

Significance of Traditional Medicinal Plants used for Treatment of Rabies at Ambo Town

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Abstract

Clinical study was conducted on Significance of Traditional Medicinal Plants Used for Treatment of Rabies Disease at Ambo Towna in west Shoa zone, Oromia regional state at the North East part of Ethiopia. The objectives of the study were to assess and document traditional medicinal plants used for curing rabies disease and to assess the traditional knowledge of native healer for curing rabies disease. Case Study was conducted by randomly selecting and interviewing by questionnaire with the help of translators and native traditional doctor to gather information on the knowledge of medicinal plants used to diagnoses the rabies. 30 people on average were chosen for statistical analysis of which 50% were male and 50% female. Three species of plants were documented and assessed for the present investigations viz, *Phytolacca dodecandra* (Endod), *Croton macrostachyus* (Bisana) and *Amaranthus spinosus* (Dalle). We were able to show the significant values for Traditional Medicine (Plants) when we compared the cure/ treatment with Allopathic Medicine. Statistical analyses (ANOVA) gave a positive value for Traditional Medicine ($F=3.0205$ -Homogeneous) and Allopathic Medicine ($F=4.9692$ a non Homogeneous) at F-table value at 5% level with (2, 27) degrees of freedom showing that these are potential medicine for curing Rabies. Based on our clinical investigations we recommend Traditional Medicine from Plants which has greater potency to diagnose can be helpful to common/ Natives who cannot afford to go to Allopathic Medicine.

Keywords: Rabies; Traditional Medicine -T.M; Allopathic Medicine-A.M; Medicinal Plants; Infectious Disease; Traditional Healers; Improved traditional medicines (ITM) Dog Management

Introduction

Traditional medicine is an ancient medical practice which exists, in the communities before the advent of Modern health sciences. Traditional medicine is based on indigenous theories, beliefs and experience that are conserved down from generations [1]. Several countries of Africa have realized the need and importance to develop improved traditional medicines (ITM) from native and endemic plants that are traditionally used at various places for various ailments [2]. Present investigation was focused to Ambo Town of Ethiopia.

80% of Ethiopians use traditional medicine as their primary source of health care. (A historical overview of traditional medicine practices and policy in Ethiopia). Traditional medicine remains paramount to the Ethiopian people, WHO [3] estimate 90% of the Ethiopia population use traditional medicine as its first choice for day to day health care needs [4].

Rabies is a fatal zoonosis disease which causes encephalitis in all warm blooded animals and humans. There have been indications about the Occurrence of rabies from the time of Homer (Eighth century / 850 B.C) onwards and it is originated about 3000 B.C. The word “rabha” meaning violence has been known for more than 4300years [5]. Rabies is an acute encephalitis illness caused by rabies virus. Rabies virus is the pro type species belongs to family of Rhabdoviridae, effects virtually all mammal's once clinical signs are manifested [6]. Rabies is endemic in the developing countries of Africa and Asia, which also leads to death [7]. Rabies disease has no treatment once signs began but in 1885 Louis Pasteur and Emile Roux developed an extremely effective rabies vaccine that provides immunity to rabies. Rabies is a preventable viral disease of mammals most often transmitted through bite of rabid animals by contamination of saliva of infected hosts to an infected animal. The early symptoms of rabies in human are non-specific, consisting of fever, head ache and general malaise, etc. Rabies disease is preventing in peoples by eliminating rabies through animal's vaccinations as well as by preventing entry of infected dogs and wild animals in close proximity to domesticated animals to prevent the contamination with infected saliva [6].

In Ethiopia individuals who are exposed to rabies virus often see traditional healers for the diagnosis [8] as majority of human rabies cases are from bites of rabid dogs. According to the Ethiopian Health and Nutrition research Institute (EHNRI), rabies has been endemic in Ethiopia since the early 17th century. The first major outbreaks of rabies in Ethiopia reported in 1884. WHO [9] estimated about 70,000 deaths of humans by rabies every year worldwide [10-12].

Rabies can be well controlled among domesticated animals by different types of useful and widely available vaccines, Canine rabies continued to be a serious problem in Africa, including Ethiopia [13]. In Ethiopia the number of dog to human ratio is approximately assumed to between 1:6 - 1:8 in urban and rural areas, respectively. Low level of public awareness, lack of nationwide rabies (dog) surveillance, poor attention, resource allocation by the government is major important problem that hinder the control of rabies in Ethiopia. Ethiopia being one of the developing countries is highly endemic for rabies approximately 10,000 people were estimated to die of rabies annually in Ethiopia which makes it to be one of the worst affected countries in the world [14]. Dogs are the principal source of infection for humans and livestock [15].

The efficacy for some of these ethno – medical and ethno – veterinary plants against rabies where evaluated with modern pharmaceutical practices by few researches in the country. There are many species of plants which are used by Traditional healers [16] but in our present investigation we made initial attempts on three plants sp viz *Phytolacca dodecandra*, *Croton macrostachyus* and *Amaranthus spinosus* which

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was compared with the Allopathic medicine.

Traditional healers use traditional plants like *Phytolacca dodecandra* (Endod) which belongs to family “Phytocaceae” is perennial plant used for treatment of Rabies which is native to North America, South America, East Asia and Ethiopia [17]. The plant contains phytolacca toxin which is poisonous to mammals, has been used as detergent as well as traditional medicine in Ethiopia [18]. Petros Admasu et al., [19] evaluated the efficacy of antirabies from the extracts of roots and leaves of *P.dodecandra* in mice showed anti-rabies effect. The Chemical compounds responsible for the cure is still not known.

Croton macrostachyus (Bisana) is belongs to family “Euphorbiaceae” is a deciduous tree, used for Traditional medicine to treat rabies, epilepsy, cough, skin disease, dysentery, lung complaints, plain full eyes, toothache etc. [20]. The treatment given by Zawge Takle Mariam has 19 plants including the bark of *Croton macrostachyus* [21]. In Ethiopia is has many uses like leaf extract is applied to against itchy and root or stem bark is chewed to treat tooth ache and rabies [22].

Amaranthes spinosus (Dadlile) belongs to family “Amarathoideae” is an annual plant some species are used as leafy vegetable. The seed of Amaranths are used to treat rabies [23]. The nature of the chemical compounds used for the cure is yet to be investigated.

According to WHO average cost of rabies immunization in Africa is around US \$49 in, which is very expensive to the rural communities. In Ethiopia individuals who are exposed to rabies often go to traditional healers for the diagnosis. Priliminary investigation carried out to address the following questions viz;

1. Traditional medicinal plants used to treat rabies at AMBO TOWN?
2. Which parts of the plants are used for the treatment/ Cure?
3. What is the mode of preparation and administration of medicine used?
4. To Asses and document traditional medicinal plants used for treatment of Rabies at Ambo town and compare with the Allopathic medicine.

The treatments recommended for people bitten by rabid dogs have been recorded in many Ethiopian medical books since the early 17th century [24]. The employment of a wide variety of supposed cures by early traditional practitioners illustrated the well-established character of the traditional pharmacopoeia in the country [25]. Medicinal plants are plants that are commonly used in treating and preventing specific diseases to humans [26].

Significance of the Study

The study helps to identify the traditional medicinal plants used for the treatment of rabies at Ambo Town which also provides information regarding the plants parts are used for medicinal purpose. Further, it will help other researchers as guide line or reference to conduct their activity effectively in investigating the Chemical Compounds/ Biomolecules which are present in the plant parts as Medicine We try to investigate and give different backward communities the importance and low cost which can be easily assessed. This survey and analysis of the different patients will give the thorough knowledge Rabies which can be healed from these plants conserved for future generation with its scientific importance which can be lost in due course of time. The treatment found to be much better than English when we compared statistically significant and low cost. According to the WHO, up to 80% of indigenous populations rely on traditional medicines and more

than 30% of the entire plant species at one time or others were used for medicinal purpose. African countries compare to modern system of medicine and the health care system of rural population depend on indigenous systems of medicine.

The most cost effective strategy for preventing rabies in people is by eliminating rabies in dogs through animal vaccinations as well as by prevents entry of stray dogs and wild animals in close proximity to domesticated animals to prevent contact of contaminated saliva [6].

Materials and Methods

The Investigations were conducted at Ambo town is located in west shoa zone, Oromia regional state, 112 km from Addis Ababa towards west direction. Elevated at 2100–2200 m above sea level and receive annual rain fall 900mm with average minimum and maximum temperature at 15°C and 29°C respectively.

Study pattern and period

Across sectional study was conducted six months. This design was used to assess the traditional medicine to asses and document traditional medicinal plant parts used for curing rabies disease to compare with Allopathic medicine.

Study population

The proposed population for this study was Traditional Plant Medicine clinics of AMBO TOWN by collaborating with the Traditional native Doctors and collecting the data from the patients who are in coming to clinic (30 Patients with different sex, age and other factors have been taken into consideration to document the data).

Method of data collection

Data was collected by utilizing the prepared questionnaire and by interviewing the respondents keeping personal attention Confidential.

Method of data analysis

Data was analyzed using descriptive method and the results presented using tables and graphs. The analysis was completed in times as for the schedule plan. The analyzed data were interpreted and presented by using Statistical Methods (Table 1).

Results

The study population among the different Rabies affected patients (30) was identified according to their sex, religion, occupation status, economic status and educational level. Out the total population in the study area 50% were identified as males and 50% as females (Graph 1). This population Concerning to their religion identified as 28% were orthodox, 32% protestant, 20% muslim, 12% were wakefata and 8% were catholic (Graph 1). For each plant 10 patients were selected in random

Botanical Name	Amharic Name	Part of the plant used	Mode/Method of use
<i>Phytolacca dodecandra</i> (Phytolaccaceae)	Endod	Root	Grinding the root parts and homogenizing with water taken orally one cup for 3 days.
<i>Croton macrostachyus</i> (Euphorbiaceae)	Bisana	Root and stem bark	Chewing and swallowing the juice three times/Day.
<i>Amaranthes spinosus</i> (Amaranthoideae)	Dalile	Seed	Seed kernel is buried under fire source for seven days, then one tea spoon full powder taken with water left over from cheesing (Whey).

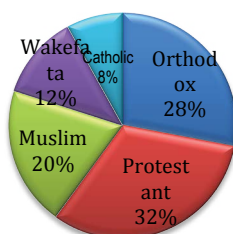
Table 1: Traditional medicinal plant parts used to cure rabies.

that are affected by Rabies. Three plants were used for the treatment of rabies by three different sets of Patients of 10 each—in comparison of the Traditional Medicine with Allopathic Medicine correlation was done with age and both medicine. Regarding occupational status 7% were governmental employed, 20% merchant, 30% daily labor and 43% were farmers. According to economic status of the population 17% financially sound, 46% lower class and 37% were middle class. By educational status 43% were illiterate and 57% were literate [27].

Phytolacca dedecandra gave 0.34709 gave correlation between age for Traditional Medicine and - 0.32455 for Allopathic medicine in terms of days of cure (Table 2, Figure 1) with an average of 21 days for T.M and E.M/A.M as 34 days.

Croton macrostachyus gave 0.238764 correlations between age for Traditional Medicine and -0.26903 for Allopathic medicine in terms of

RELIGION



Graph 1. Religion information of the respondents.

S.no.	sex	Age	T.M (days)	A.M (days)
1	M	55	21	30
2	F	40	22	34
3	M	14	20	37
4	F	22	21	30
5	F	30	22	32
6	M	20	18	30
7	M	24	21	39
8	F	20	22	39
9	F	22	21	32
10	M	31	22	38

Table 2: Comparison of T.M. and A.M of *Phytolacca dedecandra* (Endod).



Figure 1: *Phytolacca dodecandra* (Phytolaccaceae).

S.no.	sex	Age	T.M (days)	A.M (days)
1	F	15	24	32
2	F	17	21	30
3	M	23	22	32
4	M	16	21	33
5	F	16	20	39
6	F	18	22	30
7	M	23	20	38
8	M	28	23	30
9	F	21	20	31
10	M	28	23	30

Table 3: Comparison of T.M. and A.M *Croton macrostachyus* (Bisana).



Figure 2. *Croton macrostachyus* (Euphorbiaceae).

days of cure (Table 3 and Figure 2) with an average of 22 days for T.M and E.M/A.M as 33 days.

Amaranthes spinosus gave 0.058066 Correlation between age for Traditional Medicine and 0.11081 for Allopathic medicine in terms of days of cure with an average of 19 days for T.M and E.M/A.M as 30 days (Table 4 and Figure 3).

The difference between the three Plants species in terms of days of cure of the both Traditional medicine and Allopathic medicine are shown in the (Table 5) along with the correlation between the age between Traditional medicine and Allopathic medicine.

ANOVA significant test was done for two Medicines i.e. two separate tables for Traditional and Allopathic Medicine (Tables 5 and 6)

ANOVA the statistical test was performed for the both the Traditional Medicine and Allopathic Medicine for the three Plant species which were used in the Present Investigation. To check the hypothesis for F Ratio at 5% of 2, 27 degree of freedom. Out of the two treatments tested Traditional Medicine (Tables 6 and 7) showed positive results on Statistical Analysis, since ANOVA hypothesis showed homogeneous for the plants species for Rabies and Allopathic medicine/Treatment showed a non-homogeneous pattern proving our investigations Strongly supporting the traditional medicine when compared with the Allopathic medicine by observing and discussing with patients and also dog affected with Rabies (Figure 4) have been depicted in Figures 5 and 6.

Discussion

S.no	Sex	Age	T.M (days)	A.M (days)
1	M	28	16	31
2	F	52	18	30
3	F	35	20	30
4	M	16	18	32
5	F	18	21	27
6	F	18	20	28
7	M	36	21	26
8	M	35	22	30
9	M	29	20	31
10	F	18	18	32

Table 4: Comparison of T.M. and A.M *Amaranthes spinosus* (Dalile).



Figure 3: *Amaranthes spinosus* (Amaranthoideae).

S.no.	Plant name	Correlation between age and T.M	Correlation between age and A.M.	Average of T.M. (Days to cure)	Average of A.M (Days to cure)
1.	<i>Phytolacca dedecandra</i>	0.348709	-0.32465	21	34
2.	<i>Croton macrostachyus</i>	0.238764.	-0.26903	22	33
3.	<i>Amaranthes spinosus</i>	0.058066	-0.11081	19	30

Table 5: Showing the comparison between T.M and A.M for the three plant species.

Source of variation	Degree of freedom	Sum of squares	Mean sum of squares	F - ratio
Treatments (Rabies) Error	2	13.0667	6.5334	F=3.0205
Total	27	58.4000	2.1630	
	29	71.4667		

F-table value at 5% level with (2,27)degrees of freedom=3.3541.
F calculated value is less than F table value, so we accept our hypothesis.
All treatments are homogenous.

Table 6: ANOVA table Traditional Medicine.

Source of variation	Degrees of freedom	Sum of squares	Mean sum of squares	F - ratio
Treatments (Rabies) Error	2	99.200	49.6	F =4.9692
Total	27	269.5	9.9815	
	29	368.700		

F table value at 5% level with (2,27) degrees of freedom=3.3541
F calculated value is greater than F table value, so we reject our hypothesis.
All treatment are not homogenous for Allopathic Medicine.

Table 7: ANOVA table for Allopathic Medicine.



Figure 4: Dog affected by Rabies.



Figures 5: Pictures of Patients affected by rabies from dog bite.



Figures 6: Pictures of Patients affected by rabies from dog bite.

From the investigation based at AMBO Community it has been observed that the dog management and vaccination influence the spread and occurrence of rabies. About 75% of local community are not aware of allopathic [28]. Based on our questionnaire and interview the respondents were identified according to their sex, religion, Educational status and Economic stability. Irrespective of the educational status most of the native people were going to local healers. From our observations it showed that, the individual with less and medium income are depending on the traditional medicine from Plants for diagnosing Rabies. While the

people with Financially sound are going for the Allopathic Medicine i.e., Vaccinations against the Rabies.

Due to improper knowledge of traditional healers not accurately treating to the local community noticed some death cases too [1]. The use of traditional medicinal plants to treat rabies disease is not exhaustively documented in Ethiopia, in spite of studies has been conducted in northern, western, central, south eastern and south western zones. However Petros et al., [19] have reviewed the folk remedies for the cure of Rabies where native people used different Traditional Medicinal plants. In the present study we have made an preliminary investigations on three medicinal plants species (*Phytolacca dodecandra*, *Croton macrostachyus* and *Amaranthus spinosus*) used to treat rabies from the bite of dogs by Traditional healers of Ambo town which was diagnosed authentically. Observations were well documented to compare the cure with Allopathic Medicine. On Analysis we were able to get the strong positive side for the traditional medicine in terms of time/period of the treatment given by using Traditional medicine from plants. However some of the patients were not able to diagnose completely as they started taking the Traditional medicine four days after dog bite. According to Geber et al. [29] there is a negative altitude about the traditional medicine if the present generation of traditional healers who are not revealing these secrets of these Medicines due to lack of illiteracy.

Our Observations done by using the three plants sp of 10 patients (per plant) showed a strong significance to statistical analysis i.e., ANOVA. The correlation between age and traditional medicine for *Endod*, *Bisana*, and *Dalile* were the following 0.348709, 0.238764, and 0.058066 respectively. ANOVA test was preformed separately for traditional and modern Allopathic medicine in terms of days to cure on rabies. For traditional medicine the data proved to be very significant from F table value at 5% with (2,27) degree of freedom it showed 3.3541 where all the treatments were are homogeneous and F ratio showed 3.0205 which is less than 3.3541 which show the acceptance of the hypothesis, there by showing our investigations to be very strong traditional medicine when we compared with modern Allopathic medicine the hypothesis was rejected as all the treatments were not homogenous and F ratio shows more than the table value (3.3541) at 5% with (2,27) degree of freedom is 4.9692 (calculated value).

Conclusion

The study was conducted based on the significance of traditional medicinal plants used for treatment of rabies from dogs at Ambo town for a period of six months. Our Investigations revealed that rabies diseases occur frequently in the community due to poor dog managements and vaccination. To tackle the existing problem in the community based on the cost of Medication (vaccination) we made our study on traditional medicinal plants used for Rabies by the native people of the community. Based on our analysis and observations on three medicinal plant species used, were documented which are in tradition from many generations by Traditional healers. The majority of the reported medicinal plant species were wild and many of them were also reported to be rare. There is immense need to conserve and educate on these Traditional Medicinal plants to every common man so that this can be commercialize in the market for proper diagnosis by the educated native Traditional Healers at affordable prices.

So far little research has been conducted on these medicinal plants we do not have enough literature to identify accurately these chemical compounds involved for diagnosing the rabies coming from dogs bite. So we propose that modern technological research like Biotechnology

and molecular biology is on the thrust area to help and characterize these Chemical Compounds which are involved in diagnosing the Rabies infection from the dog bites to Human [30]. Attempts should be made conserve these Medicinal Plant Species by Plant Biotechnological strategies to reach ever poor/the common man at very less price especially in rural villages of the developing countries like Ethiopia where the Dog Management and Modern Health clinics are not available. Based on our investigations we recommend some of the future studies needed to utilize the indigenous drug resources would enhance the local industry on one hand and minimize the expenditure incurred on the purchase of foreign drugs on the other hand.

Based on the above results of our statically date we propose the traditional medicine is the best with low cost and can be used for dog bite-rabies without any side effects which is natural provided treated under educated traditional healers with medical background.

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