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Survey of ethno-veterinary medicinal plants at selected Horro Gudurru Districts, Western Ethiopia

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Plant remedies are still the most important in therapeutics of treat livestock diseases, though large knowledge of ethno medicinal plants is declining to deterioration due to the oral passage of herbal heritage verbally. The objective of the study was to identify and document ethno-veterinary medicinal plants. The study was carried out from January to July 2014 at selected Horro Gudurru districts of western Ethiopia. The study sites were selected purposefully based on the recommendations of elders and local authorities. Ethno-botanical data were collected using semi-structured interviews, field observations and group discussion. About 51 study participants were involved in this study during the study period. A total of 25 ethno-veterinary medicinal plant species belonging to 19 families were documented with details on their local name, family, habitat, their traditional preparation and mode of application. *Solanaceae* families constituted the highest proportion (16%) followed by *Euphorbiaceae* (12%). The informants reported that there were 14 known livestock diseases which are treated by traditional healers. Herbs (44%) were the most widely used followed by shrubs (32%). Oral route of administration (76%) was the most commonly used followed by topical (24%). About 78.4% of the plant taxa were available every time. Agricultural expansion (43.3%) has been found to be the first main threat followed by deforestation (21.2%). The study revealed that the traditional healers and some livestock owners had knowledge of medicinal plants used to treat livestock diseases. Hence, further research should be conducted to evaluate the efficacy and possible toxicity of the plants in the study area.

Key words: Ethno-veterinary, disease, Horro Guduru Wollega, medicinal plants, livestock.

INTRODUCTION

In Ethiopia, livestock production remains crucial and represents a major asset among resource-poor smallholder farmers by providing milk, meat, skin, manure and traction. However, the economic benefits of livestock populations remain marginal due to prevailing livestock diseases which are among the principal bottle necks of

livestock performance and cause of high economic losses of the resource poor farmers (Mesfin and Lemma, 2001).

Plant remedies are still the most important and sometimes the only sources of therapeutics for nearly 80% of human and more than 90% in livestock population

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in Ethiopia. Estimated floras of 6500 to 7000 species of higher plants are medically important and out of these medicinal plants, 12% are endemic to Ethiopia (Mengistu, 2004). Despite their vital role in catering for the health of human and livestock population, large part of the knowledge of ethno medicinal plants is on the verge of irreversible loss and declining to deterioration due to oral passage of herbal heritage from generation to generation verbally rather than in writings (Pankhurst et al., 2001).

Traditional healers and local farmer's (traditional health practitioners) have made remedies from plants that play an important role in treating both animals and human diseases. Ethno-veterinary 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. The traditional practitioners can prepare and use homemade remedies without any expenditure (Yirga et al., 2012). The use of ethno-veterinary practices to treat and control livestock diseases is an old practice in a large part of the world, particularly developing countries where animal health service facilities are still very poor or/and are found scarcely located at urban areas (Kokwaro, 1976; McCorkle, 1995; Sinha et al., 2002). Even still, those in close proximity to conventional drugs also use traditional medicinal drugs to treat their animals (Gemechu et al., 1997) due to shortage of modern drug of choice, cultural acceptability, efficacy against certain diseases and economic affordability (Teklehaymanot and Giday, 2007).

However, the traditional knowledge of ethno-veterinary medicinal plant is not compiled in Ethiopia (Giday et al., 2009; Sori et al., 2004). 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 livestock healthcare and drug development in the present and future (Tamiru et al., 2013).

The studies conducted on the traditional ethno-veterinary medicinal plants in Ethiopia are very limited when compared with the multiethnic cultural diversity and the diverse flora of Ethiopia (Giday et al., 2009). Even though traditional ethnoveterinary knowledge of medicinal plants is very crucial to treat different animal diseases, there is no study conducted in Horro Guduru Wollega Zone of western Ethiopia on this regard. Hence, the present study was designed to identify and document ethno-veterinary medicinal plant species and traditional medicinal knowledge of the traditional health practitioners in study area.

MATERIALS AND METHODS

Study area

The study was conducted from January to July 2014 at selected Horro Guduru Districts/Woredas in Oromia regional state of Western Ethiopia. The zone is found about 251 Km from West of

Addis Ababa. The study area is located at an elevation of 2,088 m above sea level. The annual minimum and maximum temperature is 15-27°C and the annual average rainfall is 1800 mm (NAMSA, 2013). The rural and peri-urban areas of the zone are featured by mixed agricultural system where livestock play an important role. There are no adequate veterinary services in case of drug availability, only some broad spectrum drugs were offered.

Study population

The target populations used in this study were elderly livestock owners and traditional animal healers. The survey was conducted through questioner surveys designed for farmer particularly knowledgeable elders and traditional animal healers.

Data collection

The study sites were selected based on the availability of practice of traditional medicine and on the recommendations of local authorities and agricultural developing agents. Moreover, the agro-climatic zones was considered to select the study districts' and kebeles purposely. An ethno-veterinary botanical survey was conducted to gather information on the traditional usage of plants in livestock health care system using a semi-structured interview, observations and field guided walks (Martin, 1995) with the local farmers and traditional healers who were willing to share their indigenous knowledge. A total of 51 individuals were purposively selected and interviewed based on their knowledge on traditional medicine in the study area. The market survey was made to distinguish and record the type of herbal drugs sold in the market, and the multipurpose role of some medicinal plants was observed during the study period. Furthermore, herbal drug sellers and others who brought plant species were interviewed. The group discussions were conducted to elaborate the methods of preparation, administration and conservation of the medicinal plants. Interviews were conducted in "Afan Oromo" language. During the study period, each informant was visited two to three times in order to confirm the reliability of the ethnobotanical information. The responses that were not in harmony with each other were rejected.

Plant specimen collection and identification

The medicinal plants were collected from the wild and home gardens based on the report of the informants. The collected plants and the necessary recorded information were taken. Preliminary identification was done at the site (field) and the collected voucher specimens were taken to the Natural Herbarium of Wollega University and identified by botanist. After the specimens were taken to the department, plant species were identified using taxonomic keys; the volumes of the Flora of Ethiopia and Eritrea (Edwards et al., 2000; Hedberg et al., 2006) and by making a comparison with the already identified specimens that were deposited at the herbarium.

Data analysis

Descriptive statistical methods: proportions and tables were used to summarize the collected ethno-veterinary medicinal data.

RESULTS

General characteristic of the informants

In the present study, traditional healers (72.5%) and

Table 1. Summary of group interviewed, source of plants and availability of the medicinal plants in the study area.

Variables		Total no. of respondents	No. of identified major risk factors
Sources of Plants	Wild	39	76.5%
	Domestic	7	13.7%
	Both	5	9.80%
Total		51	100
Group of interviewed	Livestock owners	14	27.5%
	Traditional healers	37	72.5%
Total		51	100
Age of respondents	Elderly	44	96%
	Young	7	4%
Total		51	100
Availability of the medicinal plants	Every time	40	78.4%
	Seasonally	8	15.7%
	Difficult to get	3	5.90%
Total		51	100

livestock owners (27.5%) participated during the study period. Almost all of the respondents were elderly, age group: 96.0% and younger age group: 4%, respectively (Table 1).

Sources and habitat of ethno veterinary medicinal plants

The ethno-veterinary medicinal plant data collected from the study site revealed that most of the medicinal plants were collected from the wild (76.5%) followed by from home gardens (13.7%) and both (9.8%), respectively (Table 2). In addition, the most indicated habit of the medicinal plants was herbs (44%) and then shrubs (32%) (Table 3).

Medicinal plant parts used for the preparation of the remedies

The study showed that the widely used plant part for the preparation of the remedies in the study area was leaves (48%) and followed by roots (36%) and the rest were seed and fruits (20%) (Figure 1 and Table 3).

Mode of preparation, route and ingredients added

The study revealed that the highest mode of preparation was in the form of grinding (49.3%); followed by crushing (27.7%) and others like chopping, decoction, roasting, consumption of whole plant part, streaking (23.0%). The majority of the plant remedies were prepared from fresh material of the plants which accounted for 87% followed by fresh/dry (13%). The most widely used route of administration was oral which accounted for 76% followed by topical (24%) and inhalation (4%) (Table 3).

Indications

The informants reported that there were 15 known livestock diseases and disease conditions in the study area which are treated by traditional healers. Of the diseases, rabies (29.4%) was the most common one. Traditional healers (key informants) ranked these plant taxa based on their perception of the degree of effectiveness (Table 5).

Availability of medicinal plants based on the season

Availability of some ethno-veterinary medicinal plants were affected by season; many of the plants were available all the time (78.4%), some are available seasonally (15.7%), and the rest, difficult to get (5.90%) as described in the study area (Table 1).

Medicinal plant families frequently used at study area

Solanaceae and Euphorbiaceae families constituted the highest proportion (16%) followed by Cucurbitaceae (12%), Cucurbitaceae (8%) and all other plant families were constituted proportionally (4%) (Table 4).

Inheriting knowledge of medicinal plants

According to the survey, transfer of ethno-veterinary knowledge of medicinal plants follows vertical transfer to the most selected family member orally with great secrecy. The highest number of transfer of knowledge on the plant is to trust eldest son that accounted for 45.0% followed by trusted sons (23.5%), and others are all members of the family (19%), relatives (9%) and friends (4%). The findings of the study showed that as people

Table 2. Summary of ethno veterinary medicinal plants, disease treated, habit, part, route and uses of the plants.

Scientific name	Family name	Local name	Habit	Parts	Other uses	Routes	Indications
<i>Achyranthes aspera</i>	Amaranthaceae	Maxxannee	Herb	Root	Fence	Oral	Wound, mastitis
<i>Allium sativum</i>	Alliaceae	Qullubbii adii	Herb	Leaf	Food	Oral	Abdominal pain, Pastuerellosis, relief bloat
<i>Brassica carinata</i>	Brassicaceae	Gomenzeera	Herb	Seed	Food	Oral	Stop bloat, wound
<i>Brucea-anti dysentrica</i>	Simaroubaceae	Qomonyoo	Herb	Fruit		Oral	Rabies, ring worms
<i>Calpurnia aurea</i>	Fabaceae	Ceekkataa	Shrub	Leaf	Fence	Topical	Lice infestation, leech
<i>Capsicum annum</i>	Solanaceae	Mimmixa	Herb	Seed	Food	Oral	Abdominal pain, relief bloat, Pastuerellosis, leech, Tapeworm
<i>Carrissa- spinarum</i>	Apocynaceae	Hagamsa	Shrub	Root	Fence, Food	Oral	Ring worm, wound
<i>Clucia lanceolata</i>	Euphorbiaceae	Ulee foonii	Shrub	Root	Fence	Oral	Rabies
<i>Coffea Arabica</i>	Rubiaceae	Buna	Shrub	Seed	Food	Topical	Wound, abdominal pain
<i>Croton macrostachyus</i>	Euphorbiaceae	Bakkanniisa	Tree	Leaf	Shed	Oral, Topical	Ring worm, relief bloat, wound
<i>Grewia bicolar</i>	Tiliaceae	Harooressa	Tree	Leaf	Fence	Oral	Retained fetal membrane
<i>Justicia- schimperiana</i>	Acanthaceae	Dhummugaa	Shrub	Root, Leaf	Fence	Oral	Rabies, coccidiosis
<i>Nicotiana- tabacum</i>	Solanaceae	Tambooo	Shrub	Leaf	stimulant	Oral	Leech, Tape worm
<i>Prunus africana</i>	Rosaceae	Hoomii	Tree	Leaf	Shed, furniture	Topical	Wound
<i>Phytolacea- dodecandra</i>	Phytolacaceae	Handoodee	Herb	Leaf	Detergent	Oral	GIT parasites, rabies
<i>Ricinus- communis</i>	Euphorbiaceae	Qobboo	Shrub	Root	Shed, Food	Oral	Retained fetal membrane, rabies
<i>Solanium incanum</i>	Solanaceae	Hiddii	Herb	Root	-	Oral	Pastuerellosis
<i>Vernonia anygdalina</i>	Asteraceae	Eebicha	Tree	Leaf	Fence	Oral	Retained placental membrane
<i>Zehneria scara</i>	Cucurbitaceae	Hidda reeffaa	Herb	Leaf	Fence	Oral	Rabies, Pastuerellosis
<i>Zingiber officinale</i>	Zingiberaceae	Jinjibila	Herb	Root	Food	Oral	Rabies, Pastuerellosis, abdominal pain, leech
<i>Olea europaea</i>	Oleaceae	Ejersa	Tree	Leaf	Charcoal	Inhalation	Rabies, snake bite
<i>Cucumis ficifolius</i>	Cucurbitaceae	Hiddi hooloto	Herb	Root	-	Oral	Rabies
<i>Solanum gigantum</i>	Solanaceae	Hiddii saree	Herb	Root	-	Oral	Rabies
<i>Dodonaea angustifolia</i>	Sapindaceae	Itacha	Shrub	Leaf	-	Topical	Lice infestation
<i>Citrus aurantifolia</i>	Rutaceae	Lommi	Tree	Fruit	Food	Topical	Tick infestation, wound

become older and older, their knowledge of traditional medicine becomes better and better. Most of the informants were elders which indicated the trend of transferring (inheriting) the knowledge is usually at old age. The study also indicated that there is no widely observed trade of medicinal plants in the study area though some practitioners and women sell some medicinal plants in the market and in their homes. Some of the plant medicines that are grown in home gardens and sold were *Olea europaea*, *Nicotiana tabacum*, *Capsicum annum*, *Coffea arabica*, *Justicia schimperiana* and *Ricinus communis*.

Conservation and threats of medicinal plants

The study indicated that many of the informants who have knowledge on traditional medicine usage give priority to the immediate use of the medicinal plants than

to its sustainable future uses, as a result their harvesting style is destructive. However, some plants are protected for spiritual and cultural purposes. Thus, these places are good sites for the protection of the medicinal plants since cutting and harvesting are not allowed in such particular areas. This indicated that a good practice for the conservation of medicinal plants is through cultivation. The study revealed that there were a number of threats that affect the medicinal plants in the study area. The factors include agricultural expansion (43.3%) followed by deforestation (27.9.2%) and overgrazing (16.3%) (Table 6).

DISCUSSION

In this study, a total of 25 ethno-veterinary medicinal plant species belonging to 19 families were identified and documented with details on their local name, family,

Table 3. Summary of ethno-veterinary medicinal plant habit, parts and routes of administration.

Variables		Frequency	Percent (%)
Habit	Herb	11	44
	Shrub	8	32
	Tree	6	24
Parts	Leaf	12	48
	Seed and fruit	5	20
	Root	9	36
Routes	Oral	19	76
	Topical	6	24
	Inhalation	1	4

Table 4. Summary of ethno-veterinary medicinal plants' frequencies in the study area.

Family name	Frequency	Percent (%)
<i>Amaranthaceae</i>	1	4
<i>Alliaceae</i>	1	4
<i>Brassicaceae</i>	1	4
<i>Simaroubaceae</i>	1	4
<i>Fabaceae</i>	1	4
<i>Solanaceae</i>	4	16
<i>Apocynaceae</i>	1	4
<i>Euphorbiaceae</i>	3	12
<i>Rubiaceae</i>	1	4
<i>Tiliaceae</i>	1	4
<i>Acanthaceae</i>	1	4
<i>Rosaceae</i>	1	4
<i>Phytolacaceae</i>	1	4
<i>Asteraceae</i>	1	4
<i>Cucurbitaceae</i>	2	8
<i>Zingiberaceae</i>	1	4
<i>Oleaceae</i>	1	4
<i>Sapindaceae</i>	1	4
<i>Rutaceae</i>	1	4

habitat and their traditional preparation, and mode of application. *Solanaceae* and *Euphorbiaceae* families constituted the highest proportion (10.7%) followed by *Fabaceae* and *Cucurbitaceae* with the same proportion (7.14%). The finding was in line with other findings that were conducted in different parts of Ethiopia (Gebre, 2005; Tolesa, 2007; Teklehaymanot et al., 2009; Gebrezgabiher et al., 2013; Lulekal et al., 2014).

Most of the respondents were older age groups, however, very few youths were involved in traditional

livestock treatment in the study area. This was in line with report of Yirga et al. (2012a, b) from Jimma. The findings also agree with reports of Tamiru et al. (2013) from Dabo Hana District, West Ethiopia and Gebrezgabiher et al. (2013) from Tigray region. The less medicinal knowledge in relation to young age might be attributed to the fact that traditional knowledge is built with years of experience (Awat, 2007). This might be also be due to the transfer of ethno-veterinary knowledge of medicinal plants which follows vertical transfers to the most selected family member orally with great secrete usually at old age.

The finding revealed that the majority of the traditional healers and some livestock owners in the villages rely on traditional veterinary knowledge, practices and locally available materials (Giday and Ameni, 2003), primarily medicinal plants to cure and prevent livestock diseases such as wound, rabies, retained fetal membrane, abdominal pain, bleeding, pastuerellosis, mastitis, leech infestation, bloating, dermatophilosis, skin diseases, lice infestation, ring worm and gastro intestinal parasites. This indicated that herbaceous medicinal plants were the widely used for the treatment of various diseases. The finding agrees with studies in other parts of Ethiopia (Tessema et al., 2001; Giday and Ameni, 2003; Sori et al., 2004; Teklehymanot and Giday, 2007; Birhanu et al., 2014).

In this study, most of the medicinal plants were collected from the wild (76.5%) and others were from home gardens (13.5%) and both (9.80%). This was in line with studies in other parts of Ethiopia (Giday et al., 2009), Pakistan (Farooq et al., 2008) and Brazil (Barboza et al., 2007; Monteiro et al., 2011). This indicated that the practice of cultivation of plants for their medicinal purpose in home gardens in most of the country is low though many plants are cultivated for other purposes, mainly for food. In a similar way, people in the study area have less effort to cultivate medicinal plants in their home gardens rather, they go to nearby or far places and harvest the plants. In addition, the habit of the medicinal plants indicated that most of them were herbs (44%) followed by shrubs (33.6%) and tree (24%). The knowledge on the type, part used, dosage, administration of the medicinal plants is circulating only among traditional practitioners of traditional medicine based on the severity of diseases (Tadesse, 1986). All plant growth forms were not equally used as remedies, because of the difference in distribution among the growth forms. This leads to the wide use of herbs and shrub for their medicine. In the present study, the part of the medicinal plant which is highly used for the preparation of the remedies were leaves (48%) followed by roots (36%). This agrees with the reports of Giday et al. (2003) and Mesfin (2007). Based on the information gathered from the key informants especially from those who are highly accepted by the society for their ability in healing different health problems, the condition of preparation of remedies was not the same. The highest condition of preparation was fresh (87%) followed by fresh/dry (13%). In contrast to

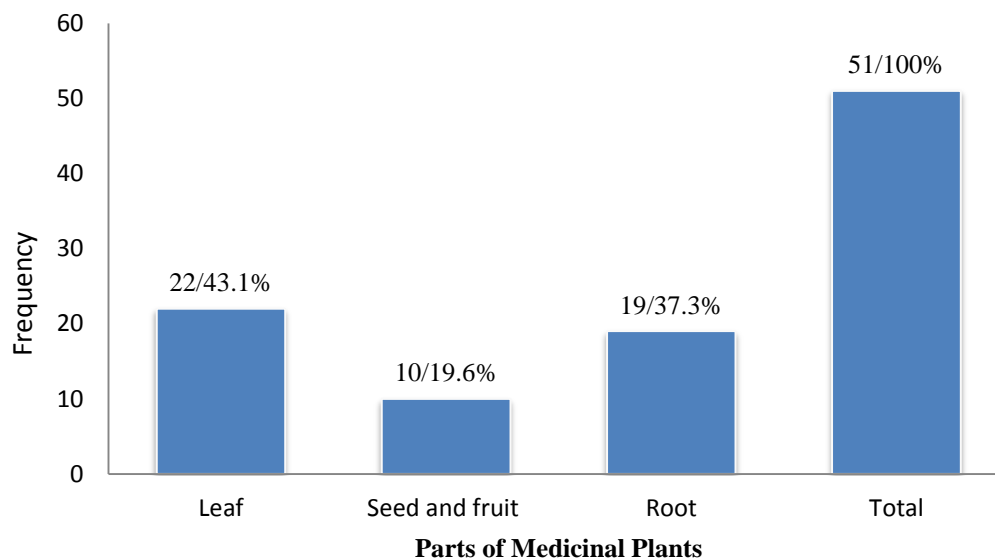


Figure 1. Parts of ethno-veterinary medicinal plants used for treating livestock diseases in the study area.

Table 5. Summary of ethno-veterinary medicinal plant with respect to indications in the study area.

Livestock diseases (indications)	Frequency and Percent
Rabies	15 (29.4%)
Wound	5 (9.80%)
Retained fetal membrane	2(3.92%)
Abdominal Pain	4 (7.84%)
Pastuerellosis	5(9.80%)
Mastitis	1 (1.96%)
Leech infestation	3(5.90%)
Relief bloating	5 (9.80%)
Dermatophilosis	3 (5.90%)
Ring worm	3 (5.90%)
Lice infestation	1 (1.96%)
GIT parasites	1 (1.96%)
Tape worm	1 (1.96%)
Snake bite	1 (1.96%)

this, some professional traditional healers sell their plant medicines in dried form in the market and also store the dried plant medicines in different containers in their homes. This agrees with another finding at Tigray region (Gebrezgabiher et al., 2013).

The study also showed that the information gathered from the key informants especially from those who are highly accepted by the society, most of the plant remedies were administered orally (76%) followed by topical (24%) and inhalation (4%). The result agrees with similar studies elsewhere in Ethiopia (Abebe and Ayehu, 1993; Teklehaymanot and Giday, 2007). But, the dosage determination was the big problem in the study area

because there is no standardized known unit of measurements of the plant remedies. However, the dose was determined by using 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 diseases, age and body condition of the animal. This agrees with report of ethno-medicinal plant knowledge and practice by Abera (2014) from Gimbi district, Southwestern Ethiopia.

In this study, the information gathered from the key informants indicated that the treats of medicinal plants

Table 6. Priority ranking of factors perceived as threat to ethno-veterinary medicinal plants on the level of destructive effects in Horro Guduru based on interviews (n=51).

Factors	Frequency	Percentage (%)	Rank
Agricultural expansion	45	43.3	1
Deforestation	29	27.9	2
Overgrazing	17	16.3	3
Drought	13	12.5	4

increase from time to time in the study area. The agricultural expansion was the major medicinal plant treats (43.3%) followed by deforestation (27.9%). This might be due to continuous agricultural expansions, deforestation and draught in addition to lack of attention towards the medicinal plants. The plants disappeared because of rapid socioeconomic, environmental and technological changes and as a result of the loss of cultural heritage under the guise of civilization (Lulekal et al., 2008; Khan et al., 2012).

The traditional medicinal use of some surveyed medicinal plants is recorded in other parts of the country. *Hagenia abyssinica* is used to treat tinea in human in Bale, Debark and Kofle rural communities of Ethiopia (Assefa et al., 2010). Similar, its use for treatment of livestock ailments have been also documented (Mesfin and Obsa, 1994; Abebe et al., 2000; Wondimu et al., 2007; Yineger et al., 2008). The therapeutic value of *Achyranthes aspera* is known for skin diseases (Goyal et al., 2007) and various gastrointestinal and respiratory problems (Bhandari, 1990). The medicinal use of *Azadirachta indica* to treat endoparasites and ectoparasites is also documented by Sori et al. (2004) in the Borena pastoralists, southern Ethiopia. Moreover, the efficacy of leaves of *A. indica* to reduce the parasitic load (Khan, 2009) and that of the Aloe species in treating *Trypanosoma* in sheep (Ibrahim, 1986) has also been confirmed. The study depicted that the traditional healers and local farmers have rich knowledge on ethno-veterinary medicines to treat and manage their livestock through indigenous knowledge, to protect the health and increase productivity.

Conclusion

In this study, 25 species and 19 families of ethno-veterinary medicinal plants were identified and documented during the study period in the study area. There were a large number of valuable resources, practices and knowledge of ethno-veterinary medicine which can solve problems of shortage of drugs at rural areas as well as drug resistance in different diseases. The plants were mainly collected from the wild by consultation of traditional health practitioners. Agricultural expansion and deforestation were found to be the main

threats to the medicinal plants. Thus, attention should be given to the medicinal plants and research is needed to determine safety, toxicity and determine the dose.

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Conflict of interest

The authors declare that there is no conflict of interest.

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