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Ethno-veterinary medicine: A potential alternative to animal health delivery in Wolmera district, Oromia Region, Ethiopia

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Abstract

This survey was conducted from December 2016 to March 2017 in Wolmera district of Oromia Region, Ethiopia to document indigenous knowledge of the community on plants used in ethno-veterinary medicine. From a total 80 respondents from eight peasant associations, 48 respondents were selected purposely by the researcher alone while the rest 32 were selected purposely by the help of local elders in the study area. Majority of respondents 63(87.27%) were male and the remained 17 (12.72%) were females. Most of the respondents 55(68.75%) were used plants to treat livestock ailment, and 50 (91%) acquired the knowledge from their parents and elders of blood relationship. Twenty- five medicinal plant species of veterinary importance classified into 22 families were documented. From identified plant families, asteraceae, euphorbiacea, solonaceae and polygonaceae were represented by 2 species each. The remaining (17 families) were represented by single plant species. Leaves were the most frequently utilized plant part (68%) and oral route (80%) was the most common route of administration, whereas concoction (60%) accounted the major form of preparation of herbal remedies. Determination of the dose is done by using different household utensils and also by using their own hand. Anthrax, black leg, ecto and endo parasites, rabies, foot and mouth disease, bloat, and colic were among the fifteen different livestock diseases or syndromes treated by traditional practitioners. Fifty-five out of 80 respondents who participated in this survey have an awareness on ethnoveterinary practice but plant parts used, dose and routes of administration were varies among the traditional practitioners. Therefore, we strongly recommended for detail scientific and pharmacological evaluations (efficacy, safety, mode of delivery and dosage) of the identified plant species in future use.

Key words*:* Aliments; Endogenous knowledge*;* Ethno veterinary*;* Medicinal plants

Introduction

Absence or inaccessibility to modern veterinary services and high cost of modern drugs, as well as failure in their efficacy, a large proportion of farmers rely on traditional medicine (herbal remedies) to keep their livestock healthy and productive for several decades (Kaur *et al*., 2011). In Ethiopia, due to huge potential of medicinal plants, traditional herbal medicine is an integral part of the local culture and used widely for the treatment of human and livestock aliments (Giday and Teklehaymanot, 2013).

Ethno-veterinary knowledge like other traditional knowledge is transferred from generation to generation through the word of mouth (oral tales) with great secrecy through family members, horizontally by exchange through peers, or diagonally through traditional healers to learners (Yirga *et al.,* 2012). This knowledge may disappear because of rapid socio-economic and technological changes. Moreover, environmental degradation, agricultural expansion (cultivation of marginal lands) and urbanization warranting urgent need to document and preserve the indigenous knowledge (Kalayou *et al*., 2012; Khan *et al*., 2012)

For the sake of documentation of endogenous knowledge regarding ethnoveterinary medicinal plants, several studies have been conducted throughout the world such as in South Africa (Vander and Swan, 2001) , in Zimbabwe(Tafara and Taona, 2004*)*, in China (Shen *et al*.,2010*)*,in Pakistan *(*Deeba *et al.,* 2009) and in India (Somvanshi,2006). Similarly, in Ethiopia, studies have been conducted on plant remedies which are used extensively by animal owners to treat livestock diseases (Giday and Ameni, 2003; Hunde *et al*., 2004; Kebu *et al.,* 2004; Sori *et al.,* 2004; Yineger *et al*.,2007; Yineger *et al*., 2008; Yigezu *et al.,* 2014*).* However, the effort is still quite insignificant when compared to the undocumented ethnoveterinary plant lore of the country. Therefore, the present study was conducted to identify and document plants used in ethnoveterinary practices along with livestock ailments treated by farmers in Wolmera district of Oromia Region, Ethiopia.

Materials and Methods

Study area

This study was conducted from December 2016 to March 2017 in eight selected peasant associations (PAs) of Wolmera District of Oromia Region, Ethiopia. The district is located at a distance of 33 km West of the capital, Addis Ababa at latitude 9º 3' N and 38º 30' E longitude (Fig 1). The district is largely a highland area. The highest point in this district is mount *Wechecha* with an elevation of 3191 m.a.s.l, located in the southern part of the district. The Menagesha National forest (2500 hectares in size) covers the southern and western slopes of this mountain (Briggs, 2002). The average annual rainfall of the district is 1014 mm. The maximum and minimum temperatures of the area are 22.3ºC and 6.16ºC, respectively; and the area experiences a bimodal rainfall patterns with a short rainy season which occurs from March to May and long rainy season which starts at the end of June and ends at early November. Oromiffa is spoken as a first language by 70.1% of the residences, whereas 24.22% spoke Amharic and the remaining 5.68% spoke other languages. Crop-livestock farming system is being practiced in the district and the dominant livestock raised in the district is cattle, small ruminants and equines in their decreasing order (CSA, 2015).

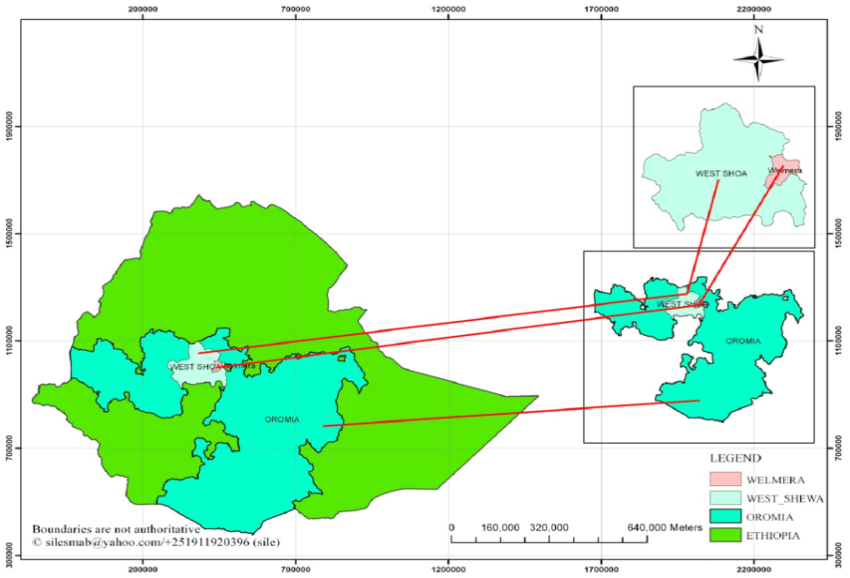

Figure 1. Map of the study district

Study design

A community based cross-sectional study design supported by questionnaire and close observation was conducted to collect Ethno-veterinary knowledge on medicinal plants in the selected peasant associations. A semi-structured questionnaire was prepared and administered to 80 respondents who depended on plant recourses for managing livestock aliments and showed interest to participate in the study. From the total respondents, 32 were selected purposely by the recommendation of the local elders due to their long practice in providing services related to traditional herbal medicines. Whereas, 48 were selected purposely by the researchers.

Data collection

Ethnobotanical data collections were made through semi-structured questionnaire supported by field observation. The questionnaire was written in English version that was translated to local language (Oromiffa*)*. Group discussions were made with key informants for cross-checking and verifying the information that have been gathered from individuals, and information which joined common understandings considered as relevant otherwise discarded. The collected specimens of medicinal plants were coded with vernacular names, pressed, dried and taken to botanical identification by botany specialists at national Herbarium of Addis Ababa University, College of Natural Science, Department of Plant Biology and Biodiversity. While collecting the medicinal plants, local name, general description of the plants, plant parts used, methods of preparation, routes of administration, aliments to be treated, and demographics parameters of respondents and source of knowledge were properly documented.

Data analysis and management

Collected ethno-botanical data were entered into Microsoft Excel spread sheet and analyzed using SPSS 20 software version and summarized using descriptive statistical methods such as frequency and percentages.

Fidelity value

Fidelity Level (FL), the percentage of informants claiming on the use of a certain plant for the same major purpose was calculated for the most frequently reported diseases or ailments as described by Alexiades (1996).

FL=Ip/Iu X 100
Where
FL =Fidelity Level
Ip = the number of informants that claim a use of a plant species to treat a particular disease
Iu =the number of informants that use the plants as a medicine to treat any given disease

Preference ranking

Preference ranking was also computed using fifteen key informants to assess the most effective medicinal plant species used for treating the most prevalent livestock aliments reported in the area. For this purpose, key informants were selected and asked to assign use values (5=best, 4= very good, 3=good, 2 =less used and 1=least used) to each species. The values given to each medicinal plant were summed and ranked according to Martin (1995) and Cotton (1996).

Results

Demographics of the respondents

A total of 80 respondents were interviewed based on their willingness to share their indigenous knowledge on ethno-veterinary medicine. Of these respondents, the majority of them were male, 63(78.8%) and the remained, 17(21.25%) were females. The age of the respondents was ranged from 17 to 80 years, but their knowledge on medicinal plants was varied. In comparison of educational status of the respondents, non-educated respondents handled much knowledge of traditional medicine than educated one (Table 1).

Inheriting knowledge of medicinal plants

The result of this study disclosed that most of the informants 68.75 % (55/80) have indigenous knowledge on herbal medicine, whereas the rest 31.25 % (25/80) have no any indigenous knowledge on ethno-veterinary medicine. Accordingly, majority of the respondents (90.91%) acquired the knowledge from their parents, 5.46% got by asking local herbalists and the rest (3.64%) by trial and error on their own animals. Transfer of ethnoveterinary knowledge mostly follows vertical transfer to the most selected family member orally with great secrecy (Table 1).

Table 1. Demography of the respondents and sources of endogenous knowledge on ethno-veterinary medicine in the study area.

Parameters	Respondents	Have Ethno-veterinary Knowledge	Percent (%)
Sex			
Male	63	48	76.2
Female	17	17	41.2
Age			
<20	6	1	16.7
20-40	31	15	48.4
>40	43	39	90.7
Educational level			
Illiterate	34	30	88.2
Elementary	25	19	76.0
High school	17	6	35.4
Diploma &above	4	-	-
Inheriting knowledge			
From Parents	55	50	90.9
Asking local herbalists	55	3	5.5
Through trial error	55	2	3.6

Identified Medicinal Plants for Treatment of Livestock Ailments in Wolmera district

This study documented 25 medicinal plant species in 22 families as useful in traditionally managing fifteen different livestock aliments in Wolmera district. Some species were recorded as being used for more than one purpose. Among the recorded species, *Selanecio gigas (Votke) C. Jeffrey*, *Allium sativum L.*,*Rumex nepalensis* Spreng, *Capsicum annuum L.* and *Ferula communis L.* were the most popular plants used to make traditional medicines in the treatment of more than one livestock aliments. Further investigation on the families has shown that families Asteraceae, Euphorbiacea, Solonaceae and Polygonaceae were represented by 2 species each. The remaining (18 families) were represented by single plant species (Table 2).

Medicinal Plant Parts Used, Method of Preparation and Routes of Administration to Treat Livestock Ailments

As shown in table 3, herbalist in Wolmera district used leaf, fruits, stems,

seeds and roots of medicinal plants to treat different animal aliments; and leaf (68%) was found to be the most familiar plant part for remedy preparations to treat blackleg, anthrax, bloat and ecto and endo-parasites. Different methods of ethnoveterinary medicinal plant preparations were also reported from identified plant parts. However, concoction (60%) followed by powdering (28%) were found to be the most frequently used methods of preparation (Table 3).

The herbal drugs following preparation were reported to be administered through different routes. The routes and method of applications varies with the type of disease to be treated and the actual sites of the disease. However, the dominant route of administration was oral (80%) followed by topical (16%) and nasal (4%) (Table 3). The dose regime was generally dependent on the degree and duration of the ailment, age, size and body condition of the animals. Various house hold utensils were used to determine the dose of the local plant medicines (Figure 2).

Table 2. Medicinal plants having ethno-veterinary importance in Wolmera district.

Scientific name of the Plants	Family name	Local name (Oromiffa)	Aliments that can be treated	Plant Parts used	Formulation	Administration route
Phytolacca dodecandra L' Herit	Phytolaccaceae	Andode	Eye disease	Leaf	Squeezing	Topical
Croton macrostachyus Del	Euphorbiaceae	Makanisa	Black leg skin wound	Leaf	Leaves are pounded and squeezed with water	Topical Nasal
Kalanchoe petitiana A. Rich	Crassulaceae	Bosoqe	Internal parasite	Leaf	Chopping, add to hot water, filtered	Per os
Lagenaria cineraria (Molina) standley (LS)	Cucurbitaceae	Buqqe	Black leg Retained placenta	Fruit	powdering and mixed with water, filtered	Per os
Calpurnia aurea (Aiton) Benth.	Fabaceae	Ceka	Rabies, External parasite	Leaf and stem	Fresh leaves are made to paste by adding little water and rubbed the Skin. Powderr them separately then, add to hot water to make a concoction. (rabies)	Topical Per os
Ocimum lamiifolium Hochst	Lamiaceae	Damakase	Black leg, Diarrhoea	Leaf	Grinding, mix with hot water	Per os
Justicia schimperiana (Hochst.exNees) T. Anders	Acanthaceae	Dhumuga	Rabies, black leg	Leaf and root	Powder them separately then, add to hot water to make a concoction.	Per os

Scientific name of the Plants	Family name	Local name (Oromiffa)	Aliments that can be treated	Plant Parts used	Formulation	Administration route
Vernonia amygdalina Del.	Asteraceae	Ebicha	Internal parasite, Retention placenta	Leaf	Chopping, mix with water, filtered	Per os
Solanecio gigas (Vatke.) C. Jeffrey	Asteraceae	Gomanaosolee	Diarrhea, Black leg Colic, Wound	Leaf	Chopping, mix with water	Per os Topical
Verbascum sinaiticumBenth.	Scrophulariaceae	Gurahare	Anthrax	Leaf	Squeeze and drenched the juice	Per os
Ajuga integrifolia Buch	Lamiaceae	Harmagusa	Diarrhea	Leaf and root	Chopped together mix with water	Per os
Ferula communis L.	Apiaceae	Hinsilale	Colic, Bloat Diarrhea	Leaf	Chooped mixed with water	Per os
Allium sativum L	Amaryllidaceae	Kulubiadi	Coughing, fungal infection, Leech	Stem	Chopping, mixing with water	Per os Topical
Rumex nepalensis Spreng.	Polygonaceae	Shulti	Internal parasite External parasite, Wound	Root	Chopping and mix with water	Per os /Topical
Nicotiana tabacum L.	Solanaceae	Tambo	Snake poisoning Leech	Leaf	Powdered leaf	Topical
Ruta chalepensis L.	Rutaceae	Tenadami	Bloat	Leaf	Boiled in hot water, filtered	Per os
Capsicum annuum L	Solanaceae	Barbare	Colic, bloat, Internal parasites	Seed	Grinding and mix with water	Per os
Juniperus procera HochstexEndl.	Cupressaceae	Gatirahabasha	Colic	Leaf	Leaves are pulverized	Per os

Scientific name of the Plants	**Family name**	**Local name (Oromiffa)**	**Aliments that can be treated**	**Plant Parts used**	**Formulation**	**Administration route**
Hagenia abyssinica(Bruce) J. F. Gmel.	Rosaceae	heto	Internal parasites	fruit	Grinding and mixing with water	Per os
Ricinus communis L.	.Euphorbiaceae	Kobo	FMD	Leaf	Chopping and mixing with water	Topical
Cymbopogon citratus	Poaceae	Xajisara	Bloat	Leaf	Chopping and mix with water and filtered	Per os
Clematis simensisFresen.	Ranunculaceae	Hidafiti	Rabies	Root	Chopping, mixing with water and filtered	Per os
Zingier officinale Roscoe	Zingiberaceae	Jinjibila	Eye inflammation	Stem	Crushing	Topical
Rumex abyssinicus Jacq.	Polygonaceae	Meqmeqo	External parasite	Leaf	Drying, powdered	Topical
Stephania abyssinica (Dillon ex A. Rich.) Walp.	Menispermaceae	Kalala	Rabies	Leaf	Chopping, mixing with water and filtered	Per os

Table 3. Summary of plant part(s) used, formulation and routes of administration of medicinal plant in the study area.

Parameters	Frequency	Percent (%) (n=25)
Plant parts used		
Leaf	17	68
Stem	4	16
Root	2	8
Seed	1	4
Fruit	1	4
Formulation		
Concoction	15	60
Squeezing	3	12
Crushing	7	28
Routes of administration		
Oral	20	80
Topical	4	16
Nasal	1	4

Figure 2. Different house hold utensils used to measure plant remedies:
A=Ladle, B= Spoon, C= water glass, D= Plastic Water container, E= horn cup, F= local beer utensil

Relative healing potential of medicinal plants

Capsicum annuum showed highest FL value (82.2%) for the treatment of bloat and under the gastrointestinal therapeutic category, highest fidelity level value was recorded for *Ocimum lamiifolium Hochst* (79.3%). *Calpurnia aurea (Aiton) Benth* was also showed high healing potential against external parasites (75%) as shown in Table 4.

Preference Ranking of Ethno-veterinary Plants

Preference ranking of five medicinal plants that were reported as an effective treatment for internal parasite, which is the most common disease in the study area was conducted after selecting 15 key informants. Hagenia abyssinica (Bruce) J. F. Gmel (64%), followed by Vernonia amygdalina Del (61%) was the most preferred plant species for the treatment of internal parasite in the study district (Table5).

Table 4. Fidelity level value of medicinal plants commonly reported against a given veterinary ailment category.

Medicinal plant species	Therapeutic category	Ip	Iu	FL value (%)
Croton macrostachyus Del	Wound	23	35	65.7
Capsicum annuum L	bloat	23	28	82.2
Rumex nepalensis Spreng	Internal parasite	13	30	43.3
Lagenariasiceraria(Molina) standley (LS)	Retained placenta	20	31	64.5
Nicotiana tabacum L.	Leech	26	38	68.4
Allium sativum L	Respiratory disease	12	28	42.8
Ocimumlamiifolium Hochst	Diarrhea	23	29	79.3
Calpurnia aurea (Aiton) Benth	External parasite	18	24	75

Ip = the number of informants that claim a use of a plant species to treat a particular disease, Iu =the number of informants that use the plants as a medicine to treat any given disease, FL= Fidelity Level

Table 5. Preference ranking of medicinal plants reported for treating internal parasite in livestock.

Medicinal plants for Internal parasite	Respondents laved from R_1 up to R_{15}																
	R_1	R_2	R_3	R_4	R_5	R_6	R_7	R_8	R_9	R_{10}	R_{11}	R_{12}	R_{13}	R_{14}	R_{15}	**Total score**	**Rank**
Hagenia abyssinica (Bruce) J. F. Gmel.	4	5	4	4	3	5	4	4	5	5	5	4	3	4	5	64	1st
Capsicum annuum L	3	2	3	5	4	2	2	5	2	3	2	1	5	1	3	43	3rd
Rumex nepalensis Spreng	2	3	2	2	5	3	1	4	4	1	3	3	3	3	2	41	4th
Vernonia amygdalina Del.	5	4	5	3	4	4	5	2	3	4	4	5	4	5	4	61	2nd
Kalanchoe petitiana A. Rich	1	1	1	1	1	2	3	3	1	2	1	2	1	2	1	23	6th

NB-Scores in the table indicate ranks given to medicinal plants based on their efficacy. Highest number (5) for the medicinal plant which informants' thought was most effective in treating internal parasites and the lowest number (1) for the least-effective plant species
R1....R15= respondents.

Discussion

The present study was conducted in Wolmera district of Oromia region, Ethiopia from November 2016 to March 2017 to document indigenous knowledge of the communities on Ethno-veterinary medicine. A total of 80 respondents were interviewed based on their willingness to participate in the survey. Of these respondents, only 68.75% had ethno-veterinary knowledge; and most of them were males. The result is in line with studies conducted previously in different parts of Ethiopia such as in Borena pastoralist area (Sori *et al*., 2004), in Jimma zone (Yigezu *et al*., 2014), in Ankober,North Shoa zone (Lulekal *et al.,*2014) and elsewhere in creator Giyai municipality, South Africa (Luseba and Van Der Merwe, 2006) and in North western Yunnan, China (Shen *et al*., 2010). This similarity may be due to high degree of secrecy on passing indigenous knowledge on medicinal plants within the family circle only to sons; and could also be related with the local attitude of societies that restricts female to stay home just only for limited activities such as to look after babies and giving attention to the work performed in the home rather than reacting with outside environment.

In line with this study, other studies have reported that the highest medicinal plant knowledge is developed as the age of the herbalists increased (Yirga *et al*., 2012; Tamiru *et al*., 2013). This may be due to the fact that indigenous knowledge is built with years of experience and might also be the herbalist passed the secret to selected members of the family especially to their elder son when his age become above 40 years.

In this study, 25 species of medicinal plants belong to 22 families were identified and documented for treating 15 types of livestock aliments in study area. Studies conducted previously in different parts of Ethiopia identified and documented different plant species having value in Ethno-veterinary Medicine. *Viz*, 83 plant species in Southern Tigray (Giday and Ameni,2003), 43 species in Borona pastoralist area (Sori *et al*., 2004), 72 species in Wonago district, Southern Ethiopia (Mesfin *et al*.,2009), 22 species in Seharti-Samre district (Yirga *et al*., 2012),74 species in Jimma Zone (Yigezu *et al*., 2014),51 species in Ankober, North Shoa (Lulekal *et al*.,2014) and 24 species in Amaro special district (Tekele, 2015). These identified and documented medicinal plant species were used for treating fifteen to thirty-seven livestock aliments in each study sites. Overall, our survey and works done previously in different parts

of Ethiopia have shown that the country is rich in medicinal plants and fairly distributed throughout its regions.

Among medicinal plant species reported in this study, 9 species in Horogudru districts (Tadesse and Dereje, 2015), 6 species in South Ethiopia (Romha *et al*.,2015), 2 in central Kenya (Njoroge and Bussmann, 2006), 3 in Marajó Island, Brazil (Monteiro *et al*.,2011) and 3 in central India (Verma, 2014) were reported to treat almost similar livestock aliments. All these findings suggest that traditional ethno-veterinary knowledge widely used in elsewhere in the world and there might be increases inclination of people to depend on such practices because it is considered equivalently effective to modern cares, and moreover, cheap and easily available in their environments (Yigezu *et al*.,2014).

Some of the medicinal plants reported were also described in other surveys to treat similar diseases. *Vernonia amygdalina Del*. And *Agugain tergrifolia* F.Gmel(Tekele, 2015) were used to treat internal parasites. Also, *Capsium annuum L* and *Zingiber officinale* Roscoe(Lulekal *et al*., 2014; Tadesse and Derje, 2015) were used to treat bloat in Cattle, *Zingiber officinale Roscoe* (Yigezu *et al*.,2014) for conjunctivitis, *Justicica schimperiana (Hochst.exNees)* T.anders (Tadesse and Derje, 2015) for rabies, *Nicotiana tabacum L. (*Yigezu *et al*., 2014; Romha *et al.,*2015; Takele, 2015) was used to treat snake bite and leech and *Croton macrostachyus* Del. and *Calpurnia aurea* (Aiton) Benth (Lulekal *et al*., 2014) also reported to treat wound and tick infestation respectively. Medicinal plants that were reported by different informants and communities with the same therapeutic indications represent traces of true efficacy (Giday *et al*., 2009).

Alike present study, leafy part of the plants rank first, among the various plant parts(stems rots and seeds) used for treatment of various diseases of the livestock in other studies at different parts of Ethiopia (Tamiru *et al*., 2013; Yigezu *et al*., 2014; Romha *et al*., 2015; Tekele, 2015), in India (Verma, 2014), in Brazil (Monteiro *et al*.,2011), in Pakistan (Deeba *et al.,* 2009) and in Kenya (Njoroge and Bussmann, 2006); however, in contrast to our study, Lulekal *et al*., (2015), Mesfin *et al*.(2009) and Tabuti *et al*. (2003) have reported that root is as the most used part in their studies. This difference could be as the pharmaceutical value and concentration of active ingredients in each plant varied depending on climatic and geographical factors, soil type, and difference in endogenous knowledge in the communities; and might be also the types of medicinal plant species found in the study areas. However, harvesting of leaves compared to

harvesting of stems and roots has a less negative impact on the survival and sustainable utilization of useful medicinal plants in future perspective (Yigezu *et al*., 2014*).*

Herbalists in the study area were used a variety way to prepare their plant remedies such as concoction, crushing/powdering and squeezing and administered the prepared remedies per os or applied topically. These findings were concurred with the reports of Yigezu *et al*. (2014) in Jimma zone, Mesfin *et al*. (2009) in Wonago, Ethiopia, Deeba *et al*. (2009) in Pakistan, Njoroge and Bussmann (2006) in Kenya and Shen *et al*. (2010) in Nu Village of western China. These methods of preparation and routes of administration might be related to usage of different solvents mainly water as vehicle system; and could be also considered as rapid physiological reaction with the causative agents and increase the curative power of the medicinal plant remedies.

Determination of dose of plant medicine was determined by severity and duration of ailments, body size and age of the patients. However, there were variations in unit of measurement of plant remedies. Most of the time, doses in the study area were determined by using different house hold utensils like water glasses, ladles, horn cups, spoons and plastic containers. On the other hand, lack of precision and standardization has been reported as a drawback of remedy preparation from medicinal plants. Similar findings were reported in Ethiopia and elsewhere in the world (Yineger *et al*., 2008; Deeba *et al*., 2009; Monteiro *et al*., 2011; Lulekal *et al*., 2014; Romha *et al*., 2015).

Healing potential for some medicinal plants was estimated using Fidelity level (FL). Accordingly, *Capsicum annuum L.* (82.2%), followed by *Calpurnia aurea (Aiton*) (75%) were the plants having the highest FL value, for their use to treat bloat and external parasites, respectively. Similar findings have been reported in other studies (Lulekal *et al*., 2014; Romha *et al*., 2015). Plants scoring higher FL values are thought to have better potency as compared to plants with less FL values (Trotter and Logan 1986). On the other hand, Lulekal *et al*. (2013) recommended for further chemical screening those plants with high FL values.

Hagenia abyssinica (Bruce) J. F. Gmel and *Vernonia amygdalina Del.* were the most preferred medicinal plant species to treat internal parasites, the most prevalent disease in the area. This might be attributed to the presence of bioactive compounds against different internal parasitic species

Conclusion and Recommendation

Ethno-veterinary practices significantly play a major role in livestock health care as an alternative or integral part of modern veterinary practices especially in marginal areas where modern veterinary coverage is lacking. In this survey, about 25 medicinal plant species belong to 22 families were identified and documented. The people in the study district have ample ethno- veterinary knowledge in treatment of livestock aliments of different origins. However, the efficacy and the toxicity level of each medicinal plant species were not well known. Therefore, we strongly recommended for detail scientific and pharmacological evaluations (efficacy, safety, mode of delivery and dosage) of the identified plant species in future use.

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Conflict of interest

There is no conflict of interest to declare

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