academicJournals

Vol. 7(40), pp. 2960-2971, 25 October, 2013
DOI: 10.5897/JMPR2013.5225
ISSN 1996-0875 © 2013 Academic Journals
http://www.academicjournals.org/JMPR

Journal of Medicinal Plant Research

Full Length Research Paper

Ethnoknowledge of plants used in veterinary practices in Dabo Hana District, West Ethiopia

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Accepted 9 October, 2013

A study was conducted from April to September 2012 in Dabo Hana district of Ilubabor Zone, West Ethiopia to document ethnoknowledge of plants used in veterinary practices and to assess factors affecting its utilization. Traditional healers were selected purposively and interviewed. Medicinal plants were shown by healers for identification. Forty-eight medicinal plant species classified into 35 families were documented and claimed to treat 22 animal health constraints. Leaves were the most frequently utilized plant part (31.58%). Oral route (57.89%) was found as the most common route of administration. Determination of the dose was done by using cup, glass, plant parts and their own hand as handful. Difficulty of preparation, seasonal availability of medicinal plants, coverage and availability of modern drugs, coverage of modern education, climatic change and deforestation ($p<0.05$) were statistically significant factors affecting utilization of ethnoveterinary medicine. There was positive correlation ($r=0.466$) between number of the medicinal plants the informants know and their age. In conclusion, there are large numbers of medicinal with undocumented cumulative knowledge of the indigenous people. Therefore, documentation of the indigenous knowledge before it is lost forever and proving these valuable practices by further researches and scientific dissemination of the knowledge were recommended.

Key words: Dabo Hana, ethnoveterinary medicine, medicinal plants

INTRODUCTION

In all countries of the world, there exists traditional knowledge related to the health of humans and animals. In Africa, traditional healers and remedies made from plants play an important role in the health of millions of people (Rukangira, 2001) and animals, which is studied by ethnoveterinary medicine. Ethnoveterinary medicine studies traditional knowledge, folk beliefs, skills, methods and practices used for the treatment of livestock ailments (Tabuti et al., 2003). It offers medicines which are cheap and locally available than pharmacotherapy. Farmers can prepare and use homemade remedies without any expenditure (Yirga et al., 2012a).

The knowledge is transferred from generation to generation through the word of mouth (oral tales) with great secrecy (Yirga et al., 2012a) than in written form (Mesfin et al., 2009). However, it can be transferred to generation vertically through family members, horizontally by exchange through peers, or diagonally through traditional healers to student learners (Philander et al., 2008). Traditional medical knowledge of medicinal plants and their use by indigenous cultures are not only useful for conservation of cultural traditions and biodiversity, but also for community healthcare and drug development in the present and future (Pei, 2001). Pharmacotherapy is

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one of the most important means of controlling livestock diseases, but it is possible only if livestock owners can afford to cover the cost of treatments. In Ethiopia, conventional veterinary services have been playing a paramount role in the control and prophylaxis of livestock diseases in the last three decades. However, they cannot yet deliver complete coverage in preventive and curative health care practices because of inadequate labor, logistical problems, an erratic supply of drugs and the high cost of drugs and equipment (Sori et al., 2004). Due to this, livestock keepers particularly in rural areas frequently visit traditional healers to get solutions for their ill-health animals (Kalayou et al., 2012). Therefore, ethnoveterinary medicine is important when livestock raisers have no other animal health care options (Endalew, 2007).

In Ethiopia, people have been using both plant and animal species for medication of different animal and human diseases over centuries when there was no modern health service delivery. The practice was not stopped with introduction of the modern pharmaco-therapy and plant remedies are still the most important and sometimes the only sources of therapeutics for nearly more than 90% livestock population (Tadeg et al., 2005; Giday et al., 2009). However, information on veterinary herbal medicine has not been systematically documented (Sori et al., 2004) and there is a danger that this knowledge will soon be lost as traditional social patterns are increasingly disturbed by globalization (Gradé et al., 2009), environmental degradation, agricultural expansion, cultivation of marginal lands and urbanization (Teklehaymanot and Giday, 2007; Lulekal et al., 2008; Giday et al., 2009) warranting urgent need to document and preserve the indigenous knowledge (Kalayou et al., 2012). So transmission of the knowledge by documentation for next generation is the most valuable work and can also be used as a vital tool to conduct pharmacological tests on the plants since drug resistance is one of the current issues. Therefore, the present study was conducted to document ethnoknowledge of plants used in veterinary practices and to assess factors affecting utilization of ethnoveterinary medicine in Dabo Hana district of Ilubabor Zone, West Ethiopia.

MATERIALS AND METHODS

Study Area

The study was conducted from April to September 2012 in Dabo Hana district of Ilubabor Zone, West Ethiopia. Kone is the administrative town of the district and located at 534 Km away from Addis Ababa, capital city of Oromia Regional State and Ethiopia. The surface area of the district is approximately 538.41Km^2 (53841 hectare). Geographically, the area comprises of 10%, 66% and 24% high, mid and low land, respectively. The annual temperature ranges from 18-24°C and the mean annual rainfall is 1131 mm. The area receives maximum rainfall from June to August and minimum from January to March.

The people living in the district belong to the Oromo ethnic group, which is the largest ethnic group in Ethiopia. They "*Afaan Oromoo*," which is one of the Cushitic language families of the Afro-Asiatic language group and first in number of speakers in Ethiopia and third in Africa (Firaol, 2012). The animal population of the area includes cattle (61,633), sheep (7,394), goat (13,497), horse (279), donkey (1,941), mule (599) and poultry (40,292). The husbandry system of all animal species is extensive system. Trypanosomosis, pasteurollosis, black leg, internal parasites, external parasites, mastitis, other bacterial and viral diseases and mechanical injury were the prevalent animal health constraints of the district, respectively. Mixed farming system is practiced in the whole area (Socio-economic Data, 2012).

Data Collection

A survey was conducted to gather information on ethnoknowledge of medicinal plants used in veterinary practices and to assess factors affecting its utilization. The information was obtained by face to face interview with traditional local healers using semi-structured questionnaire. Twenty three traditional herbalist informants, of whom 19 men and the rest 4 women, were purposively selected depending up on their accumulated knowledge, belief of the community in the efficacy of their herbal drugs and experience being oriented by local residents. They were requested to show the plants they knew on the field.

Data of the medicinal plants, which include local name, indication and contra-indication, parts used, dose, route of application, frequency, methods of preparation, other plants or substances added to it and season of availability, personnel data and views of the informants on ethnoveterinary medicine, the way the herbalists acquired, their willing and way to transfer and status of the plants in the forest were recorded.

Plant species belonging to different families mentioned and shown by each traditional herbalist were identified using their local name and with aid of the informants at place of their growth. These plants were botanically identified using Flora of Ethiopia and Eritrea and Illustrated Checklist Medicinal Plants and other Useful Plants of Ethiopia (Abebe et al., 2003).

Data Analysis and Management

Data was collected using *Afaan Oromoo language* and translated to English by the research team members. The English version of the collected data was entered into Microsoft Excel spread sheet. Percentage was used to calculate proportion. Presence of statistical significant difference between utilization of traditional herbal drugs and factors affecting it was calculated using Fishers' exact test (Thrusfield, 2005). Pearson's correlation was employed to evaluate correlation between number of the plants the informants know and age of the informants. Tables were used to summarize the result. For the analysis, p-value less than 0.05 was considered as statistically significant.

RESULTS

Profiles of key respondents

Traditional healers involved in the study were from both sexes: 19 (82.6%) male and 4 (17.4%) female and different religion followers. Twenty (86.96%) were farmers, one (4.35%) was employed by government and the rest two (8.7%) were students. All the informants belonged to the Oromo ethnic group and their ages

Table 1. Educational background of the informants.

Educational level (Grade)	Number	Proportion (%)
0	13	56.521
1-4	3	13.043
5-8	2	8.695
9-10	3	13.043
≥10	2	8.695

ranged from 22 to 84 years with the mean age of 48.3 years. The majority (56.53%) were illiterate, who could neither read nor write (Table 1).

Acquisition of the ethnoknowledge systems

Transfer of this ethnoknowledge of medicinal plants follows vertical transfer to the most selected family member orally with great secrecy. But also few individuals can show and tell others outside their family members if they have close relationship. Twenty (86.96%) of them had acquired the knowledge from older family members including father, mother, grandfather/ mother and "*Guddifachaa*" family; while two (4.35%) had acquired it from other elders, friends and relatives.

The rest informant acquired by his own trial and error on his own animals. Most of the informants were elders that indicated the trend of transferring (inheriting) the knowledge is usually at old age. Statistically, there was positive Pearson's correlation (r = 0.466) between number of the plants the informants know and their age.

Factors affecting practice of ethnoveterinary medicines

The informants were also asked whether they want to transfer the knowledge and practice to others formally or informally. Of the total 23 informants, 21 (91.3%) were willing to transfer the knowledge to everyone who wants to know it by putting emergence of sudden death before transferring the information to others as a reason. The rest 2 (8.7%) had no willing to transfer the knowledge outside their family members and want to keep it in secret till their death.

Of the 23 informants, 17 (73.91%) responded that utilization of traditional herbal drug has been declining from time to time due to several factors and the rest 6 (26.09%) informants believes that it is not reduced. The potential risk factors responsible for this were difficulty of preparation, seasonal unavailability of plants, availability and coverage of modern drugs and education, side effects, lower effectiveness of homemade remedies, climatic change, deforestation and lack of willingness of traditional herbalists to transfer knowledge. From these factors, difficulty of preparation (Fisher's exact=15.221, P=0.000), seasonal availability of medicinal plants (Fisher's exact=10.553, P=0.002), coverage and availability of modern drugs (Fisher's exact=18.555, P=0.000), coverage of modern education (Fisher's exact=12.627, P=0.000), climatic change (Fisher's exact=7.441, P=0.014) and deforestation (Fisher's exact=10.553, P=0.000) were statistically significant difference in utilization of ethnoveterinary while side effects of the herbal drugs (Fisher's exact=2.255, P=0.272), lower efficacy (Fisher's exact=3.551, P=0.124) and lack of willingness of traditional herbalists to transfer the folk knowledge (Fisher's exact=0.650, P=0.462) were found statistically insignificant.

Plants used for practice and knowledge of animal diseases treatment

During the current study, 48 species of medicinal plants were identified. These were grouped into 35 families; of which Cucurbitaceae, Euphorbiaceae, Fabaceae and Solanaceae families were the most dominant, accounting 8.33% each, followed by Ranunculaceae (4.17%) and the rest families were identified with single species (2.08%) as shown in Table 2.

Different parts of these plants were documented for treatment of animal ailments (Table 3). Of these, leaf was identified as the most frequently used (31.58%) plant part followed by bark and root (14.04% each) (Figure 1). Water was the most frequently added solvent. Enjera, cheese and salt were also added. However, all additives were not added in to a single homemade remedy and addition varied depending on the disease, species of plants used and amount needed. Some of these homemade remedies were found to be contra-indicated in some cases like increased dose, pregnancy, old or young age and species of animals. For example, more than half tuber of *Crinum abyssinicum* Hochst. Ex A. Rich. (*C. abyssinicum)* and over dosage of *Calpurnia aurea* (Ait.) Benth. (*C. aurea*) can kill cattle.

Dosage

Following preparation, the herbal drugs were detected to be administered in diverse routes. Single plant was found to be administered in different routes depending up on the preparation and type of the disease needed to be treated. Oral administration was found as the most frequently utilized route (57.89%) (Table 3).

Local herbalists determine the dose of homemade remedies using cup (about 85 ml), glass (about 330 ml), plant parts like number of bulbs and number of seeds and their own hand as handful. The dosage regime is generally dependent on the degree and duration of the ailment, and age, size and body condition of the animal.

Table 2. Identified medicinal plant species with their family and local name, and parts used to treat animal diseases.

Species of plant	Local/vernacular name	Family name	Disease/s treated by the plant	Part(s) of the plant
Acacia brevispica Harms	Arangamaa	Fabaceae	Rabies	Leaf
Adhatoda schimperiana (Hochst) Nees	Dhummuugaa	Acanthaceae	Rabies	Root
Albizia gummifera (J.F. Gmel). C.A. Sm.	Ambabbeessa	Fabaceae	Emaciation	Bark
Albizia schimperiana Oliv.	Ambaltaa	Fabaceae	Ulcerative lymphangitis, colic, myiasis	Leaf, bark
Allium sativum L.	Qullubbii adii	Alliaceae	Mastitis, colic, diarrhea, bloat, internal parasites, septicemia	Bulb
Berseama abyssinica Fresen.	Lolchiisaa	Melianthaceae	Trypanosomosis	Seed
Brucea antidysenterica J.F. Mill.	Qomonyoo	Simaroubaceae	Trypanosomosis	Leaf
Caesalpina decapetala (Roth) Alston	Qomxorii	Fabaceae	Rabies	Root
Calpurnia aurea (Ait.) Benth.	Ceekaa	Leguminosae	Skin disease, rabies	Leaf, stem, seed, root
Capsicum annum L.	Barbaree	Solanaceae	Colic, bloat, septicemia	Fruit
Carissa spinarum L.	Agamsa	Apocynaceae	Rabies	Root
Clausena anisata (Willd.) Benth.	Ulmaayyii	Rutaceae	Ectoparasite infestation	Leaf, branch
Clematis simensis Fresen.	Hidda fiitii	Ranunculaceae	Rabies	Root
Clutia abyssinica Jaub. & Spach.	Ulee foonii	Euphorbiaceae	Diarrhea	Leaf
Colocasia esculenta (L.) Schott	Goodarree	Araceae	Wound, Retained fetal membrane (RFM)	Tuber
Crinum abyssinicum Hochst. Ex A. Rich.	Qullubbii waraabessaa	Amaryllidaceae	Internal parasites	Bulb
Croton macrostachyus Hochst.	Bakkanniisa	Euphorbiaceae	Mastitis, rabies, colic, trypanosomosis, septicemia	Leaf, bark
Cucumis ficifolius A. Rich.	Faca'aa	Cucurbitaceae	Black leg, colic, emaciation	Tuber
Cucurbita pepo L.	Buqqee	Cucurbitaceae	Trypanosomosis	Leaf
Cynoglossum lanceolatum Forsk.	Senxereerree	Boraginaceae	Mastitis, black leg	Root, stem/branch
Dracaena steudneri Engl.	Sarxee	Dracaenaceae	Black leg, rabies, trypanosomosis, emaciation	Bark
Echinops kerebicho Mesfin	Qarabichoo	Compositae	Black leg, cough	Whole parts
Eragrostis tef (Zucc.) Trotter	Xaafii diimaa	Poaceae	Eye disease	Seed
Euphorbia ampliphylla Pax	Adaamii	Euphorbiaceae	Wart	Milk secretion
Ficus palmata Forssk.	Luugoo	Moraceae	Skin disease	Leaf
Grewia ferruginea Hochst. ex A. Rich.	Dhoqonuu	Tiliaceae	RFM	Bark
Impatiens tinctoria A. Rich. subsp. *abyssinica* (Hook. f.) Grey Wilson	Qicuu	Balsaminaceae	Myiasis	Tuber
Kalanchoe petitiana A.Rich.	Bosoqqee	Crassulaceae	Eye disease	Leaf

Table 2. Contd.

Lagenaria siceraria (Molina) Standl.	Hadhooftuu	Cucurbitaceae	Rabies, trypanosomosis	Leaf, seed
Lepidium sativum L.	Shinfaa/ Feecoo	Brassicaceae	Black leg, colic, diarrhea, bloat, internal parasites, septicemia	Seed
Linum usitatissum L.	Talbaa	Linaceae	RFM	Seed
Mirabilis jalapa L.	Abaaboo diimaa	Nyctagnaceae	RFM	Whole parts
Momordica foetida Schumach.	Saaroo bofaa	Cucurbitaceae	Fracture, rabies, trypanosomosis, myiasis	Leaf, stem
Nicotiana tabacum L.	Tamboo	Solanaceae	Lice and some ectoparasite infestation, black leg, trypanosomosis, leech infestation, snake bite	Leaf
Nigella sativa L.	Gur'aa	Ranunculaceae	Black leg, internal parasites, cough	Seed
Phytolacca dodecandra L Her	Andoodee	Phytolacaceae	Eye disease	Leaf
Plectranthus punctatus (L.f.) L'Hèr	Dabbasee	Lamiaceae	Fracture	Leaf
Prunus africana (Hook.f.) Kalkm.	Hoomii	Rosaceae	Wound, myiasis	Bark
Ricinus communis L.	Qobboo diimaa	Euphorbiaceae	Rabies	Root
Sida rhombifolia L.	Karaabaa	Malvaceae	Skin disease	Whole parts
Solanum dasyphyllum Schumach.	Hiddii waraabessaa	Solanaceae	Colic, mastitis	Fruit
Stereospermum kunthianum Cham.	Botoroo	Bignoniaceae	Ulcerative lymphangitis, black leg, rabies, colic	Bark
Trachyspermum ammi (L) Sprague ex Turrill	Inshilaala qalamee	Umbelliferae	Black leg	Root
Trichilia dregeana Sond.	Anuunuu	Meliaceae	Trypanosomosis	Bark
Verbascum sinaiticum Benth.	Gurra harree	Scrophulariaceae	Skin disease	Leaf
Vernonia auriculifera Hiern	Reejjii	Asteraceae	Diarrhea	Leaf
Withania somnifera (L.) Dunal in DC.	Gizaawwaa	Solanaceae	Skin disease	Leaf
Zingiber officinalis Rosc.	Jijimbila	Zingibraceae	Colic, diarrhea, bloat, internal parasites	Rhizome

Practice and Knowledge of Animal Diseases Treatment

Twenty two animal health constraints treated by local herbalist were identified (Table 4). Knowledge of utilization of the plants against different diseases varies among traditional herbalists. Single disease can be treated by different plant preparations or by the same plants using different methods or addition of other substance(s). Table 4 shows the knowledge and practice of herbalists in the district.

Plants having broad spectrum activity

Five plants were mentioned as they have ability to heal many diseases. These plants were considered as "master of medicinal plants (Angafa Qorichootaa)" and they include *Croton*

Table 3. Routes of administration.

Route of administration	Frequency	Proportion (%)
Nostril	5	8.77
Oral	33	57.89
Topical/Dermal	11	19.3
Topical	7	12.28
Intra-mammary	1	1.75
Total	57	100

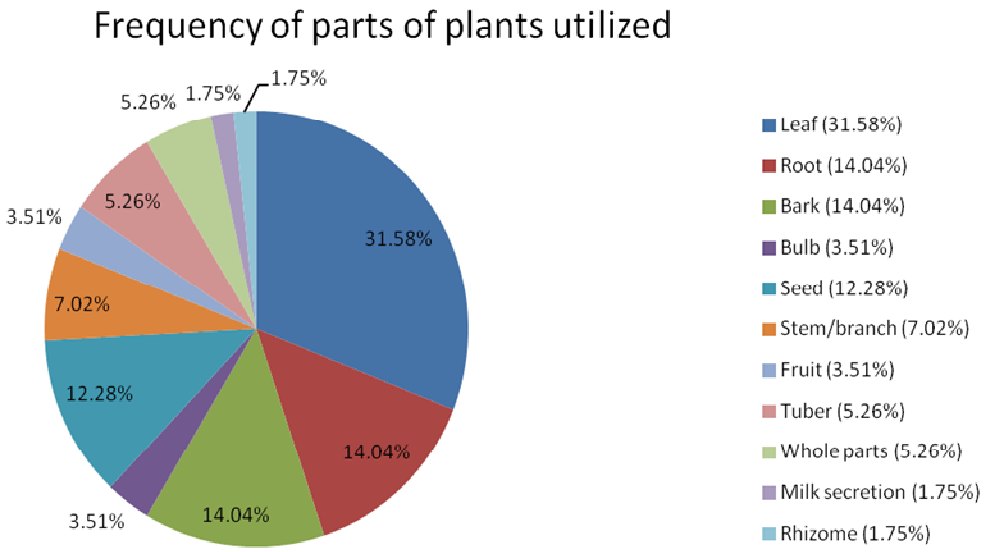

Figure 1. Parts of plants used in treatment of animal disease with their frequency of citation against different diseases.

macrostachyus Hochst., *Momordica foetida* Schumach., *Adhatoda schimperiana (Hochst) Nees*, *Carissa spinarum* L., *Acacia brevispica* Harms., and *Cucumis ficifolius* A. Rich. One or more or whole parts of these plants were added to many home made remedies (Table 4). The herbalists believe that these plants have low antagonist and very high synergistic effect when they are utilized with others.

DISCUSSION

Traditional healers involved in the current study belong to Oromo people and they are well known in treating many illnesses with homemade remedies from local medicinal plant species. This agrees with report of Yineger et al. (2008) from Jimma, Ethiopia. Majority of the respondents were older than 45 years; very few youths were involved in traditional livestock treatment in the study area showing consistency with previous reports (Yirga et al., 2012a, b). Less medicinal knowledge in relation to young age might be attributed to the fact that traditional knowledge is built with years of experience.

The present study revealed vertical transfer of ethnoveterinary medicine knowledge to the most selected family member and few individuals outside the family members orally with great secrecy which is in line of agreement with report from Tigray region, Ethiopia (Yirga et al., 2012a). Also ethnoveterinary practices have been developed by trial and error (Fullas, 2010), which is in agreement with acquisition of the knowledge and practice by trial and error documented in the present work. Even though the informants involved in this study had acquired the knowledge and practice with great secret, most of them have willingness to transfer the knowledge to others who are interested to know in contrast to report of Yirga et al. (2012a), which indicated the knowledge of traditional medicine as professional secret. The difference between these studies may be due to difference in attitude in the society and contributing what they have for next generation.

Traditional veterinary medicine knowledge like all other traditional knowledge systems is handed down orally from generation to generation and it may disappear

Table 4. Practices and knowledge of animal health constraints treatment.

Animal disease	Mode of preparation and administration
Ulcerative lymphangitis	Leaf and bark of *Albizia schimperiana* Oliv*. (A. schimperiana)* are crushed with bark of *Stereospermum kunthianum* Cham. (*S. kunthianum)* and squeezed using small amount of water. Half coffee cup of the squeeze is infused through nostril for 2-3 consecutive days for equines.
Mastitis	Cow affected with mastitis is treated by juice of half cup of coffee of grinded fruit of *Solanum dasyphyllum* Schumach. (*S. dasyphyllum*), bulb of *Allium sativum* L. (*A. sativum*) and leaf of *Croton macrostachyus* Hochst. *(C. macrostachyus)* orally for three consecutive days. Water squeeze of crushed root of *Cynoglossum lanceolatum* Forsk. (*C. lanceolatum)* is also drenched orally. When the teat of the cow gets blinded, its stick is used to open the canal of the teat.
Wound	Grinded bark of *Prunus africana* (Hook.f.) Kalkm. (*P. africana*) is topically bandaged on the wounded area and removed after one day and repeated till recovery. Crushed tuber of *Colocasia esculenta* (L.) Schott (*C. esculenta)* is topically bandaged on fire wound and removed on third day. Then it is repeated up to recovery of the animal.
Eye disease	Leaves of *Kalanchoe petitiana* A. Rich. (*K. petitiana)* are squeezed to the eye of an animal suffering from different problems. It is applied topically till recovery. Seed of *Eragrostis tef* (Zucc.) (*E.tef*) is also grinded and applied topically for three consecutive days. Additionally, leaves of *Phytolacca dodecandra* L Her (*P. dodecandra*) are also crushed and squeezed within the hand and applied topically till recovery.
Skin diseases	The leaves of *Withania somnifera* (L.) Dunal in DC. (*W. somnifera)*, and *Verbascum sinaiticum* Benth. (*V. sinaiticum)* are crushed together and used to wash the animal using water till recovery. All parts of *Sida rhombifolia* L. (*S. rhombifolia)* are crushed and used to wash the animal using water. In addition, it can be given orally till recovery repeatedly. The leaf and stem of *C. aurea* is crushed and used to treat animals suffering from skin diseases by washing. The leaf of *Ficus palmata* Forssk. (*F. palmata*) is used to wash the animal.
Louse infestation and some others ectoparasites	Leaf of *C. aurea* and whole parts of *S. rhombifolia*, separately or in combination, are used to wash the animal body with boiled water till recover topically. Overdose dosage is contraindicated as it causes death. *Nicotiana tabacum* L. (*N. tabacum*) leaf is used to wash the infested part of the animal with hot water. Leaf of *Clausena anisata* (Willd.) Benth. (*C. anisata*) is used to sweep poultry house infested by poultry ectoparasites (lice, *Ceratophyllus gallinae, etc)* or put in hot water to dissolve its contents and the water sprayed with the plants' end branches to disinfect the house.
Fracture	The leaves and stem of *Momordica foetida* Schumach. (*M. foetida*) are boiled in water and used to massage the fractured bones of tame animals till recovery by local experienced herbalist. The leaves of *Plectranthus punctatus* (L.F.) L'Hèr (*P. punctatus*) are also used in the same manner of *M. foetida* in treatment of fracture.
Retained fetal membrane	Tuber of *C. esculenta*, internal part of bark of *Grewia ferruginea* Hochst. ex A. Rich. (*G. ferruginea*) and seed of *Linum usitatissum* (*L. usitatissum*) are grinded and squeezed with water. The juice is given orally depending on the size of the animal. The whole part of *Mirabilis jalapa* L. (*M. jalapa*) and seed of *L. usitatissum* are crushed together and swallowed to the cow when straining starts.

Table 4. Contd.

Black leg	Bark of *S. kunthianum* is crushed using water and given orally. Tuber of *Cucumis ficifolius* A. Rich. (*C. ficifolius*) is crushed and squeezed using small amount of water. The squeeze is drenched orally once immediately after occurrence of the disease. Leaf of *N. tabacum* is boiled using water and crushed. Then it is prepared in dough form and buried; when cattle become affected with the disease, one glass is drenched to the animal orally. Roots of *Trachyspermum ammi* (L) Sprague ex Turrill *(T. ammi)* are crushed together and squeezed using water. Then one and half glass of the squeeze is drenched orally for two consecutive days in cattle. Seed of *Lepidium sativum* L. (*L. sativum*) is prepared in powder form and dissolved in water; and given orally when the cattle get sick depending the size, age and weight of the animal once or repeated till recovery. Barks of *Dracaena steudneri* Engl. (*D. steudneri*) and *S. kunthianum*, and tuber of *C. ficifolius* are crushed together and given with enjera orally depending on the size of the cattle. Root of *C. lanceolatum* is crushed and the powder is dissolved in water, and the solution is given orally for three consecutive days depending on the size of the cattle. Whole parts of *Echinops kerebicho* Mesfin (*E. kerebicho*), seed of *Nigella sativa* L. (*N. sativa*) are crushed and grinded together. Then it is given once orally.
Rabies	Water squeeze of crushed roots of *A. schimperiana* and *Ricinus communis* L. (*R. communis*) is given orally for infected animals for three days with 48 hours gap depending on the species, age and size. Root of *Caesalpina decapetala* (Roth) Alston (*C. decapetala)*, root of *Clematis simensis* Fresen. (*C. simensis*), root of *A. schimperiana*, leaves and root of *R. communis* are crushed together and squeezed using water. Then three glasses is given orally for three consecutive days orally in the morning before taking anything. Bark of *C. macrostachyus*, leaves of *M. foetida*, leaves of *Acacia brevispica* Harms. (*A. brevispica*), root of *A. schimperiana*, and root of *Carissa spinarum* L. (*C. spinarum*) are crushed together and squeezed using water. Then one cup of coffee is drenched orally for tame animals. Juvenile leaf of *C. aurea*, leaf and root of *A. schimperiana*, bark of *D. steudneri*, leaf of *Lagenaria siceraria* (Molina) Standl. (*L. siceraria*), root of *R. communis* and bark of *S. kunthianum* are crushed together and handful of the mixture is given orally or one cup of coffee for three days consecutively after squeezed. Seed and root of *C. aurea*, root of *A. schimperiana,* root of *R. communis* and bark of *D. steudneri* are crushed and drenched with cheese orally.
Colic	Leaves and barks of *A. schimperiana* are crushed with bark of *S. kunthianum* and squeezed using water. Half coffee cup of the squeeze is infused through nostril for 2-3 consecutive days for equines. Tuber of *C. ficifolius* is chopped with leaf *C. macrostachyus* and fruit of *S. dasyphyllum* and squeezed using water. One to three coffee cups are drenched orally only when the animal gets sick in most tame animal species depending on size and age. The seed of *L. sativum* the rhizomes of *Zingiber officinalis* Rosc. (*Z. officinalis)*, the bulb of *Allium sativum* L. (*A. sativum*) and the fruit of *Capsicum annum* L. (*C. annum*) are crushed together or separately and given orally once or repeated till recovery if the disease persists.
Trypanosomosis	Seeds of *Berseama abyssinica* Fresen. (*B. abyssinica)*, juvenile stage of leaves of *Brucea antidysenterica* J.F. Mill. (*B. antidysenterica)* and *C. macrostachyus*, and leaf of *M. foetida* are crushed together and squeezed. One to two cup of coffee is infused through nostrils depending on the size of the cattle for three consecutive days. Bark of *D. steudneri* and seed of *L. siceraria* are squeezed with water after crushed and half of coffee cup is drenched orally for 2-3 consecutive days. Bark of *Trichilia dregeana* Sond. (*T. dregeana*) is crushed and given with enjera orally depending on size. *N. tabacum* leaf is crushed and squeezed using water. One cup of coffee is drenched orally once in cattle. Leaves of *C. pepo* are crushed together and given to eat or squeezed with water to drench. In both cases, it is given for 4-5 consecutive days orally depending on the size of cattle.
Diarrhea	Seed of *L. sativum*, bulb of *A. sativum* and rhizome of *Z. officinalis* are grinded together after drying the crushed mixture. Then it will be drenched orally once or repeated till recovery. Leaves of *Vernonia auriculifera* Hiern (*V. auriculifera*) and *Clutia abyssinica* Jaub. & Spach. (*C. abyssinica)* are crushed and squeezed. Then it is given for poultry with enjera when they get diarrheic.
Bloat	When ruminants, especially cattle, get bloat, seed of *L. sativum*, rhizome of *Z. officinalis*, fruit of *C. annum* and bulb of *A. sativum* are grinded with salt and dissolved in water. Then the solution is drenched for the cattle orally once or repeated till recovery. The dose depends on the size of the cattle.

Table 4. Contd.

Internal parasites	In addition to many medicaments like seed of *L. sativum*, rhizome of *Z. officinalis*, bulb of *A. sativum* and seed of *N. sativa* used for different internal parasite diseases, bulb of *C. abyssinicum* is also used to treat many endoparasitic diseases. Half of tuber of *C. abyssinicum* is crushed and given for the animal suffering from different endoparasites orally. Due to the toxic effect of the plant, giving more than half of the tuber can kill the animal and it is only practiced by experienced local herbalist.
Leech infestation	Leaf of *N. tabacum* is boiled using water and crushed. Then it is prepared in dough form and buried. When cattle become infested with leech, small amount of the dough is dissolved in small amount of water and infused to the animal through nostril or if the animal is aggressive, gaseous application of *N. tabacum* is utilized by putting the *N. tabacum* prepared in the form of bread on the fire near or in front of the animal. Some herbalists spit into the nostril of the infested animal by chewing *N. tabacum*.
Myiasis	Leaf and bark of *A. schimperiana*, tuber of *Impatiens tinctoria* A. Rich. subsp. *abyssinica* (Hook. f.) Grey Wilson (*I. tinctoria*), leaf of *M. foetida* and bark of *P. africana* are crushed together and put in the wound. It is applied topically till recovery after washing with warm water.
Septicemia	The seed of *L. sativum*, bulb of *A. sativum* and fruit of *C. annum* are crushed together and given orally immediately when an animal get septicemic condition. Leaf of *C. macrostachyus* with bulb of *A. sativum,* seed of *L. sativum*, and fruit of *C. annum* are pounded together or solely and given to cattle orally.
Snake Bite	Leaf of *N. tabacum* is boiled; dough is prepared and buried. Then one glass suspension of the dough is drenched orally immediately after bite with snake.
Wart	Milk like secretion of *Euphorbia ampliphylla* Pox (*E. ampliphylla*) is applied topically till recovery when cattle get wart.
Emaciation	The subcutaneous part of bark *Albizia gummifera* (J.F. Gmel). C.A. Sm. (*A. gummifera*) is crushed with bark of *D. steudneri* and tuber of *Cucumis ficifolius* A. Rich. to prepare for swallowing. Handful of the prepared medicament is provided for the animal to swallow and repeated at its month.
Cough	The whole parts of *E. Kerebicho* is crushed with seed of *N. sativa* and given for cattle to eat with enjera only once.

because of rapid socioeconomic, environmental and technological changes and as a result of the loss of cultural heritage under the guise of civilization (Khan et al., 2012). Similarly, difficulty of preparation, seasonal availability of medicinal plants, coverage and availability of modern drugs, coverage of modern education, climatic change and deforestation were potential factors contributed for declining utilization of homemade remedies in the study area. Additionally, globalization (Gradé et al., 2009), anthropogenic activities (Rukangira, 2001), environmental degradation, agricultural expansion, cultivation of marginal lands and urbanization (Teklehaymanot and Giday, 2007; Lulekal et al., 2008; Giday et al., 2009) were also reported from different areas as the factors causing significant danger for soon disappearance of the knowledge.

Plants comprise the largest component of the diverse therapeutic elements of traditional livestock healthcare practices (Etana, 2010). They are also known to provide low cost animal health care alternatives for simple health issues in rural communities and are relatively simpler to prepare and administer (Okoli et al., 2002).

During this study, 48 species of medicinal plants classified into 35 families used to treat different animal diseases were identified. Cucurbitaceae, Euphorbiaceae, Fabaceae and Solanaceae families were the most dominant. One or more of the plant species identified in this study were also reported from other parts of Ethiopia (Sori et al., 2004; Endalew, 2007; Lulekal et al., 2008;

Megersa, 2010; Kalayou et al., 2012; Yirga et al., 2012a, b) and other countries (Nfi et al., 2001; Deeba, 2009; Shen et al., 2010; Khan et al., 2012). Such widespread use of these plants by different groups of societies in different countries could to a certain extent be attributed to their efficacy. In other words, the ethnomedicinal reports of those species from wider geographical regions and different cultural groups could validate the medicinal properties of the species (Lulekal et al., 2008).

The medicinal plant preparations were applied through different routes of administration like oral, topical or dermal and nasal routes. Of these, oral application (33 preparations, 57.89%) was the highest and most commonly used route of application followed by topical or dermal application (11 preparations, 19.3%). These results are consistent with the findings of various ethnobotanical researches in different areas of Ethiopia (Lulekal et al., 2008; Giday et al., 2003; Hunde et al., 2004).

Determination of the dose of homemade remedies using cup, glass, plant parts like number of bulbs and number of seeds and their own hand as handful were the identified means to treat animals in the study area. The dosage regime is generally dependent on the degree and duration of the ailment, age, size and body condition of the animal. This is in line of agreement with report of ethnomedicinal plant knowledge and practice of Oromo ethnic group in Jimma, Southwestern Ethiopia (Yineger et al., 2008).

The medicinal values of *A. schimperiana* and *Styloceras kunthianum* to treat ulcerative lymphangitis were well known practice by traditional herbalists in the present study area. Effectiveness of *S. kunthianum* against equine lymphangitis in this study is consistent with antifungal property of the plant (Abebe et al., 2003).

In present study, preparations of *Sedum dasyphyllum*, bulb of *Allium sativum* and leaf of *C. macrostachyus* were identified as plants used to treat bovine mastitis. In line with this, *C. macrostachyus* from Tigray region, Ethiopia and *A. sativum* from Pakistan has been documented for treatment of bovine mastitis. The efficacy of the plants against the disease is related to their antibacterial (Kalayou et al., 2012), antifungal and antiviral activities (Abebe et al., 2003) since bacteria, fungi and virus are microorganisms that are implicated as causes of bovine mastitis (Quinn et al., 1994).

Effects of *Withania somnifera* and *Sida rhombifolia* against skin diseases in the current study agrees with reports from other areas and their ingredients. *W. somnifera* is crushed and tied by cloth in the area of allergy induced by insect in Jimma (Etana, 2010). Withaferin A and withanolides, active ingredients isolated from *W. somnifera* exhibit antibiotic action, including inhibition of gram-positive bacteria. Cryptolepine (active ingredient of *S. rhombifolia)* has antibacterial, antifungal, antiviral, anti-protozoal and antihelminthic properties (Abebe et al., 2003).

Leaf of *Nicotiana tabacum*, leaf *C. aurea* and whole parts of *S. rhombifolia*, are used to treat animals infested with lice and other ectoparasites like *Ceratophyllus gallinae* in the current study area. Similarly, *C. aurea* has been documented to remove lice and ticks (Megersa, 2010; Kalayou et al., 2012). Nicotine (parasiticide for Scabies) and nicotimine (insecticide) are active ingredients isolated from *N. tabacum* (Abebe et al., 2003).

In line with the current study, the efficacy of *Linum usitatissum* to remove retained fetal membrane was reported from Sargodha district of Pakistan (Dilshad et al., 2008) and it is due to laxative effects of linseed oil of the plant in Veterinary Medicine (Abebe et al., 2003). Bark of *S. kunthianum* and *Gallionella ferruginea* are crushed together and mixed with salt to be eaten by cattle on dish or latex of *G. ferruginea* is pounded, mixed with water and on a glass of tella (local beer) is given to cattle in Ejaji of Oromia region, Ethiopia (Endalew, 2007); and tuber of *Colocasia esculenta* is crushed and mixed with water and then given to cow with retained placenta was reported from Wayu Tuka Wereda, East Wollega Zone of Oromia Region, Ethiopia (Megersa, 2010).

Drenching filtrate of *C. ficifolius* to treat black leg in the current study is similar to report from Wayu Tuka, Ethiopia. The efficacy of *C. ficifolius* is due to its antibacterial activity which has been approved by different researches. The efficacy of *S. kunthianum* against black leg in the current study is also in line of agreement with bactericidal effect of lapachol, compound from isolated *S. sauveolens* (Abebe *et al*., 2003). Utilization of *N. tabacum* in treatment of black leg was also reported from Tigray region, Ethiopia (Kalayou et al., 2012) agrees with the current result.

Rabies is one of the most important problems in the study area. In line with plants used in current study for treatment of rabies, dried root of *C. macrostachyus* powdered and given to dog with 'enjera' which suffered from Rabies (Megersa, 2010). *Adhatoda schimperiana* is crushed, squeezed, mixed with milk and half coffee cup is given (Etana, 2010).

Oral application of rhizome of *Z. officinalis* is used to treat colic from Borena (Sori et al., 2004) agrees with the present result. It contains zingerone, which is known to be a good remedy for colic (Abebe et al., 2003). Effect of *N. tabacum* against snake bite agrees with report of Megersa (2010).

Among medicinal plants identified for trypanosomosis treatment in the current study, *Cucurbita pepo* was also reported from Medebay-Zana District of Tigray region, Northern Ethiopia (Yirga et al., 2012a). As trypanosomosis is one of the top diseases affecting agricultural activities of farming community of Ethiopia, different medicinal plants have been utilized as remedy. These plants were reported from different parts of the country (Sori et al., 2004; Woldegerima et al., 2008; Yirga et al., 2012a).

Some plants documented in this study were reported

from different countries to treat diarrhea in animals. Utilization of *A. sativum* to treat diarrhea agrees with practice of Nu people of NW Yunnan of China (Shen et al., 2010). Seed of *Lepidium sativum* is powdered and mixed with bulb *A. sativum* and given to cattle against diarrhea (Endalew, 2007). Benzylisothiocyanate and sinapic acid (from *L. sativum*) were reported for their well known antibacterial activity (Harborne and Baxter, 1993) which is related to diarrhea caused by bacteria.

Similar to the result of current study, seed of *L. sativum* and bulb of *A. sativum* are pounded together and given to cattle when they suffer from bloat in Ejaji, Ethiopia (Endalew, 2007). Different species of plants are implicated to treat internal parasites. Anti-ulcer activity of *Nigella sativa* L. was reported in experimental animals (Abebe et al., 2003). Minced cloves of *A. sativum* are used to treat endoparasites (Endalew, 2007). *L. sativum* seeds and leaves were reported against gastroenteritis (Al-Yahya et al., 1990). *N. tabacum* is used in the treatment of leech infestation in the current study area. Similar to this, nostril infusion of leaves juices is used to remove leech from infested cattle in Cameroon (Nfi et al., 2001).

L. sativum, *A. sativum, Capsicum annum* and *C. macrostachyus* were the plants used to treat septicemic animals in this study area. Leaf of *C. macrostachyus* and bulb of *A. sativum* are pounded together and given to cattle orally (Endalew, 2007). This is due to antibacterial activities of these plants (Abebe et al., 2003; Kalayou et al., 2012).

Echinops kerebicho and *N. sativa* with enjera were plant species utilized to treat coughing in the present study. There was report of efficacy of *E. kerebicho* against lung tuberculosis in which coughing is one of the symptoms of the disease. This may be related to alkaloid echinopsine reported from several species of the genus (Abebe et al., 2003).

Some plants were identified as having broad spectrum activity in the study area and they are called “master of medicinal plants (*Angafa Qorichootaa*).” These plants include *C. macrostachyus*, *M. foetida*, *A. schimperiana*, *C. spinarum*, *A. brevispica* and *C. ficifolius*. They were found to have wide range of medical value against many diseases. Available evidences from different areas are in agreement with the present result. The plant has been documented as a remedy for a wide range of human and livestock diseases, such as scabies and diarrhea (Teklehaymanot and Giday, 2007) in Ethiopia and leaf infusions as antihelmintic and laxative remedy (Adedapo et al., 2008) in Tanzania. Also it has been used as a remedy for major bacteria such as *Escherichia coli*, *Bacillus cereus*, *Micrococcus lutea* and *Pseudomonas auruginosa* (Wagate et al., 2010) in Kenya and leaf for treatment of bloat and ringworm treatment in cattle in Ethiopia (Sori et al., 2004). A single plant part was occasionally observed to be used for treatment of multiple ailments; the same applied to combination of plant parts (Rahmatullah et al., 2010).

Some plant species like *N. tabacum* and *M. foetida* were identified for their sedative effects. Disinfectant property of *Clausena anisata* in poultry house was known in the current study. Clausenol from *C. anisata* has disinfectant activity and has been reported in the treatment of eye disease and tropical ulcers. This may be due to imperatorin, which aid in dermal pigmentation and isolated from *Clausena dentate.* Oil of *Trachyspermum ammi*, thymol, is stated to be strong antiseptic (Abebe et al., 2003).

In conclusion, the present study was conducted to document medicinal plants and their ethnoveterinary knowledge and practices in Dabo Hana district. Forty-nine plant species used to treat 22 different animal health constraints were documented with their all utilization aspects. The result revealed presence of large number of valuable resources, practices and knowledge of ethno-veterinary medicine, which can solve problems facing the world especially with respect to drug resistance in different diseases and it can be considered as a bright hope for the next generation. Therefore, giving priority for conservation of these medicinal plants by concerned governmental and non-governmental bodies is very important issue. In addition, proper documentation of the knowledge and practices will invite scientists from all over the world to conduct their work on the area.

ACKNOWLEDGEMENTS

The authors are indebted to the inhabitants of Dabo Hana district, particularly the traditional herbal practitioners for sharing their valuable knowledge on medicinal plants of the area and showing medicinal plants. Staffs of Dabo Hana district Animal Health Clinics, especially Mr. Nega Gudeta and Ejigu Worku, are highly acknowledged for their all sided support from the beginning to end of the work. We are also grateful to Mr. Kebede Abdissa and Ms. Abebech Yadeta as it was impossible to document the knowledge and practices of the people in this way without their guidance and all sided support. Mr. Darge Jiru is also highly acknowledged for his role in the work.

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