risk)	19.89	0.02%(death)	«	«
North western Tigray: Leallay Adiabo district	Animal rabies	90422	154	0.17%(death)	2009-2013	Abebe <i>et al.</i> , 2015
	Canine		24	15.58%	«	
	Cattles		64	41.56%	«	
	Ovine		36	23.38%	«	
	Equine		30	19.48%	«	
	Human rabies	71359	62			
	Female		37	59.68%	«	
	Male		25	40.32%	«	
	Baby (<5)		10	16.13%	«	
	Child (6-15)		25	40.32%	«	
Adult (>15)	27	43.55%	«			
Pastoral area (Oromia region)	Livestock rabies	532	72	15.5%	2013-2014	Jibat <i>et al.</i> , 2016
	Mixed crop livestock system	248	73	13%		«
	Pastoral system	284				«
Bale zone (Web valley)	Rabies of wolves	53	41	77%	1991-1992 (An outbreak)	Sillero Zubiri <i>et al.</i> , 1996
		95	72	76%	2003-2004 (An outbreak)	Randall <i>et al.</i> , 2004
Generally in Ethiopia	Dog rabies			0.413%	Annually	Jemberu <i>et al.</i> , 2013;
	Human rabies			0.67%	Annually	Deressa <i>et al.</i> , 2011

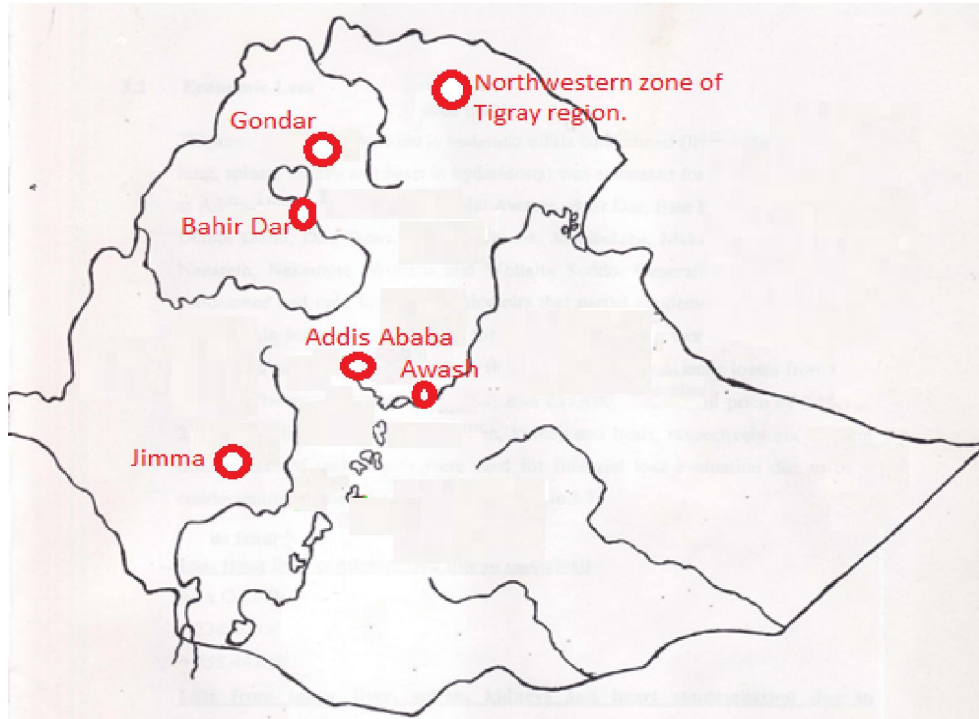


Figure 1: Areas in Ethiopia that has reported human rabies during post 2000 G.C period (Supported by QGIS).

EPIDEMIOLOGICAL DISTRIBUTION OF ANIMAL AND HUMAN RABIES IN ETHIOPIA

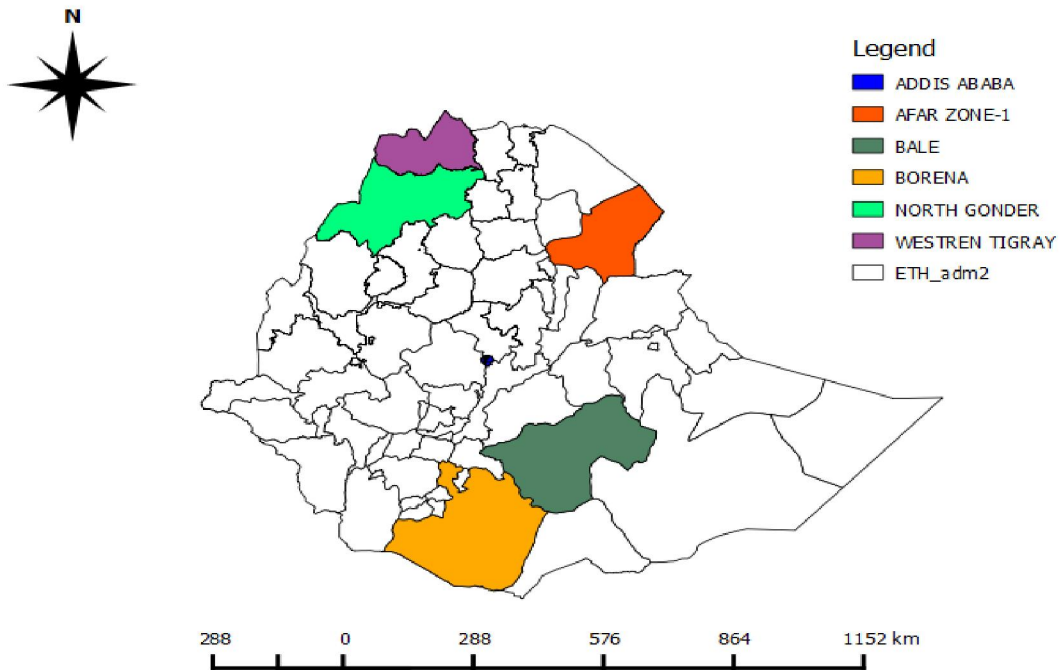


Figure 2: Epidemiological distribution of human and animal rabies in different zone with map (Supported by QGIS).

5. Knowledge, Attitude, Awareness and Practice Regarding Rabies in Ethiopia Based on Previous Reports

5.1 People’s knowledge and practice in north Gondar zone

From the reported results it was found that almost all respondents know the disease by slightly different names all meaning ‘mad dog disease’. Despite the fact that the community is familiar with the disease, many misconceptions about how it is caused and transmitted were observed. Although bite was correctly implicated as a means of transmission of the disease by all respondents, any direct or indirect saliva contact 84%, and inhalation by 34% of the respondents were also considered as means of transmission. Based on the report, humans were subjected to crude traditional treatments (84%) which sometimes have serious negative consequences to their health (Deressa *et al.*, 2010).

The report from Gondar zone showed that most respondents believed that rabies in dogs is caused by starvation, thirst and prolonged exposure to sun heat. The notion of asymptomatic rabies carrier dogs by itself is a contentious issue and the association of stressors to the development of clinical rabies might be a farfetched claim (Zhang *et al.*, 2008; Wilde *et al.*, 2009). Based on report traditional treatment usage was more prevalent in Dabat districts than in Gondar town district indicating that people in the town use more of modern treatment because of either easy access or better awareness. The use of traditional treatment by 84% of respondents in Gondar zone shows high reliance on the unproven medication insinuates that most fatal human rabies cases recoded in Ethiopia were mostly aggravated by traditional healers. The results show that dog vaccination practice was generally very low and totally nonexistent in rural district of Dabat. But, in Gondar town district, where there was better awareness, lack of access and cost of vaccine was raised as problem (Deressa *et al.*, 2010).

5.2. Knowledge, Attitude and Practice of rabies among residents in Addis Ababa

The reported study results indicated that the majority of the respondents had moderate level of knowledge and attitude towards rabies and satisfactory level of rabies prevention practices (Gino *et al.*, 2009). The report shows that 83% of the respondents had heard about rabies from different sources. It is mainly because of the fact associated with the source of information determining the appropriateness of the knowledge transferred. It is also reported that only 21.5 % of respondents receive information about rabies from mass media in news.

As the report shows such information tended to be superficial and it did not adequately enable public to acquire appropriate level of knowledge on rabies.

The KAP analysis revealed that only 30.97% of respondents recognize rabies as a fatal disease and also reported that 38.88% of the study subjects were aware of the consequences of rabies following animal bite (Anita *et al.*, 2003). However, in the reported study, majority of the respondents (71.9%) know that rabies can affect all warm blooded animals and 73.5 % of the respondents identified that dogs are major sources for the spread of rabies in human population (Syed *et al.*, 2009). It is also reported that among the community indicated the higher proportion of study participants (97.2%) had correct responses regarding the route of exposure (Yimer *et al.*, 2012). The statistically there is high risk in male and better chance of acquiring correct information about rabies and higher level of education were associated with higher knowledge score. According to the reports, majority of the respondents indicated their willingness to vaccinate their pets and believe that mass vaccination program and depopulation of stray dogs are effective measures for controlling the disease in Addis Ababa (Gino *et al.*, 2009).

The reports showed strong positive correlation; between Knowledge and Attitude, between Knowledge and Practice and Attitude and Practice scores. For instance the attitude score was found to increase with the age, educational level and monthly income. Likewise, the individual practice towards the prevention of a disease is improved by promoting the attitude as attitude can impress all aspects of one’s behavior (Ellen *et al.*, 2009).

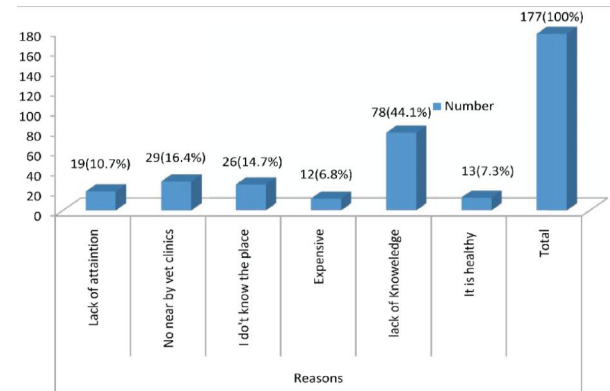


Figure 3: Reasons reported by respondents for not vaccinating their pets from the reports, Addis Ababa, January 2011 Practice as reported (Ali *et al.*, 2011).

5.3. Community Health Seeking Behavior in Gomma District, Southwest Ethiopia

As the reports shows 47% and 61% of the respondents reported that their family members and their domestic animals were sick, for which more than two third of them received treatment from modern health care facilities for the sick family members and

domestic animals respectively. Twenty eight (3.5%) respondents reported that their family members were bitten by suspected rabid dogs (Rashid *et al.*, 2008; Sambo *et al.*, 2013) The results from reports also show that eleven (1.8%) respondents reported that their domestic animals were bitten by suspected rabid animal. This implies that from every 1,000 human and animal population, there would be 35 and 18 rabid human and domestic animal cases per year. General concepts of the reports implies the majority (85%) of the respondents perceived that both human and domestic animals that had exposure to rabies should seek help and also understood that as shown from reports, 60% of the respondents believed that animals died of rabies needs to be reported to animal health care providers for prevention and control (Gino *et al.*, 2007; Sambo *et al.*, 2013).

5.4. Knowledge, Attitudes and Practices of rabies Health Center in Jimma Town

On the reported study the first aim is to assess the knowledge, attitudes and practices among attendants at an anti rabies health center in Jimma Town, Ethiopia. The results show that they have high level of KAP on rabies (Yimer *et al.*, 2012; Jemberu *et al.*, 2013; Tirsit *et al.*, 2013). However, the report shows that unfavorable attitudes and practices were found in terms of the need for appropriate first aid, medical care and animal management. The report indicated that, of the 384 respondents, 91.7% had heard of rabies before exposure and the majority (83.9%) of the victims had heard about rabies from their family or friends only 16.2% of respondents in the reported study had heard about rabies from sources such as media and teachers. This suggests that dissemination of information from the government is poor, and could be due to the fact that rabies is neglected and not considered a major public health importance in Jimma Zone (Sambo *et al.*, 2013).

The reported results also show that, while awareness of rabies was very high, some important gaps were noted. For instance, more than 90% of the respondents estimated that the maximum incubation period of rabies in humans is less than 40 days. But, this leads to misconceptions about the incubation period in Ethiopia may emanate from misleading information provided by traditional healers. For example, participants stated that they were advised not to cross rivers and travel to health facilities in search of medical care earlier than 40 days post-exposure (Agarwal and Reddaiah, 2003). However, on the reported cases about 75% of the respondents concurrently believed that traditional healers and herbal medicine could cure rabies may suggest that inappropriate assistance may be sought following bite. The result also shows that they found that Protestant religion and rural residence were independently

associated with a belief that traditional healers could cure rabies, after adjusting for other factors and only 7% of the respondents indicated that they washed the bite wound with water and soap as first aid, while 43% performed no first aid after being bitten by a suspected rabid animal. The reports also shows in terms of animal management following a bite, 47.7% of respondents replied that they immediately kill suspected rabid dogs that bite humans to prevent further attacks (Sambo *et al.*, 2013). In reported results show that, female sex was more risk full while Muslim faith was associated with a lower score (Yimer *et al.*, 2012).

As the reported results indicated that dogs are considered impure in Islamic tradition and so it is conceivable that people of this faith may be less concerned with dog welfare (Foltz *et al.*, 2005). Upon the results the majority of respondents identified that rabies could be prevented by avoiding dog bites and confining dogs. But, Only 9% of pet owners tied up their dogs during the whole day only 5% of pet owners in the present study vaccinated their dog (Yimer *et al.*, 2012).

As the reported results show about 35% of the respondents reported slaughtering food animals suspected of rabies and eating their meat, considering that the meat from such animals has medicinal value. In contrast, 65.4% of the respondents reported killing and avoiding (not eating) the body of animals bitten by suspected rabid animals fearing that rabies is transmitted through an animal's carcass. This habit poses a risk for scavengers, which may feed on dead infected animals (Sambo *et al.*, 2013). But, Rabies virus is inactivated by heating and therefore eating cooked meat or pasteurized milk is not considered an exposure (Hurisa *et al.*, 2013)

5.5. Knowledge, Attitude and Practices about Rabies in Bahir Dar Town

The reported study shows that, about 64.1% of the respondents had good level of knowledge, attitude and practices about rabies. Almost all respondents had heard about rabies from different sources (Ichhupujani *et al.*, 2006). Of those respondents, 39.9% had misunderstanding on the cause of rabies (Wudu *et al.*, 2013). 45% respondents knew the correct mode of transmission (Lai *et al.*, 2005). This reported KAP revealed that 94.5% of respondents recognize rabies as danger and a fatal disease, 21.4% know that all warm blooded animals are susceptible to rabies and 71.3% aware that dogs are the most common source of rabies. About 76.8% of the respondents were aware of common clinical signs of rabies in animals (Asabe *et al.*, 2012). The good scores were higher in males (53.4%) than females (10.7%). The reported results suggested that statistically higher levels of educations were associated with higher knowledge scores. For

example all respondents with first degree and above education levels had good KAP of rabies (Andrea. and Jesse, 2012).

The reported results on this study area also show that, 70.8% of the respondents know that wound washing is immediate action after dog bite. Half of respondents (50.4%) sought medical care from health centers after being bitten by dogs, which may be due to lack information and unavailability of health centers in immediate vicinity. It also show that majority of the respondents indicated depopulation of stray dogs is effective measure for controlling the disease in Bahir Dar (Wudu *et al.*, 2013).

5.6 Rabies Knowledge, Attitude and Practices in the Awash Basin, Eastern Ethiopia

5.6.1 Health seeking knowledge

The reported results which done around Awash Basin shows that Pastoralists of the study area are likely not to go to a medical facility when bitten; reasons include distance to health facility/logistics, mistrust in the medical system, and poor knowledge of the disease fatal outcome. It is also reported Pastoral respondent showed to be a determinant for poorer knowledge of rabies particularly for rabies in people. Despite the presence of an extension health worker system, over half (58.7%) of the respondents said they would go to traditional healers if bitten. It is estimated that the majority of human rabies deaths occurs in rural rather than in urban areas (Knobel *et al.*, 2005; WHO, 2002).

5.6.2 Health delivery and disease awareness among health workers

From the report the main constraint to human rabies prevention in the study area was the quantitative lack of PEP and its immediate inaccessibility thus delaying severely the start of the prophylaxis. Wound cleaning was rarely performed as first aid, neither by the patients themselves nor the medical staff, (Fèvre *et al.*, 2005; Ichhpujani *et al.*, 2008; Sambo *et al.*, 2014). However, in the report it is suggested that immediate flushing of a bite wound for 15 minutes with water and soap can be lifesaving, as the virus is mechanically removed from the site or is rendered unable to invade tissue (John and Patnaik, 2005). Neglecting immediate wound flushing was shown to increase the risk of developing rabies by fivefold (Hampson *et al.*, 2008).

In the reported study results, 25% of health staff did not know that livestock can transmit the disease to people. Also only 2 out of 16 health workers knew that bats can transmit rabies. The fact that 25% of health workers thought that rabies is a bacterial disease raises the question as whether they thought PEP is an antibiotic and/or if they would treat the patient with antibiotics. (Sambo *et al.*, 2014).

5.6.3 Disease awareness among non-medical respondents

The reported study result shows that a high percentage of respondents, particularly pastoralists (79.2%) did not know how dogs acquire rabies. Water shortage, wind and consumption of rotten food were often given as reason in report. The fate of a rabid person was not known by the majority of the pastoralist respondents (up to 80%). The reported study showed that family nucleus and the community particularly amongst pastoralists played a central role in passing down knowledge about the disease whereas school and media played a minor role. Urban respondents may have better access to media, but pastoralists gather a lot of information from the pastoral community during transhumance with their animals. The report implies that the use of media can be instrumental to increase rabies awareness in a population, similarly as was and is being done with other diseases such as tuberculosis in Ethiopia; it targets large audience and can also help promoting responsible dog ownership (Hampson *et al.*, 2008).

6. Conclusion and Recommendations

Rabies remains an important yet neglected disease in Africa and particularly in Ethiopia. Disparities in the affordability and accessibility of post-exposure treatment and risks of exposure to rabid dogs result in a skewed distribution of the disease burden across society, with the major impact falling on those living in poor rural communities, in particular on children. There is huge gap in knowledge, attitude and practice of the Ethiopian society with slight variability between regions, the least level of awareness being seen in pastoral community. The proportion of the community that has got information about rabies from media is often small (16% in Jimma, 21.5 % in Addis Ababa) and the quality of information received is often poor. There are several misconceptions about rabies including believing that rabies in dogs is caused by starvation, thirst and prolonged exposure to sun heat; high reliance on the unproven traditional medication (e.g. 84% in Gondar zone); believing that taking traditional treatment and crossing river to travel to health facilities in search of medical care earlier than 40 days post-exposure can cause death. The practice of dog vaccination is almost none existent in rural areas due to lack of awareness and even in the urban areas where there is better awareness, the practice is very low due to unavailability of vaccines and high cost of vaccine. The failure to receive PEP was a major factor in the number of human cases in Ethiopia. Rabies is continuing to expand its range worldwide. New regions are affected, new vectors become important. Effective vaccines and economic regimens are

available. But shortage in immunoglobulin's and treatment mistakes result in normally preventable human deaths. The study shows high canine rabies burden, and lack of sufficient awareness about the disease and high reliance on traditional treatment that interfere with timely post exposure management.

Based on this conclusion the following recommendations are forwarded:

✓ Further studies need to be conducted on both human and animal rabies. Dog bite injuries need to be used to estimate the public health burden of rabies, underreporting problems and to monitor epidemiological trends.

✓ Increasing dog vaccination coverage, enforcing mandatory rabies vaccination, improving the availability of proper post exposure prophylactic treatment for humans and creating public awareness about rabies through various media outlets are suggested intervention strategies to reduce the disease burden.

✓ Providing subsidized rabies vaccines for dogs and PEP treatment for humans is essential to improve coverage and utilization of modern, scientifically proven and effective rabies control methods especially for poor rural farming and pastoral communities.

✓ The practice of traditional healers must be closely scrutinized and scientifically tested for efficacy.

Corresponding Author:

Dr. Gudeta Mojo Hawas

Addis Ababa University College of Veterinary Medicine, Ethiopia

Telephone: +251921726339

E-mail: gudetajambo.edu.aau@gmail.com

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