

The Miracle Traditional Plants for the Treatment of Human Rabies in Central Highland of Ethiopia

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Abstract

A cross-sectional study was conducted from September 2018 to June 2019 in the central highlands of Ethiopia to assess the plants used to treat rabies-infected humans by traditional healers in the West and North Shoa zones. Eight woredas were purposefully chosen from each zone based on ethnobotanical potential. From each woreda, two potential kebeles were included. Each kebele's animal health and/or animal science practitioners chose all traditional healers and farmers who were knowledgeable about plants having anti-rabies. Accordingly, 170 farmers and 11 traditional healers were selected. A total of 17 species belonging to 15 families and 23 unidentified traditional plants having anti-rabies effects were assessed in this study. Regarding the preparation of medicinal plants for rabies treatment, various combinations of different traditional plants were utilized. They give it to both victims orally, whether they show clinical signs or not. The remedies are taken with water, skimmed milk, areki, enjera, meat, and the shell of a snail. Most of the cases of rabies were cured by traditional healers. In conclusion, potential traditional plants used by traditional healers to treat rabies must be assessed in different parts of the country and selected plants must be evaluated *in vitro* and *in vivo*.

Keywords: Human; Rabies; Traditional Healers; Traditional Plant

Introduction

Rabies is a zoonotic disease caused by the rabies virus, which causes an acute encephalitis illness in humans and animals in Ethiopia that has been present for centuries. The virus affects all mammals, and infected animals almost always die from the disease once clinical symptoms appear. The rabies virus is spread through an infected animal's saliva. The bite of an infected animal usually causes rabies in both animals and humans. If the mucous membranes (the wet parts of the eyes, nose, and mouth) or a scratch or break in the skin come into contact with rabies virus-containing saliva, the virus can enter the body. Once the rabies virus enters the body, it begins to multiply in the area near the entry site. If the infection is not stopped at this point, the virus will eventually invade the nerve cells in the area. Once the virus is in nerve tissue, it travels along the nerve to the center of multiplication (the brain). The virus may then spread to the salivary glands or other parts of the body. This incubation period lasts a varying amount of time; it can range from days to years, but the average length is 3 - 8 weeks [1].

Rabies is endemic in Africa and Asia, and the majority of human deaths from the disease occur in these regions [2]. Human mortality from endemic canine rabies was estimated to be 55,000 per year, with a yearly loss of 1.74 million disability-adjusted life years (DALYs) [3]. The annual cost of rabies in Africa and Asia is estimated to be US\$ 583.5 million, with post-exposure prophylaxis (PEP) accounting for the majority of the cost. Ethiopia, as a developing country, has a high rabies prevalence [4]. Ethiopia is one of the worst-affected countries in the world, with an estimated 10,000 people dying from rabies each year. Previous reports showed that dogs were the dominant species responsible for transmitting the rabies virus to humans and livestock in the country [5].

The primary source of rabies virus infection in humans and livestock is dog bites [6]. Many Ethiopian households own dogs, which are usually used to guard property. Although no formal studies have been conducted, it is estimated that one dog is owned by one out of every five households in the United States. Dog management is frequently inadequate, and dog vaccination is limited to a few dogs in urban areas. High dog populations and poor management contribute to Ethiopia's high endemicity of canine rabies [7]. Rabies has a significant economic impact in countries where canine rabies is endemic, such as Ethiopia, due to its effect on livestock. For example, the annual cost of livestock losses due to rabies in Africa and Asia is estimated to be US\$12.3 million [8].

The available rabies information in Ethiopia is largely based on passive reports to the Ethiopian Public Health Research Institute's zoonoses laboratory [9,10]. In countries with inadequate human and animal health information systems, passive reports typically underestimate disease incidence and are a poor indicator of disease status [11,12]. There is a lack of accurate quantitative data on rabies in humans and animals, and little is known about public awareness of the disease in order to implement effective control measures in Ethiopia.

In Ethiopia, individuals exposed to the rabies virus frequently seek treatment from traditional healers rather than the post-exposure vaccine. The traditional practice of handling rabies in humans is widespread, particularly in rural and some urban areas [6]. The vast majority of traditional healers reported that victims who developed clinical symptoms were cured. Despite the fact that the practice is widespread and the majority of people were cured, the plants used for treatments were not evaluated or documented.

Goal of the Study

The goal of this study was to evaluate the plants used by traditional healers to treat rabies-infected humans.

Materials and Methods

Study area

The research was carried out at various locations in Ethiopia's central highlands. The weather in the area is mildly cold, with temperatures ranging from 6 to 22 degrees Celsius. The area's average relative humidity is 59%. The annual temperature ranges from 18°C to 24°C, and the annual rainfall ranges from 1000 to 1225 mm. The region experiences bimodal rainfall, with a short rainy season from March to May and a long rainy season from June to September (HARC, 2008).

Study design and target population

From September 2018 to June 2019, a cross-sectional study was conducted in Ethiopia's central highlands to assess the plants used by traditional healers in the West and North Shoa zones to treat rabies-infected humans. Based on ethnobotanical potential, eight woredas were purposefully chosen from each zone. Two potential kebeles were chosen from each woreda. All traditional healers and farmers who were knowledgeable about anti-rabies plants were chosen by each kebele's animal health and/or animal science practitioners. As a result, 170 farmers and 11 traditional healers were chosen.

Questioner survey

The Animal Health Research Team developed and tested interview questions. Eleven well-known and respected traditional healers and 170 farmers with knowledge of the area were interviewed to learn the local names of the plants used to treat rabies, the parts of the plants used, the methods of preparation of remedies, the route of application of the remedies, and the dosage.

Plant identification

Different traditional plant Traditional plants used by traditional healers and farmers against rabies was compared with literature to identify the genus and species based on the local name of the plant.

Data management and analysis

All data generated during study were entered into MS-excel program and statistical analysis was performed by R statistical software version 4.1. Descriptive statistics were used to analyze quantitative data.

Result

In this study, 170 farmers and 11 traditional healers were interviewed, and 40 potential traditional plants for the treatment of rabies were identified. 22 plants were identified from the north Shoa, while the remaining 18 were from the west Shoa (Table 1).

Collection site		Number of respondents	Number of plant species	Percentage
Zone	Districts			
North Shoa	Aeltu	20	4	10
	Degem	20	3	7.5
	Grar Jarso	30	8	20
	Wuchale	20	7	17.5
Total		90	22	55
West shoa	Ambo	30	7	17.5
	Bako tibe	20	4	10
	Cheliya	20	3	7.5
	Ejersa lefo	21	4	10
Total		91	18	45

Table 1: Number of plants collected from study areas.

In this study, 17 species from 15 families and 23 unidentified traditional plants with anti-rabies properties were assessed. This finding indicates the presence of a significant diversity of plant species for rabies management in Ethiopia. This indicated that one of the OIE's listed critical human and livestock problems could be addressed by extensive use of traditional plants (Table 2).

Most of the respondents reported that leaf and root are frequently used plant parts to prepare the remedies (Figure 1).

Most of the traditional plants (23, or 57.6%) used for rabies remedies were not identified. Only the local name of the plant was identified, which requires further work on the identification of the scientific name of the plant (Table 3).

Family name	No. of medicinal plant species	Percentage
<i>Acanthaceae</i>	1	2.5
<i>Apocynaceae</i>	1	2.5
<i>Asteraceae</i>	2	5
<i>Crassulaceae</i>	1	2.5
<i>Cucurbitaceae</i>	1	2.5
<i>Euphorbiaceae</i>	2	5
<i>Fabaceae</i>	1	2.5
<i>Menispermaceae</i>	1	2.5
<i>Myrtaceae</i>	1	2.5
<i>Phytolaccaceae</i>	1	2.5
<i>Ramunculaceae</i>	1	2.5
<i>Salicaceae</i>	1	2.5
<i>Scrophulariaceae</i>	1	2.5
<i>Solanaceae</i>	1	2.5
<i>Zygophyllaceae</i>	1	2.5
Non identified	23	57.5

Table 2: Number of medicinal plant species under each plant family.

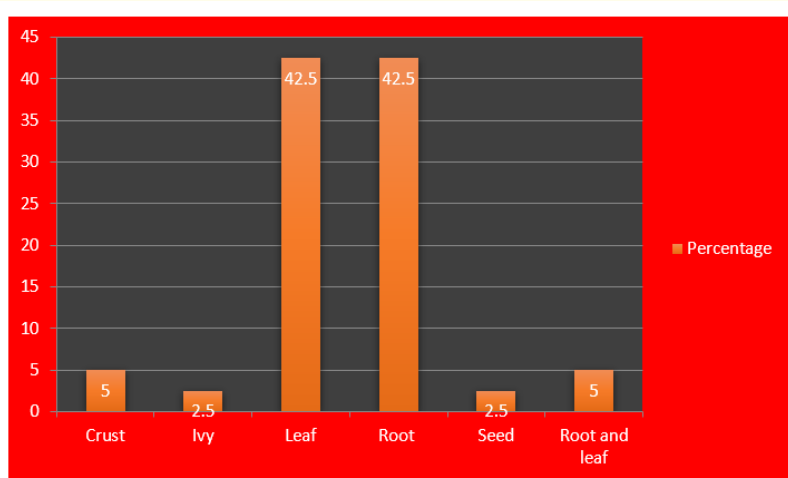


Figure 1: Plant parts used to prepare the remedies.

No.	Local name	Family name	Scientific name	Part used	No.	Local name	Family name	Scientific name	Part used
1	Adadi			leaf	26	Inchibree			Root
2	Afan ilbisaa			Root	27	Kajello			Leaf
3	Agam	Apocynaceae	<i>Carissa spinarum</i> L.	Leaf	28	Kebericho	Asteraceae	<i>Echinops kebericho</i> Mesfin	Root
4	Alaltu	Salicaceae	<i>Salix subserrata</i> Willd.	Leaf	29	Kelala	Menispermaceae	<i>Stephania abyssinica</i>	Root
5	Alle			Ivy	30	Memeqoo			Root
6	Araresa			Leaf	31	Meseret			Root
7	Arera			Leaf	32	Muti Bofa			Crest
8	Bahrzaf	Myrtaceae	<i>Eucalyptus camaldulensis</i> Dehnh.	Leaf	33	Qechema			Root
9	Bekenisa	Euphorbiaceae	<i>Croton macrostachyus</i> Del	Leaf	34	Qobo	Euphorbiaceae	<i>Ricinus communis</i> L.	Root
10	Besti			Leaf	35	Sensel	Acanthaceae	<i>Justicia schimperiana</i> (Hochst. ex Nees) T. Anders	Root and leaf
11	Boffa	Zygophyllaceae	<i>Pollieria hygrometra</i>	Crest	36	Sihide			Root
12	Bosoke	Crassulaceae	<i>Kalanchoe petitiiana</i> A. Rich	Root	37	Silale			Leaf
13	Cheka			Leaf	38	Tatto			Root
14	Digitta	Fabaceae	<i>Calpurnia aurea</i> (Aiton) Benth.	Seed	39	Ukee			Root
15	Digalu			Leaf	40	Yemdir embuway	Cucurbitaceae	<i>Cucumis ficifolius</i> A. Rich.	Leaf
16	Endod	Phytolaccaceae	<i>Phytolacca dodecandra</i> L. Hert	Root	27	Kajello			Leaf
17	Fiti	Ranunculaceae	<i>Clematis longicauda</i>	Root					
18	Gelano			Root and leaf					

19	Gindosh			Leaf				
20	Grawa	Asteraceae	<i>Vernonia amygdalina</i> Del.	Leaf				
21	Gura hare	Scrophulariaceae	<i>Verbascum-sinaiticum</i> Benth.	Root				
22	Hanqissa			Leaf				
23	Hiddi	Solanaceae	<i>Solanum marginatum</i> L.f.	Root				
24	Holoto			Root				
25	Hunkessa			Leaf				

Table 3: Traditional plant ant its part used to treat rabies.

Various combinations of different traditional plants were used in the preparation of medicinal plants for rabies treatment. They administer it orally to both victims, regardless of whether they exhibit clinical signs. The remedies are consumed with water, skimmed milk, areki, enjera, meat, and a snail shell. Traditional healers cured the majority of rabies cases. After the onset of clinical signs, traditional healers' miracle treatments cured rabies cases. The measurements used to determine dosages are not standardized and are dependent on the patient's age and physical appearance, the sociocultural explanation of the illness, the diagnosis, and the individual herbalist's experience (Table 4).

Treatment combination	Dose	Route of Administration
Besti (Leaf and Crust)	1 Cup	Oral
Kelalla (leaf) + Alleltu (Leaf) + Arera	1 Cup	Oral
Umuga (root)+Shell of Snail		Oral
Hidda Sihide (root) +Areke + injera	1 Bolus	Oral
Terro (root) + Injera	Bolus	Oral
Kojello+Muti Bofa (crust) +Hidde fiti+Milk with kita	Bolus	Oral
Digita (Seed) + Meat +Milk	Bolus	Oral
Yemdir embuway (leaf), gelano (root and leaf)	Cup	Oral
Bosoke Hundee Crushed Powdered then with milk and Injera or Kita	Peast	Oral
Fiti (Leaf)+Andode (Leaf) with Injera	Semi solid	Oral
Hidaa ukee + Free inchibrii + qechema (root)	Semi solid	Oral

Table 4: Combination of traditional plants and other ingredients of anti-rabies remedies by traditional healers.

Discussion

Ethiopia is one of the most rabies-affected countries in the world, with an estimated annual occurrence of 10,000 cases of human rabies, or 18.6 cases per 100,000 people [5]. Ethiopia is now the world's second-worst rabies-affected country, trailing only India. Lack of use of modern anti-rabies vaccines, a low level of public awareness, a lack of nationwide animal rabies surveillance, and poor government attention and resource allocation are major issues impeding rabies control in Ethiopia [13]. Plants used for traditional treatment by traditional healers and farmers have never been assessed in the central highlands of Ethiopia before, and thus, the present study was the first to assess those plants and the miracle of curing.

In the central highlands of Ethiopia, Yemidir embuway is one of the miraculous plants used by healers. Different authors in different parts of the country reported Aleltu (*Salix subserrata* Willd) [13], Qobo (*Ricinus communis*) [14], Digita (*Calpurnia aurea* (Ait.) Benth.) [15] and Yemidir embuway (*Cucumis ficifolius* A. Rich) [16] as anti-rabies traditional plants. Most of the traditional healers in our study area also used this plant as a miracle treatment for rabies. This may be due to the similarity of the fauna in most part of Ethiopia.

All eleven (11) traditional healers in our study administered their remedies orally, and farmers with knowledge of traditional plants reported the oral route as the primary route as well. This finding is consistent with Teklehaymanot and Giday [16] findings that 51.4% of traditional healers use the oral route.

Traditional healers in our study area cured rabies victims both before and after clinical signs appeared. According to Tamirat., *et al.* [17], rabies victims in the Arba Mich area of Ethiopia prefer traditional healers than conventional post-exposure prophylaxis. This indicated that Ethiopians prefer traditional rabies remedies due to their miraculous curing potential in clinically positive victims.

Conclusion and Recommendations

Rabies is a zoonotic disease caused by the rabies virus, which causes an acute encephalitis illness that has been prevalent in humans and animals in Ethiopia for centuries. Ethiopia has been considered among the most rabies-affected countries in the world, with an estimated annual occurrence of 10,000 cases of human rabies, which is equivalent to 18.6 cases per 100,000 people. In Ethiopia, individuals who are exposed to the rabies virus often see traditional healers for the diagnosis and treatment of the disease rather than the post-exposure vaccine. Most traditional healers reported that victims who developed clinical signs were cured. A total of 17 identified plant species and 23 unidentified traditional plants having anti-rabies effect were assessed in this study. Regarding the preparation of medicinal plants for rabies treatment, various combinations of different traditional plants were utilized. They give it to both victims orally, whether they show clinical signs or not. The remedies are taken with water, skimmed milk, areki, enjera, meat, and the shell of a snail. Most of the cases of rabies were cured by traditional healers. Traditional healers' miracle treatments cured rabies cases after clinical signs. Based on the above concluding remark the following recommendations were suggested:

- Potential traditional plants used by traditional healer to treat rabies must be assessed in different parts of the country.
- An *in vitro* and *in vivo* evaluation of different traditional plants must be conducted.
- One health approach must be implemented to exploit the local knowledge of traditional healers.

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