

Assessment of retrospective rabies suspected cases registered at two hospitals, community and traditional healers' knowledge, attitude and practices in south Ethiopian pastoralist.

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Abstract

Despite of available protective rabies vaccines for both human and animal, transmission of rabies from animals to people continues in Africa and Asia. Every year, over 59,000 people are estimated to die from the disease globally. Most of industrialized countries in Europe and North America have eliminated rabies from domestic dog populations. However, in the majority of developing countries, rabies remains endemic in domestic dog and poorly controlled. To understand rabies situation in pastoralist and agro-pastoralists area of southern Ethiopian, retrospective data on 431 rabies suspected animal bite cases registered at Bule Hora and Yabello Hospitals were collected and reviewed. Moreover, the knowledge, attitude and practice of 107 selected community members and 55 traditional healers were assessed. Out of 431 cases, 55.7% and 24.4% were ≤ 15 and between 16-25 years age group, respectively. There were more male 55.5% cases than female 44.5%. Only 32% of cases registered at Yabello Hospital received post exposure prophylaxis (PEP), whereas the remaining referred to other health facilities. Ninety eight percent (98 %) of animal responsible for the bite was dog and the remaining were cat, fox and donkey. Most of bites were occurred in March-June (36.2%) and November-February (35.5%). Out of interviewed participants 87.8% of them know rabies and 83.2% were able to mention rabid animals' symptoms. The 78.5% of participants did mention how rabies transmitted to dog and 88.1 % of them described dog as main source of infection. The 91.6% of participants told us that rabies is transmit-

ted to human by rabid animals' bite and 94.3% of them believe that rabies is treatable disease and the major means of prevention is traditional treatment. Almost all traditional healers mention that the symptom of rabies in human and animals, and its way of transmission; however 90.9% of them believe that traditional treatment as effective means of rabies control. Interview result of both community members and traditional healers indicated that most of the rabies cases treated by the traditional healers. Health service providers have to make PEP vaccines available for bite victims and need to raise awareness of the local communities through health education about rabies and animal bite management.

Keyword: Retrospective Study; Rabies; South Ethiopia; pastoralists

Introduction

Rabies is one of the highly fatal zoonosis, but globally neglected, more specifically in developing countries (Knobel *et al.*, 2005). The disease is caused by a negative-stranded RNA virus of the *Rhabdoviridae* family (Dietzschold *et al.*, 2005) a negative-stranded RNA virus of the rhabdovirus family. RV pathogenesis, like that of other viruses, is a multigenic trait. Recent findings indicate that in addition to the RV G protein viral elements that regulate gene expression, especially expression of the L gene, are also likely to play a role in RV pathogenesis. In vivo, RV infects almost exclusively neurons, and neuroinvasiveness is the major defining characteristic of a classical RV infection. A key factor in the neuroinvasion of RV is transsynaptic neuronal spread. While the ability of RV to spread from the post-synaptic site to the pre-synaptic site is mediated by the RV G protein, the RV P protein might be an important determinant of retrograde transport of the virus within axons. Although the mechanism(s) and a fatal disease that affects domestic and wild animals, and is spread to people through close contact with infectious material, usually saliva, via deep bites or scratches. Once the symptoms of the disease have developed, rabies is nearly always fatal. Dogs are the main host and transmitter of rabies (Vodopija *et al.*, 2016). Despite of available protective rabies vaccines for both human and animal, transmission from animals to people continues. In Africa and Asia, more than 59,000 people die annually from the disease (Léchenne *et al.*, 2016; Zinsstag *et al.*, 2017). Most of industrialized countries in Europe and North America have eliminated rabies from domestic dog populations (Hampson *et al.*, 2015). A concerted effort by South and Central American countries has reduced dog rabies transmission close to elimination (Hampson *et al.*, 2007).

However, in the majority of developing countries, rabies remains endemic in domestic dog and poorly controlled (Hampson et al., 2015).

Ethiopia has one of the highest incidence levels of human rabies in Africa, with 3–7 deaths per 100,000 people annually (Beyene et al., 2018). Deressa et al 2010 reported 35-58 annual human death due to rabies in Addis Ababa and its surrounding during 2001-2009 (Deressa et al., 2010). The impact of rabies in Ethiopia is aggravated due to limited availability, accessibility, affordability, awareness and knowledge of rabies PEP after exposure to rabid dogs and other animals (Jemberu et al., 2013). In addition to health impact the disease also affect livelihood through losses of valuable livestock and cost of travel to health center for PEP treatment (Yimer et al., 2002). Jibat et al estimated annual national economic losses of 209 million USD due to rabies in cattle (Jibat et al., 2016) and on average 2 million USD treatment costs for PEP in Ethiopia (Beyene et al., 2018).

In Ethiopia, the majority of rabies cases are diagnosed on clinical symptoms only, attributed to the distance to centrally located diagnostic facility at Ethiopian Public Health Institute, and the absence of a reliable laboratory-based surveillance system in the rest of country. Consequently, rabies case reporting rate from urban and rural sectors are low. The majority of exposed patients use traditional healers, in particularly in the rural areas. The limited available data indicates that it is the disease of public health, economic and social concern (Jibat *et al.*, 2016). Given the uncertain rabies situation in the Ethiopian, specifically in West Guji and Borena Zones, it was an important to assess the situation of the disease in the areas as well as knowledge, attitude and practice of the people towards rabies in general. The aim of study was to contribute to better understanding of situation of the disease that would, in turn assist control measures. Therefore, the case records of rabies suspected animal bites were retrospectively assessed in Bule Hora and Yabello Hospitals in southern Ethiopia. Knowledge, attitude and practice of the people and traditional healers about rabies were also assessed.

Materials and Methods

The study area

Retrospective study was conducted in 2016, in West Guji and Borena Zones of Oromia regional state in south Ethiopia. The zonal capitals, Bule Hora and

Yabello, are located at 470 and 560 km from Addis Ababa, respectively (Fig. 1). The two zones has an area of 45,435 square kilometers, a human population of 1.15 million and a livestock population of 1.13 million cattle, 1.06 million small ruminants, 0.072 million equines and 0.1 million camels (CSA, 2011).

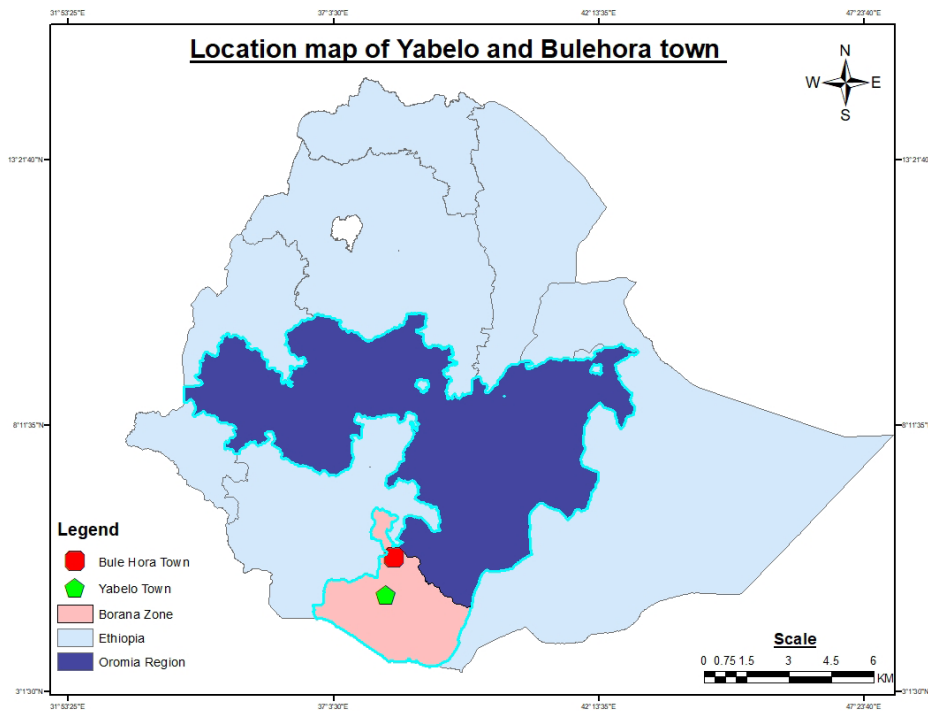


Figure 1: Map of Yabello and Bule Hora town

Sampling methods

Bule Hora and Yabello districts were selected purposively due to availability of hospitals from West Guji and Borena zones, respectively. There were only two hospitals in the two zones. Cases registered from November 2014-June 2016 at Yabello and March 2015 – September 2016 at Bule Hora Hospitals were reviewed. A predesigned format was used to collect data that basically establish age and sex profiles of patients, patient management at hospitals, if died case report, season of case report, animal responsible for bite. Two hundred sixty-eight and 163 rabies suspected case records were reviewed from Yabello and Bule Hora Hospitals, respectively.

Twenty-three and 19 Kebeles (a lowest government administrative unit) were randomly selected from list of kebeles in Bule Hora and Yabello district, respectively. In Bule Hora, 3 urban and 20 rural kebeles were included, while all 19 kebeles in Yabello district were from rural areas. Data was collected through a structured questioner survey. Questionnaire was translated into *Afaan Oromo* (a local language), and interview was made in *Afaan Oromo*. One hundred seven (107) voluntary community members and 55 traditional healers were interviewed. The questionnaires address the respondents' knowledge about rabies (causes, means of transmission, treatment after animal bite and prevention methods). The questionnaires for traditional healers explore their knowledge about rabies and how they handle rabies cases. All participants gave their oral informed consent before interview.

Data management and analysis

Data collected were coded and entered into Microsoft Excel spreadsheet, double checked with questionnaire information to avoid errors and then cleaned data import to STATA. Descriptive statistics such as frequency and percentage were used to summarize the data.

Result

Among 431 rabies suspected animal bite cases 55.7% were children (age ≤ 15 years) and 24.4% young (16-25 years) age group. There was more male 55.5% cases than female 44.5%. Two hundred sixty-eight cases registered at Yabello Hospital, only 32% were received PEP, whereas all cases registered at Bule Hora Hospital received PEP. Out of animals responsible for the bites, 98% were dogs and the remaining were cat, fox and donkey. Over all cases registered at two hospitals, 67.7% of them were received PEP, while 32.3% was made wound treatment and referred to other health facilities. The majority of cases were occurring in summer (36.2%) and winter (35.5%) seasons (Table 1).

Table 1: Rabies suspected animal bites registered at Bule Hora and Yabello Hospitals

Variables	Categories	Frequency (%)	P-Value
Hospitals(N=431)	Bule Hora	163 (37.8)	
	Yabello	268 (62.2)	
Gender	Male	239 (55.5)	0.262
	Female	192 (44.5)	
Cases by age categories (N=431)	≤15	240 (55.7)	0.118
	16-25	105 (24.3)	
	26-35	37 (8.6)	
	>35	49 (11.4)	
Animals responsible for bite (N=405)	Dog	397 (98)	0.001
	Cat	2 (0.5)	
	Fox	1 (0.3)	
	Donkey	5 (1.2)	
Care given at hospitals (N=368)	PEP (Bule Hora=163, Yabello=86)	249 (67.7)	
	Referred (Bule Hora=0, Yabello=119))	119 (32.3)	
Cases by four seasons(N=431)	Mar-June (major rain)	156 (36.2)	0.001
	July-August (minor dry season)	63(14.6)	
	Sept-Oct. (minor rain season)	59(13.7)	
	Nov-Feb (Major dry season)	153(35.5)	
Rabies suspected case death report (N=431)	Death*	1 (0.23)	

*Death report mentioned in this retrospective study was not confirmed by laboratory diagnosis and only based on clinical diagnosis.

The knowledge and practices of 107 interviewed participants revealed that 87.8% of them has knowledge of dog rabies while, 12.3% has no knowledge of dog rabies. Seventy two percent (72%) of the participant own dogs and uses dog as house or livestock guard. Out of 107 participants, 83.2% were able to mentioned rabid animals' symptoms, while the remaining 16.8% unable to describe rabies symptom. The 78.5% of participants were mentioned how rabies transmitted to dog and 88.1 % of them described a dog as main source of infection. Most of the participants (91.6%) mentioned that rabies transmitted to human by rabid animals' bites, 5.6% described as eating raw meat transmit

rabies, while the remaining 2.8% didn't know how rabies transmit. Thirty-eight-point three percent (38.3%) of interviewed participants didn't know the reservoir of rabies, while the remaining participants mentioned either dog or other animals as reservoirs. Among interviewed participants 59.8% of them; their family members were exposed to rabid animals during the last 10 years. The family members exposed to bites, 43.5% of them exposed more than two times. About 73.4% of victims were treated by traditional healers. Most of victims were children 64.7% and women 23.5%. The 94.3% of participants believe that rabies is a curable disease. Among 66.4% of participants who believe that human rabies is preventable; they mentioned that the prevention is made by traditional treatment 60.6%, killing rabid animals 14.1%, dog control 7% and by avoiding contact with rabid animals 2.8% (Table 2).

The interview result of traditional healers revealed that 80.4% of them were illiterate (can't read and write) and 54.7% of them has more than 20 years of traditional healers' services. The 58.5% (31/53) participants mentioned that dog as the animal affected by rabies, while, 41.5% of them mentioned that rabies can affect all animal species. Almost all participants mentioned that one or more symptoms of rabies in animals and human (Table 3). Almost all (98.2%) of participants mentioned that rabies as a treatable disease and 90.9% of them believe that the traditional treatment is an effective control method for rabies. Among 87.3 % of the traditional healers who had opportunity to treat rabies suspected exposure cases they clam 93.8 % of them as successful and 6.2 % as failure (Table 3).

Table 2: Knowledge, Attitude and Practice of 107 interviewed participants.

Variables	Categories	Frequency (%)	
		Yes	No
Participants by District (N=107)	Bule Hora	66 (61.7)	
	Yabello	41 (38.3)	
Own dog(s) (N=107)		77 (72)	30 (28)
Purpose to keep dog (N=77)	House/livestock guard	77 (100)	
Know dog rabies (N=107)		94 (87.8)	13 (12.2)
Rabies symptom (N=89)	prodromal	4 (4.5)	
	furious	38 (42.7)	
	paralytic & furious	47 (52.8)	
From where dog acquired rabies (N=84)	Dog	74 (88.1)	
	Other animals	7 (8.3)	
	Environment	3 (3.6)	
Reservoir of dog rabies (N=107)	Dog	45 (42.1)	
	Other animals	21 (19.6)	
	Don't know	41 (38.3)	
How rabies transmits to human (N=107)	Biting by rabid animal	98 (91.6)	
	Eating raw meat	6 (5.6)	
	Don't know	3 (2.8)	
Experience of family member bitten by animals in last 10 years (N=107)		64 (59.8)	43 (40.2)
Frequency of bite (N=62)	At least once	35 (56.5)	
	≥ 2times	27 (43.5)	
Where did Victim treated (N=64)	PEP*	16 (25)	
	Traditional medicine	47 (73.4)	
	local wound treatment	1 (1.6)	
Most victim dog/animal bite (N=102)	Men	8 (7.8)	
	Women	24(23.5)	
	men and women	2(2)	
	Children	66 (64.7)	
	children and women	2(2)	
Is human rabies treatable (N=106)		100 (94.3)	6 (5.7)
How human rabies can be prevented (N=71)	Vaccination	11 (15.5)	
	Traditional treatment	43 (60.6)	
	Dog control	5 (7)	
	Avoid contact with rabid animals	2 (2.8)	
	Kill rabid animals	10 (14.1)	

*PEP= Post exposure prophylaxis

Table 3: Knowledge, Attitude and Practice of 55 interviewed traditional healers.

Variables	Categories	Frequency (%)	
		Yes	No
Participant by district (N=55)	Bule Hora	42 (76.4)	
	Yabello	13 (23.6)	
Education status (N=51)	Illiterate (can't read & write)	41 (80.4)	
	Elementary (grade 1-8)	8 (15.7)	
	High school (9-12)	2 (3.9)	
Service year as healer (N=53)	<10	10 (18.9)	
	10-20	14 (26.4)	
	>20	29 (54.7)	
Animal affected by rabies (N=53)	dog	31 (58.5)	
	All animal species	22 (41.5)	
Rabies symptom in animals (N=55)	Prodromal	6 (10.9)	
	Furious	6 (10.9)	
	Paralytic	43 (78.2)	
Rabies symptom in human (N=54)	Anxiety	52 (96.3)	
	Confusion	2 (3.7)	
Is rabies treatable (N=55)		54 (98.2)	1(1.8)
Treatment for rabies(N=55)	Traditional treatment	50 (90.9)	
	Modern	5 (9.1)	
Experience to treat rabies cases (N=53)		49 (92.5)	4(7.5)
outcome of treatment (N=48)	Cured	45 (93.8)	
	death	3 (6.2)	

Discussion

In the present retrospective case study, among rabies suspected animal bite cases, 55.7% were children while 24.4% young age group. There were more male cases than female, 55.5% and 44.5%, respectively. Comparable reports were from Oman, 70% male cases, and 26% of 10-19 age group (Abaidani et al., 2015), 62.8% male cases and 38.5% of cases were children in Ethiopia (Yibrah

and Damtie, 2015). Teklu et al from Ethiopia was reported more male cases (63%) and children (63%) (Teklu et al., 2017). More male exposure to animal bite may be due to the fact that men tends to approach or handle animals with strange behavior, while children are more friend with pet when they are healthy and easily exposed to bite when rabid.

Among animal species responsible for the bites 98% was due to dog, while the remaining were cat, fox and donkey. Different report was from Oman where most common bites from cats (Abaidani et al., 2015). This difference may be due to cultural and religion differences to keep dog as pet animal. All cases registered at Bule Hora Hospital received PEP; whereas only 32% of cases registered at Yabello Hospital received PEP. Beyene et al (2018) reported similar finding from Yabello district that among 87 suspected victims only 28.7% were received PEP (Beyene et al., 2018). This low proportion of access to PEP was due to PEP vaccine unavailability. Most of the cases were occurred in main rainy and main dry seasons.

There was similar report from Amhara region of Ethiopia (Yibrah and Damtie, 2015). These seasonal differences may be due to the dogs' seasonal activities, such as breeding seasons in rainy season and dogs' migration to urban village for food scavenging in the dry season.

In the present study 87.8% of interviewed participants have knowledge of dog rabies and 72% of them use dog as guarding house or their livestock. When livestock guarding dog get rabid it can bite lot of village livestock and herding children before family recognized the disease. Among 107 participants, 83.2% of them mentioned rabies symptom and 78.5% of them described how dog contract the disease. The 91.6% of the participants mentioned that rabies transmitted to human by rabid animal bites. The comparable result was reported from Addis Ababa and northern Ethiopian (Ali et al., 2013; Jemberu et al., 2013) and Tanzania (Sambo et al., 2014). Regarding practice and exposed family members' managements, 73.4% of them were treated by traditional healers. Jemberu et al reported higher rate of victims treated by traditional healers in north Ethiopia than present result (Jemberu et al., 2013). This difference may be due to level of awareness or trust on traditional healers than modern medicine in the northern Ethiopia.

Among the interviewed 55 traditional healers, 80.4% of them were illiterate (can't read & write) and almost all of them mentioned rabies symptom and

as treatable disease. Most of traditional healers, 90.9% of them believe that traditional treatment is an effective control method. This high level of belief on traditional treatment may be due to a knowledge on disease causing agent or healers wants to keep their respect in the community and healing/treating as source of income and economic benefit. Almost all traditional healers use the plants for both human and animals healing purposes. Among 87.3 % of the traditional healers who had opportunity to treat rabies suspected exposure cases 93.8 % of them reported as successful while 6.2 % as failure. However, the traditional healers claim such high rate of their treatment success, it must be handled with care in such a fatal disease unless it supported by scientific evidence. Moreover, cases they report may be bite victim than clinical cases.

Among 71.3% of rabies suspected animal bites, who registered at Yabello Hospital didn't receive PEP vaccine and further referred to other health providing facilities. Those victims were exposed to additional cost of travel and accommodation at treatment centers. Furthermore, it can delay start of PEP time and can increase the risk of onset of clinical rabies. Both interview result of 107 participants and 55 traditional healers indicated that most of rabies suspected animals bite victims rely on traditional healers' treatment and trust them than the government health providers. The local communities trust and dependency on traditional healers than the government may be due to strong cultural linkage with traditional healers and government service unavailability in the area. Therefore, this needs attention of regional and local health service providers to make available vaccines for PEP and create awareness through health education on rabies for local communities. Further study is needed to include more area coverage and retrospective study.

The limitations of present study were; retrospective rabies data on animal was not available, reported human death case in this study was not confirmed by laboratory diagnosis and only based on clinical diagnosis.

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Compliance with ethical standards

For questionnaire survey participants were briefed about the objectives of the study. All participants gave their oral informed consent before the interview.

Conflict interest

The authors declare that there is no conflict of interest.

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