Ethnobotanical Investigation of Traditional Medicinal Plants in Dugda District, Oromia Regio

Mekonen Wolditsadik Beyi
Department of Biological sciences and Biotechnology, Haramaya University, Ethiopia

Abstract

Background: Ethiopia has rich flora with different plant species having medical importance in health care system based on local indigenous knowledge.

Methods: Ethnobotanical data were gathered using semi-structured interviews, field observations and group discussions with local traditional medicine practitioners. Data were analyzed using descriptive statistics. Moreover, informant consensus factor, fidelity level, preference ranking were computed following standard procedures.

Results: Ethnomedicinal use of 88 plant species distributed in 81 genera and 47 families was documented. Highest number of species (6) was under family Fabaceae, Asteraceae, Euphorbiaceae and Solanaceae. Habit wise, 38.2% were herbs followed by shrubs (32.5%) tree species (22.8%) and climbers (3.3%). Plants were used mostly in fresh for remedy preparation. The most widely used method of preparation were pounding (44.1%), crushing (26.4%) and cooking/boiling (19.5%), were the major remedy preparation methods reported. Route of administration mainly oral followed by dermal. Malaria and headache, intestinal parasite, diarrhea, amoebiasis, and stomach ache and common cold and cough had the highest ICF value > 90.

Conclusions: Indigenous people of the study area have their own ways of managing health problems of human and livestock as they are endowed with specific culture, tradition and ethical norms. Biochemical profiles of plant species used for diseases categories of high ICF should be investigated for screening of the active principles.

Introduction

Ethnobotany is the study of how people of a particular culture and religion make use of indigenous plants. It accounts for the study of the relationship between people and plants for their use as medicines, food, shelter, clothing, fuel, fodder and other household purposes [1]. In Africa, up to 80% of the population uses traditional medicine to help meet their health care needs [2]. Traditional medicines of plant origin are less costly than modern medication [3,4]. The current account of medicinal plants use of Ethiopia shows that about 887 plant species are reported to be utilized in the traditional medicine [5]. Among these, about 26 species are endemic and they are becoming increasingly rare and rare at the verge of extinction.

From the beginning of humanity, indigenous people have developed their own local specific knowledge on plant use, management and conservation [6]. In most cases, this traditional knowledge on medicinal plants passes down from generation to generation verbally and prone to loss if not documented [7]. Moreover, due to ecological shifts and environmental perturbations, plant resources are dwindling at an alarming rate, suggesting the rapid loss of medicinal plants and their associated indigenous knowledge. Indigenous knowledge develops as a result of human interaction with their environment. Traditional medical system is, therefore, shaped by the ecological diversity of the country, socio-cultural back ground of the different ethnic groups as well as historical developments, which are related to migration. In Ethiopia, for example, previous studies showed the existence of traditional medical pluralism [8]. Documentation of ethnobotanical knowledge on medicinal plants is basic for conservation and community developments. Ethnobotanical studies are often significant in revealing locally important plant species especially for the discovery of new drugs [9]. Despite the agro-ecological and cultural diversity of the country, the documentation of medicinal plants and associated indigenous knowledge appears incomplete [10]. There is no much study in western part of Ethiopia, and particularly no documented study is found from Dugda District of Oromia Region, Ethiopia. This suggesting that there is still a gap in our knowledge about ethnobotanical data on medicinal plants from various parts of Ethiopia, although we have rich and diverse ethnolinguistic groups throughout the country [11]. According to Pankhurst [12], detailed information on the medicinal plant could only be obtained when studies are taking place in the various areas of the country to include places where little or no botanical and ethnobotanical explorations have been made. Among rural Oromo communities of Dugda district as would be the
case elsewhere, traditional medication is believed to be an important health care system, which mainly involves the use of locally available medicinal plants. However, such knowledge and practices, and plant resources may be threatened due to anthropogenic and other natural factors. Thus, concerted ethnobotanical research plays a vital role to draw information on plants and related indigenous knowledge for conservation and sustainable utilization. This study was, therefore, designed to conduct ethnobotanical study of medicinal plants of Dugda district.

**Materials and Methods**

**Description of the Study Area**

Geographically Dugda district is located in between 8°01’ N to 8°10’ N latitude and 38°31’ E to 38°57’E longitude. Dugda district is located in the East Shoa zone of Oromia Regional State that has a total area of 959.45 km2. Overall, the district has 36 rural Peasant Administrations and four urban villages. The main capital of the district is Meki town which is situated 134 km to the southeast of the capital Addis Ababa. Meki has 3 urban villages and has a population of 58,490. The boundaries of Dugda district are Arsi zone in the east, Gurage zone in the west, Bora district from north and northwest and Adami Tulu Jido Kombolcha district in the south.

**Study Site Selection**

Reconnaissance survey was conducted from July 27 to 30 to select three potential kebeles which included; Cirri, Wayo Gabriel and Xepho for ethnobotanical data collections.

**Informant’s selection**

Ethnobotanical information was collected from 60 informants. Among the 60 informants, 16 key informants (traditional healers) were selected with the assistance of community leaders, elderly people and members of the local community. As pointed out by Purposive sampling technique was used for selecting key informants, while random sampling was employed to select the other 44 informants. The key informant’s interviews were very important as they were considered to be experts on local medicinal plants. Generally, the informants were grouped into three age groups, young, adult and elderly (above 50) to see how the knowledge varies with age groups as described in.

**Ethnobotanical Data Collection**

Prior to Ethnobotanical data collection, respondents were selected from the selected kebeles. Totally, 60 respondents, 16 key informants (traditional healers) were participated in this study. Ethnobotanical data were collected between August, 2017 and October, 2017 on two field trips made to the sites. Data collection methods were through semi-structured questionnaires and interviews, group discussions and guided field walks with key informants (traditional healers) for field observations. Key informants were first interviewed individually to mention about the local names of the plants they use to treat diseases, diseases treated, part(s) of plants used, methods of gathering, methods of preparation of remedies, route of administration of remedies, application of the remedies, dosage, side effects of the treatment, use of the plants other than medicine, types of threat and conservation problems. Thereafter, group discussions were made with them based on the checklist of questions and asked for field walk for onsite observation of the plants. Similar procedure was also applied with randomly selected non-practitioners of traditional medicine. Voucher specimens were collected, pressed, and dried for identification. For some species, preliminary identification was done in the field using keys and illustrations. In addition, further identification of all specimens was done by comparison with authentic specimens, illustrations and taxonomic keys from Flora of Ethiopia and Eritrea, and with assistance of experts of Haramaya University. The identified specimens were deposited in Haramaya University Herbarium.

**Data Analysis**

Descriptive statistical methods (percentage and/or frequency) are employed to summarize ethnobotanical data.

Informant Consensus Factor (ICF): Informant consensus factor was calculated for categories of ailments to identify the agreements of the informants on the reported cures using the formula used by [13]. ICF was calculated as follows: number of use citations for each ailment (nu) minus the number of species used (nt) for that ailment, divided by the number of use citations for each ailment minus one.

\[
ICF = \frac{(n_{ur} - n)_{t}}{(n_{ur} - 1)}
\]

**Fidelity Level**

The fidelity level (FL), the percentage of informants claiming the use of a certain plant for the same major purpose, was also calculated for the most frequently reported diseases or ailments using the following equation [14].

\[
FL(\%) = \frac{NP/N \times 100}{}
\]

Where Np is the number of informants that claim the use of a plant species to treat a particular disease and N is the number of informants that use the plants as a medicine to treat any given disease.

**Preference ranking**

Preference ranking is used to compare the most effective medicinal plants used by the community to treat the particular disease. Preference ranking was conducted following [15] and [16] for six most important medicinal plants used in treating bloating, as traditional healers treat it usually. For this, ten informants were selected to identify the best preferred medicinal plant species for treatment of the illness. Each informant was provided with six medicinal plants reported to cure bloating with leaves of medicinal plant used being paper tagged then asked to assign the highest value (6) for the most preferred species against the illness and the lowest value (1) for the least preferred plant and in accordance of their order for the remaining one. The value of each species was summed up and the rank for each species was determined based on the total score. This helps to indicate the rank order of the most effective medicinal plants used by the community to treat the disease.

**Results and Discussions**

**Some Socio-Demographic Information of the Respondents**

A total of 60 traditional healers were sampled. The respondents were with an average age of 48 years. Males were dominant representing (63.3 %) of the respondents. Generally, (60 %) of the
respondents were above 50 years. The majority (67%) of them was illiterate and those who attended grades one to four constituted (16%) while (17%) attended grades nine to twelve. There was a significant positive correlation (Pearson correlation coefficient, $r =0.38$, at $\alpha = 0.05$, $p = 0.04$) between the age of informants and the number of species reported by the informants (older respondents reported large number of species). This might be due to exposure to modern education younger people showed minimal interest in learning and practicing ethno medicinal practices. According to less medicinal knowledge in relation to young age might be attributed to the fact that traditional knowledge is built with years of experience. Advancement in science and technology is quickly pushing the younger generation into a new tradition. However, there was highly significant negative correlation ($r =-0.24$, at $\alpha = 0.05$, $p < 0.001$) between the number of species reported and informants’ educational level (illiterates reported large number of species) (Table 1 and Figure 1).

Ethnomedicinal plant species used by people of the study area

A total of 88 species of medicinal plants used to treat 68 different health problems were gathered and documented from the study area. These plants belong to 81 genera and 47 Families. Out of these plants, 51 species (57.3%) and 13 species (14.6%) were noted to treat only human and livestock ailments respectively, while 25 species (24.5%) were used to treat both human and livestock ailments.

This suggests that local people of Dugda District practice traditional medicine of plant origin besides modern medicine. In terms of species composition, family Asteraceae, Fabaceae, Euphorbiaceae and Solanaceae each consisted of 6 species. The remaining families contained one to three species each. Some plants were reported more frequently as medicinal plants than others to treat various ailments. For example, Aloe macracarpa L. was cited by 75% of the respondents as a source of remedy for treating different internal parasites for both livestock and humans followed by Carissa spinarum L. cited by 63% respondents for evil spirit, stabbing pain, gonorrhea and malaria; Allium sativum L. by 58% respondents to treat colds, evil eye, malaria and wounds; Croton macrostachyus L. by 51% respondents to treat Acanthospermum hispidum; gonorrhoea, bloating, jaundice and stomachache; Vernonia amygdalina Del. by 48% respondents to treat internal parasites, jaundice and diarrhea; Dodonea angustifolia L. by 41% respondents to treat different internal parasites, ear wounds, lice and wounds and Hypoestes forskalii L. by 37% respondents to treat diabetes, tonsillitis and bleeding (stopping of bleeding completely) (Table 2).

Of the 88 medicinal plants collected, majority are herbaceous followed by shrub, tree and climbers (Figure 2). This shows that herbs and shrubs are most widely used medicinal plants of the study area. This may be due to the abundance of these habits in the study area compared to trees and climbers. Relatively high number of herbs and shrubs for medicinal purpose has also been reported previously by Alemayehu [17] who studied medicinal plants of Ada’a District east Shoa zone.

Plant part(s) used for medicine, preparations methods and conditions

Although different plants part were reported, the most cited plant part for remedy preparations was leaf followed by root, the whole part, seed and bark. Other plant parts including fruit, bulb, stem, sap, latex were also reported. This result agrees with some previous studies conducted in different parts of the country [18-20,22]. According to [4], herbal preparation that involves roots, rhizomes, bulbs, barks, stems or whole parts have negative effects on the survival of the mother plants. In this study area use of root and entire plant part that require uprooting of plants will negatively affect their regeneration. The same is true with collection of bark and seeds. Therefore, emphasis should be given not to excessively collect these plant parts in order to ensure their survival for future use. Concerning the preparation of traditional medicine, the local people employ various methods of preparation of traditional medicines for different types of ailments. These preparations vary based on the type of disease treated and the actual site of the ailment (figure 3). Pounding (44.1%), crushing (26.4%), cooking/boiling (19.5%), squeezing (6.8%) and smoking (2.9%) were the major remedy preparation methods reported.

Preparations may involve using a single plant part or mixtures of different organs of the same plant. For example, fresh fruit of Citrus limon and bulb of Allium sativum are pounded together and mixed with honey and eaten with bread to treat a stomachache. In this study, the local people also use some other products as additives in their preparations. For example, water, oil, sugar, salt, milk, honeys are some of the additives that the local people reported to be used to improve the flavor and reduce adverse effects such as vomiting and diarrhea so that the efficacy of the traditional medicine would be maintained or increased. Such additives were also reported by some previous researchers [22-24]. Most (63.43%) remedy preparations were reported to be from fresh plant materials while 23.13% and 13.43% of preparations were from dried and fresh/dried plant materials, respectively. Similarly, a study conducted by [25] in Borana, Oromia Regional State, south Western Ethiopia, showed that using fresh materials for different health problems is more than dry materials.

Dosage, route and ways of remedy administration

The dosage of medicine to be administered is given by rough estimation of the age and physical condition of the patient. Hence there is no precision on the dosage of the remedy [26]. Reported that lack of precision in the dosage is one of the major drawbacks of practicing traditional remedy. As regards to route of administration, include through oral, dermal, nasal, and others. Overall, oral administration was reported as a dominant route of administration (60.13%) followed by dermal route (34.64 %) (Figure 3) both oral and dermal routes permit rapid physiological reaction of the prepared medicines with the pathogens and increase its curative power. This finding agrees with some previous reports (Kebu et al., 2004; Mulugeta, 2014).

Ways of applications of plant remedies

The prepared traditional medicines are applied in a number of methods, among which drinking (41.66%), eating (20.37%), painting (7.40%), put on and tide (6.48%), smoking (5.55%), rubbing (4.62%), washing (4.62), holding on (3.70%), put on (2.77%), inserting (1.85%), and sniffing (1.85%) were mentioned. In this study, drinking and eating account for the largest percentage (Table 3).
Table 1: List of medicinal plants used for human and livestock diseases in Dugda district.

| No | Botanical Name and plant habit       | Family      | Local Name (Afan Oromo) | Health problem / disease treated | Part(s) used, conditions, mode of preparations & application | Route of Administration |
|----|-------------------------------------|-------------|-------------------------|---------------------------------|-------------------------------------------------------------|-------------------------|
| 1  | Acacia abyssinica Hochst.exBenth Tree | Fabaceae    | Laaffo                  | Back pain*                      | Leaf: Fresh crushed leaves are mixed with water and drunk.   | Oral                    |
|    |                                     |             |                         |                                 |                                                             |                         |
|    |                                     |             |                         | Eye disease**                   | Leaf: Fresh leaves are pounded, squeezed and the juice is added to the eye. | Eye                     |
|    |                                     |             |                         |                                 |                                                             |                         |
|    |                                     |             |                         | Horse scabies**                 | Root and bark: Fresh root and bark grounded together and wash the animal with the solution. | Dermal                  |
| 2  | Acacia etabaica Schweinf subsp. Etabaica Tree | Fabaceae    | Doodota                  | Internal parasite*              | Fruit: Adding the dried fruit with sugar and drunken 3 to 4 cup. | Oral                    |
| 3  | Agavesisalana Perrine ex.Engl Herb   | Agavaceae   | Algee                    | Black leg**                     | Root: Fresh root is crushed, mixed with water and given to cattle. | Oral                    |
| 4  | Allium cepa L. Herb                 | Alliaceae   | Shunkurtii diimaa        | Poisoning*                      | Root: Tie up the dried root powder with the leaf concoction of Vernonia amygdalina and Premna schimperi. | Dermal                  |
| 5  | Albizia schimperiana Oliv. Tree     | Fabaceae    | Ambalataa                | Wound*                          | Bark: Dried bark of the plant powdered and applied on affected part. | Dermal                  |
| 6  | Allium sativum L. Herb              | Alliaceae   | Qullubbii Adii           | Colds*                          | Bulb: The dried bulb is Pounded, mixed with honey and 2-3 teaspoon is eaten Every day for five days. | Oral                    |
|    |                                     |             |                         | Evil eye*                       | Bulb: The dried bulb is crushed together with one rhizome of Zingiber officinale with honey and 3 tea spoons are taken. | Oral                    |
|    |                                     |             |                         | Malaria*                        | Bulb: The fresh bulb is pounded, mixed with the crushed fresh leaves of Ruta chalepensis, and applied externally to prevent the disease. | Dermal                  |
|    |                                     |             |                         | Wound*                          | Bulb: The dried bulb is pounded and tied on the wound every two days for one week days. | Dermal                  |
| 7  | Acacia albida Del. Tree             | Agavaceae   | Garbii                   | Eye bruise**                    | Bark: Fresh bark masticated and spitted out on the eye.     | Dermal                  |
|   | Plant Name                                | Family  | Common Name          | Parts Used                          | Applications                                                                 |
|---|------------------------------------------|---------|----------------------|-------------------------------------|------------------------------------------------------------------------------|
| 8 | Aloe macrocarpa Tod. Herb                | Aloaceae| Argiisa              | Leaf: Fresh leaves chowed and swallow the juice. | Oral                                                                         |
|   |                                         |         |                      | Leprosy*                            | Dermal                                                                       |
|   |                                         |         |                      | Bloat**                             | Oral                                                                         |
|   |                                         |         |                      | Nose bleeding*                      | Nasal                                                                        |
| 9 | Azadirachta indica L. Tree               | Meliaceae| Nimilniimii dhugaa   | Leaf: First fresh leaves are prepared and applied on cattle skin. | Dermal                                                                       |
|   |                                         |         |                      | Tick**                              | Dermal                                                                       |
| 10| Beta vulgaris L. Herb                    | Chenopodiaceae| Hundee dlmaa | Root: Fresh root of the plant is collected and eaten. | Oral                                                                        |
| 11| Brassica carinata A. Br. Herb            | Brassicaceae| Goommanaa           | Leaf: The dried leaf Powdered and mixed with water then dunk. | Oral                                                                        |
| 12| Bidens macroptera (Sch. Bip. ex Chiov.)Mesfin Herb | Asteraceae| Keeloo               | Leaf: Fresh Leaves put on fire and rubbed on affected part. | Dermal                                                                       |
|   | Calpurnia aurea (Ait.) Benth. Shrub      | Fabaceae| Ceekataa             | Lice**                              | Dermal                                                                       |
|   |                                         |         |                      | Diarrhea***                         | Oral                                                                         |
|   |                                         |         |                      | Syphilis*                           | Oral                                                                         |
|   |                                         |         |                      | Leech**                             | Nasal                                                                        |
| No. | Plant Name | Family | Common Name | Parts Used | Benefits | Application |
|-----|------------|--------|-------------|------------|----------|-------------|
| 14  | Capparis tomentosa Lam. Shrub | Capparidaceae | Harangamaa | Root: Fresh/dried root is pounded, mixed with butter and is applied to the affected breast. | Swelling** | Dermal |
| 15  | Capsicum annuum L. Herb | Solanaceae | Barberee | Fruit: Dried fruit mixed with water and given orally | Bloat** | Oral |
| 16  | Citrus limon (L.) Burm.f. Shrub | Rutaceae | Loomii | Leaf: Fresh leaf of Citrus limon and bulb of Allium sativum are pounded together and mixed with honey and eaten with wheat bread. | Stomach ache* | Oral |
| 17  | Coriandrum sativum L. Herb | Apiaceae | Dimbilaala | Leaf: The fresh leaf of this plant pound with leaf of Croton macrostachyus and creamed on pain area for 2-3 days. | Diffuse cutaneous leishmaniasis* | Dermal |
| 18  | Carica papaya L Tree | Caricaceae | Paappayyaa | Seed: Dried seeds are roasted, pounded and is drunk three coffee cups every morning for seven days. | Jaundice* | Oral |
| 19  | Catha edulis (Vahl) Forssk. ex Endl. Shrub | Celastraceae | Catii | Leaf: Fresh leaf of Catha edulis is pounded, mixed with water add local areke or katkala and is given orally. | Urine retention*** | Oral |
| 20  | Carissa spinarum L. Shrub | Apocynaceae | Agamsa | Root: Fresh root of Carissa spinarum is pounded and added to fire and smoke to the patient. | Evil spirit* | Dermal |
| 21  | Coffea Arabica L. Shrub | Rubiaceae | Buna | Root: Fresh Root is pounded, boiled in water and is drunk by cup. | Stabbing Pain* | Oral |
| 22  | Cordia africana Lam. Tree | Boraginaceae | Waddeessa | Root: Fresh root is pounded, insert into cold water, wait for day and is drunk. | Gonorrhea* | Oral |

**Note:** The above table lists a selection of plants and their traditional medicinal uses. The applications are described in detail, highlighting the parts of the plant used, the manner of preparation, and the methods of application. Each entry specifies whether the treatment is dermal, oral, or another method.
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|---|

| Clutia abyssinica Joub. & Spach. Shrub | Euphorbiaceae | Ulee | Toothache* | Leaf: Fresh leaves hold in teeth for 30-40 minutes. | Oral |
|---|---|---|---|---|---|
| Croton macrostachyus Del. Tree | Euphorbiaceae | Bakkanniisa | Ascaris* | Leaf and bark: The tip of fresh young leaf and the bark is pounded, boiled, add butter, cool it and after it solidifies, five to ten tablets are made and three tablets for children, five to ten tablets for elders is given. | Oral |
| Clematis simensis Fresen. Shrub | Ranunculaceae | Hidda | Intestinal parasite | Root: Fresh root crushed and given for cattle by mixing in water to get relief from internal parasite. | Oral |
| Cucurbita pepo L. Shrub | Cucurbitaceae | Dabaaguala | Hookworm* | Seed: Fresh or dried Seeds are soaked in water overnight, chew and swallowed as they are. | Oral |
| | | | Bloat* | Root: Fresh root together with Vernonia amygdalina is pounded; local areke or katukala is added and given orally. | Oral |
| No. | Species                                                                 | Family     | Local Name | Use                                                                 | Route     |
|-----|-------------------------------------------------------------------------|------------|------------|----------------------------------------------------------------------|-----------|
| 27  | Cyphostemma cyphopetalum L. Climber                                     | Vitaceae   | Gaalee     | Flower: Fresh flower is squeezed and the flower is rubbed over the wound. | Dermal    |
| 28  | Cynoglossum lanceolatum Forssk. Herb                                     | Boraginaceae | Chigoogii  | Leaf: Fresh leaf together with Ocimum lamifolium is pounded and drunk with coffee. | Oral      |
| 29  | Datura stramonium L. Herb                                               | Solanaceae | Manji      | Cough*: Leaf: Dried or fresh leaf is pounded; one spoon is added to a cup of coffee and drunk every morning up to four days. | Oral      |
|     |                                                                        |            |            | Toothache*: Seed: Fresh or dried Seeds are boiled in water and inhaled the vapour. | Oral      |
|     |                                                                        |            |            | Eye disease*: Leaf is squeezed and the juice is applied to the eye.       | Eye       |
|     | Dodonea gustifolia L.f. Shrub                                           | Sapindaceae | Ittacha    | Ear wound***: Leaf: Dried leaf Crushed mixed with butter and placed on the damaged part. | Dermal    |
| 30  | Dovyalis abyssinica (A.Rich.) Warb. Shrub                               | Flacourtiaceae | Koshommii | Tapeworm*: Flower: Fresh or dried flowers are crushed, soaked in water for a day and drunk with local katukala or farsoo. | Oral      |
|     |                                                                        |            |            | Internal Parasite**: Seed: Dried seed grounded, pasted with oat flour, bake and give to the animal. | Oral      |
|     |                                                                        |            |            | Wound***: Leaf: Fresh or dried leaf is grounded and apply to the wound after washing with squeezed leaf of Calpurnia aurea. | Dermal    |
|     |                                                                        |            |            | Lice**: Leaf: The fresh leaf of the plant is collected and adds water and applies on animal skin. | Dermal    |
| 31  | Dovyalis abyssinica (A.Rich.) Warb. Shrub                               | Flacourtiaceae | Koshommii | Rheumatic Pain*: Root: Fresh or dried root powder is together with the pounded young shoot of Cordia africana is smoked. | Dermal    |
|     |                                                                        |            |            | Ascaris*: Bark: Fresh or dried Fine powder of pounded bark of Dovyalis abyssinica is mixed and taken at meal time. | Oral      |
| 32  | Echinops macrochaetus Fresen Shrub                                      | Asteraceae | Kosoruu    | Foot and mouth Disease**: Stem: Fresh stern of this plant is chopped and fumigated to sheep. | Dermal    |
| No. | Common Name                  | Family      | Scientific Name                        | Part Used                  | Disease                           | Method/Route of Administration |
|-----|------------------------------|-------------|----------------------------------------|----------------------------|-----------------------------------|--------------------------------|
| 33  | Ehretia cymosa Thonn. Tree   | Boraginaceae| Ulaagaa                                | Stomach ache***            | Leaf or root: Fresh or dried Leaf or root is pounded, add katica and given to cattle. | Oral                            |
|     |                              |             |                                        |                            | Mich*                            | Leaf: Fresh leaf is crushed and is drunk. | Oral                            |
|     |                              |             |                                        |                            | Taeniasis *                       | Seed: Fresh or dried seeds are grounded, mixed with water and is drunk. | Oral                            |
| 34  | Ensete ventricosum (Welw.)   | Musaceae    | Warqee                                 | Stomachache*               | Root: Dried root is crushed, mixed with honey and is drunk. | Oral                            |
|     | Herb                        |             |                                        |                            | Leech **                          | Bark: Fresh or dried bark is pounded, mixed with small amount of water and is added through the nostrils for two consecutive days. | Nasal                           |
| 35  | Eleusine floccifolia Forssk. | Poaceae     | Coporsa                                | Snake bite*                | Above ground part: Fresh above ground part pounded and paste on the skin. | Dermal                          |
| 36  | Epilobium hirsutum L. Herb   | Onagraceae  | Ashuffee                               | Diffuse cutaneous leishmaniasis* | Leaf: The Fresh leaf of this plant put in fire by taking away from fire and by rubbing creamed pain area. | Dermal                          |
| 37  | Euphorbia tirucallii L. Shrub| Euphorbiaceae| Cadaa                                  | Hemorrhage *               | Sap: Fresh white milky sap of the plant carefully tapped on hemorrhage. | Dermal                          |
| 38  | Eucalyptus globulus Labill.  | Myrtaceae   | Baarzaafi adii                         | Cough*                     | Leaf: Fresh young leaves are boiled in water and fumigate the vapour under sealed clothes at morning time. | Dermal                          |
| 39  | Euclea racemosa Murr. Shrub  | Ebenaceae   | M’eesaa                                | Gonorrhea*                 | Root: Fresh or dried root is pounded, boiled in water and drunk with goat milk. | Oral                            |
|     |                              |             |                                        |                            | Internal Parasite*                | Root: Fresh or dried Crushed root is boiled and drunk with sugar. | Oral                            |
| 40  | Euphorbia abyssinica Gmel.   | Euphorbiaceae| Adaamii                                | Gonorrhea*                 | Latex: Fresh or dried very small amount of the milky latex is mixed with grain flour, bake and eaten for five consecutive days. | Oral                            |
|     | Tree                        |             |                                        |                            | Hemorrhage*                       | Sap: Fresh white milky sap of the plant carefully tapped on hemorrhage. | Dermal                          |
| No. | Plant Name                                      | Family       | Part Used | Condition       | Method                                                                 | Route  |
|-----|------------------------------------------------|--------------|-----------|-----------------|------------------------------------------------------------------------|--------|
| 41  | Euphoriba depauperata A.Rich. Herb            | Euphorbiaceae| Seed      | Eczema*         | Latex and seed: Fresh Latex and pounded seed of Calpurnia aurea are mixed and applied at the part in the night for five days. | Dermal |
| 42  | Ficus sycomorus L. Tree                       | Moraceae     | Latex     | Abdominal pain***| Fruit: Eating the fresh fruits of the plant.                           | Oral   |
| 43  | Ficus vasta Forssk. Tree                     | Moraceae     | Seed      | Worm**          | Bark: Fresh bark crushed and mixed with water and two litters is given for big cattle and one Litter for calf. | Oral   |
| 44  | Ficus sur Forssk. Tree                       | Moraceae     | Bark      | Wound***        | Bark: Fresh or dried fine powder of the bark is mixed with butter, applied to the wound and sit for 10-15 minutes under the sun. | Dermal |
| 45  | Guizotia scabra (Vis.) Chiov. Herb           | Asteraceae   | Leaf      | Urine Retention***| Leaf: Fresh leaf are pounded, mixed with water and given.              | Oral   |
| 46  | Grewia ferruginea Hochst. ex A. Rich. Tree   | Tiliaceae    | Leaf      | Wound***        | Whole part: Fresh or dried The plant parts are crushed; the fine powder is mixed with butter and is applied to the wound.       | Dermal |
| 47  | Helianthus annuus L. Herb                    | Asteraceae   | Seed      | Abdominal pain* | Leaf: The hair washed by fresh or dried leaves of Grewia ferruginea and used as soap.                                    | Oral   |
| 48  | Hordeum vulgare L. Herb                      | Poaceae      | Seed      | Bloat**         | Seed: fresh or dried Seed is crushed and sprinkled on the feed.       | Oral   |
| 49  | Hypoestes forskalii (Vaht) R.Br. Herb        | Acanthaceae  | Leaf      | Bleeding**      | Leaf: Fresh leaf is rubbed on the damaged part until the bleeding stops. | Dermal |
| 50  | Juniperus procera Hochst .ex Endl. Tree      | Cupressaceae | Root      | Toothache*      | Root: The dried root is infused in water solution and three full cups of coffee is drunk.                                 | Oral   |

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| No. | Common Name | Family | Local Name | Uses |
|-----|-------------|--------|------------|------|
| 51  | Justicia schimperiana (Hochst. ex Nees) T. Anders | Acanthaceae | Dhumuugaa/Sansalii | Jaundice*** Leaf: Newly growing fresh leaves milled on palms and the squeezed liquid added to a coffee cup 4. Drink the liquid every night time for a week. Oral |
| 52  | Lagenaria siceraria (Molina) Standl. | Cucurbitaceae | Buqqee | Evil eye* Seed: Fresh Seeds are grounded and add to fire and smoke or drink with honey. Dermal |
| 53  | Laggera tomentosa (Sch.Bip.ex A.Rich.) Oliv. & Hiern | Asteraceae | Ajoo | Any swelling expecting tuberculosis*** Leaf: Fresh pounded leaf is tied on the smelling. Dermal |
| 54  | Lantana camera L. | Verbenaceae | Akayi sinbira | General malaise (Mich)* Leaf: Fresh pounded together with leaf of Ocimum lamiifolium and the squeezed out liquid drink with tea. Oral |
| 55  | Lippia adoensis | Verbanaceae | Kusaayee | Intestinal Parasite* Cough* Leaf: Fresh leaf is pounded and boiled and a tea spoon of it is added to cup of coffee and drunk for four days every. Oral |
| 56  | Linum usitatissimum L. | Linaceae | Talbaa | Amoebisis* Seed: The dried pounded seed is drunk in an empty stomach. Oral |
| 57  | Lycopersicon esculentum (L.) Mill. | Solanaceae | Timaatima | Common cold* Fruit: Fresh fruit put in fire and eaten when get hot in order to get relief from common cold. Oral |
| No. | Common Name                           | Scientific Name          | Family    | Part Used                  | Preparation                                                                 | Route   |
|-----|--------------------------------------|--------------------------|-----------|----------------------------|----------------------------------------------------------------------------|---------|
| 58  | Maytenus senegalensis (Lam.) Exell   | Shrub                    | Celastraceae | Kombolcha                  | Leaf: Dried Leaf together with young stem of Olea europea and pounded mixed with butter and the paste is applied on it. | Dermal  |
|     |                                      |                          |           | Hemmoroides*               |                                                                            |         |
|     |                                      |                          |           |                            | Diarrhea**                                                                  | Oral    |
|     |                                      |                          |           |                            | Bark: Fresh bark is pounded, mixed with water and local beer and given orally. |         |
|     |                                      |                          |           |                            | Lice**                                                                      | Dermal  |
|     |                                      |                          |           |                            | Leaf: The fresh leaf of the plant is collected and adds water and applies on animal skin. |         |
| 59  | Mangifera indica L. Tree             | Anacardaceae             |           | Maangoo                    | Leaf: Dried leaf of powdered and mixed in water then given for the cattle.  | Oral    |
|     |                                      |                          |           | Stomach ache**             |                                                                            |         |
| 60  | Musa x paradisiaca L. Herb           | Musaceae                 |           | Musuui                     | Fruit: Eating fresh fruits 1 to 2 when headache happen.                    | Oral    |
|     |                                      |                          |           | Headache*                  |                                                                            |         |
| 61  | Melia azedarach L. Tree              | Meliaceae                |           | Nimii                      | Stem: Fresh young stem is chewed and kept on the teeth.                    | Oral    |
|     |                                      |                          |           | Toothache*                 |                                                                            |         |
|     |                                      |                          |           |                            | Bark: The fine powder of dried bark is added to a glass of water and applied through the mouth twice. | Oral    |
| 62  | Nicotiana tabacum L. Herb            | Solanaceae               |           | Tombo                      | Stem or leaf: The fresh young stems and or leaf is ground, add salt then one glass of the mixture is given every morning for four days orally or through the nose. | Oral    |
|     |                                      |                          |           | Leech**                    |                                                                            |         |
|     |                                      |                          |           |                            | Leaf: Bath the patient with fresh leaf decoction of Nicotiana tabacum and Ocimum lamii folium, for five days. | Dermal  |
|     |                                      |                          |           | Epilepsy*                  |                                                                            |         |
| 63  | Ocimum basilicum L. Herb             | Lamiaceae                |           | Bassobiaa                  | Leaf: Fresh leaves together with root of Aloe macrocarpa concocted together and drink the solution. | Oral    |
|     |                                      |                          |           | Flu*                       |                                                                            |         |
| 64  | Ocimum laurifolium Hochst. ex Benth. | Shrub                   | Lamiaceae  | Damakese                   | Leaf: Fresh leaf together with leaf of Eucalyptus globules is pounded, mixed with water and drunk. | Oral    |
|     |                                      |                          |           | Mich*                      |                                                                            |         |

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| No. | Species                                                                 | Family          | Village | Disease                  | Part Used                          | Method                                                                 | Route      |
|-----|-------------------------------------------------------------------------|-----------------|---------|--------------------------|------------------------------------|------------------------------------------------------------------------|------------|
| 65  | Olea europaea L. subsp. cuspidata (Wall. ex G.Don) Cif. Tree             | Oleaceae        | Ejersa  | Itchy skin*              | Leaf: Fresh leaves of Olea europaea is boiled in water and steam the vapour to the part. | Dermal      |           |
|     |                                                                         |                 |         | Wound***                 | Stem: Partly dried stem is inserted into fire and the oily liquid produced from the stem is applied on the wound. | Dermal      |           |
|     |                                                                         |                 |         | Gastritis*               | Stem: A very small amount of the oily liquid produced from the dried stem is drunk after meal for four consecutive days. | Oral       |           |
| 66  | Panicum hochstetteri Steud. Herb                                       | Poaceae         | Marga gogorrii | Kidney problem*          | Leaf: Fresh Leaves chewed and swallowed | Oral       |           |
| 67  | Podocarpus falcatus (Thunb) R.B. ex. Mirb. Tree                         | Podocarpaceae   | Birbisa | Intestinal parasites*    | Bark: Decoction of the dried fine powder of the bark, grounded garlic and honey are pasted and about two tea spoon is eaten at bed time for 2-4 days. | Oral       |           |
| 68  | Phytolacca dodecandra L. Herit. Shrub                                  | Phytolaccaceae  | Handoode | Rabies***                | Root: Fresh root of Phytolacca dodecandra is pounded, mixed with water, one arake glass of the solution is given for 7-10 day (for humans) for animals 15-20 for ten days. | Oral       |           |
|     |                                                                         |                 |         | Malaria*                 | Root: Fresh root is grounded mixed with water and drunk in the morning for five consecutive days. | Oral       |           |
| 69  | Plantago lanceolata L. Herb                                             | Plantagiaceae   | Qorxoobii | Mitch*                   | Leaf: Rub the body with the squeezed fresh leaves. | Dermal      |           |
| 70  | Phoenix reclinata Jacq. Tree                                            | Areceae         | Meexxi  | Eye disease**            | Leaf and stem: Fresh or dried leaf and stem of Phoenix reclinata chewed together and spitted on cattle eye. | Dermal      |           |
| 71  | Rhamnus prinoides L. Herit. Shrub                                      | Rhamnaceae      | Geeshoo | Leech**                  | Leaf: Fresh leaf together with Nicotiana tabacum, pepper is pounded mixed with water and goat butter, and then applied through the nose. | Nose       |           |
|     |                                                                         |                 |         | Tonsillitis*             | Leaf: Chew the fresh leaf and swallow twice a day for four days. | Oral       |           |
| No. | Taxonomy | Family | Common Name | Parts Used | Preparation | Method of Use |
|-----|----------|--------|-------------|------------|-------------|---------------|
| 72  | Ricinus communis L. | Euphorbiaceae | Qobboo | Leaf | The fresh leaf is warmed on fine and rubbed on the swelling. | Dermal |
| 73  | Rosmarinus officinalis L. | Lamiaceae | Urgooftuu | Root | Fresh root powder and drunk the solution when headache occur. | Oral |
| 74  | Ruta chalepensis L. | Rutaceae | Qinidaabii | Root | Fresh root chewed and ingest the juice. | Oral |
| 75  | Rosa abyssinica Lindley | Rosaceae | Gora | Leaf | Fresh leaf is pounded, mixed with water and drunk once. | Oral |
| 76  | Rumex nervosus Vahl. | Polygonaceae | Dhangaggoo | Root | Crushed fresh or dried root together with butter is placed on the wound. | Dermal |
| 77  | Senna italica Mill. | Fabaceae | Filii | Leaf | Fresh leaf infusion is inhaled or places the leaf in the nostrils again and again. | Nose |
| 78  | Solanum incanum L. | Solanaceae | Hiddii | Root | Fresh root powder is drunk with coffee. | Oral |
| 79  | Schinus molle L. | Anacardiaceae | Kundoberbere | Root | Fresh root powder and fruit applied on the wound twice a day. | Dermal |
| 80  | Solanum tuberosum L. | Solanaceae | Dinnicha | Root | Fresh root boiled and eaten. | Oral |
| 81  | Saccharum officinarum L. | Poaceae | Shankora | Stem | Fresh Steam put in fire and eaten when gets hot in order to get relief from common cold. | Oral |
| 82  | Snowdenia polystachya (Fresen.) Pig. | Poaceae | Muja | Root | Fresh root boiled with root of Carissa spinarum and wash the animal. | Dermal |
| No. | Common Name                  | Scientific Name                        | Family           | Part Used | Condition                  | Preparation                                                                 |
|-----|------------------------------|----------------------------------------|------------------|-----------|----------------------------|-----------------------------------------------------------------------------|
| 83  | Stephania abyssinica (Dillon & A.Rich.) Climber | Stephania abyssinica (Dillon & A.Rich.) Climber | Menispermaceae   | Root      | Rabies**                   | Dry root of *Stephania abyssinica* will be powdered and backed with grain flour and given to cattle. | Oral |
|     |                              |                                        |                  |           |                             | Root and leaf: Dry root and leaf of *Stephania abyssinica* will be powdered together, mixed with water and given to the animal. | Oral |
| 84  | Toddalia asiatica (L.) Lam. Shrub | Toddalia asiatica (L.) Lam. Shrub | Rutaceae         | Bark      | Evil eye*                   | The fresh or dried root is chewed and swallowed. Leaf is crushed and then the decoction is mixed with coffee and drunk. Fresh root is crushed and the infusion is taken, a cup of the solution once a day. | Oral |
|     |                              |                                        |                  | Leaf      |                             | Root: Fresh root is fumigated to the patient or fresh leaf is pounded, mixed with water and drunk. | Oral |
| 85  | Verbena officinalis L. Herb | Verbena officinalis L. Herb | Verbenaceae      | Root      | Mich*                      | Dried root together with the root of Verbena officinalis and Carissa spinarum is fumigated to the patient. | Oral |
|     |                              |                                        |                  |           |                             | Root: Fresh root of this plant and bark of Croton macrostachyus is pounded mixed with water and then after a day is given. | Oral |
| 86  | Vernonia amygdalina Del. Shrub | Vernonia amygdalina Del. Shrub | Asteraceae       | Leaf      | Jaundice*                  | Fresh leaf is pounded, mixed with water, filter and drunk. | Dermal |
|     |                              |                                        |                  |           |                             | Leaves decoction of this plant is drunk.                                     | Oral |
|     |                              |                                        |                  |           | Internal parasite**         | Fresh leaves chopped and added to local katukala and salt and will be given to the animal. | Oral |
|     |                              |                                        |                  |           | Diarrhea*                  | Fresh leaf is pounded together with coffee. Seeds, mixed with butter and eaten. | Oral |
|     |                              |                                        |                  |           | Bloat**                    | Fresh leaf Pounded, mixed with water and given orally. | Oral |
| 87  | Vicia faba L. Herb | Vicia faba L. Herb | Fabaceae         | Seed      | Stomach ache*              | Dried or fresh Leaves decoction of this plant is drunk. | Oral |
|     |                              |                                        |                  |           | Tapeworm*                  | Fresh seeds are soaked in water over night and eaten for five days. | Oral |
Table 2: Some of the medicinal plants cited most by informants.

| Botanical Name of Medicinal Plants | Disease treated               | No. of Informants | Percentage |
|-----------------------------------|--------------------------------|-------------------|------------|
| Aloe macrocarpa Tod (Argilisa)     | Internal parasites            | 75                | 75         |
| Carissa spinarum L. (Agamsa)      | Malaria                       | 63                | 63         |
| Allium sativum L.                 | Wounds                        | 58                | 58         |
| Croton macrostachyus L.           | Ascaris                        | 51                | 51         |
| Vernonia amygdalina Dell.         | Jaundice                       | 48                | 48         |
| Dodonean gustifolia L.            | Ear wounds                     | 41                | 41         |
| Hypoestes forskooci L.            | Tonsillitis                    | 37                | 37         |
| Calpurnia aurea (Ait.)Benth       | Lice                           | 35                | 35         |
| Ocimum lamiifolium                | Flu                            | 29                | 29         |
| Melia azedarach L.                | Toothache                      | 21                | 21         |

Table 3: Informant Consensus Factor.

| Disease categories                                                                 | Nt | Nur | ICF |
|-------------------------------------------------------------------------------------|----|-----|-----|
| Malaria and Headache                                                                | 7  | 100 | 0.93|
| Abdominal problems, Intestinal parasite, Diarrhea, amoeba, urine problems and stomach ache | 11 | 95  | 0.9 |
| Common cold and Cough                                                               | 10 | 87  | 0.9 |
| Sensorial diseases (ear, eye and epilepsy)                                         | 7  | 60  | 0.89|
| Tonsillitis                                                                         | 8  | 64  | 0.88|
| Skin problems, Dandruff, Hair loss, Hemorrhond, Swelling wound                     | 9  | 57  | 0.85|
| Rabies, Snake bite, Spider poison                                                  | 12 | 73  | 0.84|
| Heart problems, Diabetes, Blood pressure                                           | 6  | 34  | 0.84|
| Tooth ache                                                                          | 4  | 15  | 0.78|
| Jaundice                                                                            | 6  | 23  | 0.77|
|                                                                                     | 6  | 23  | 0.77|

Figure 1: Growth forms of medicinal plants used for human and livestock ailments in the study.

Figure 2: Percentage preparation methods of Traditional medicinal plants.
Informant consensus factor and fidelity level

The diseases of the study area have been grouped into different categories based on the site of incidence of the disease, condition of the disease as well as treatment resemblance of the disease to the local people. Analysis of ICF showed that values ranged from 0.77 to 0.93 for the diseases categories (Table 3). Of the disease categories, Malaria and head ache had the highest ICF value suggesting the common occurrence of these problems and agreement of the people on their remedy. It has been showed that medicinal plants that are effective in treating certain diseases and well known by community members have higher ICF values. Gonorrhea, kidney problem and Jaundice, had the lowest (0.77) ICF value, which may be due to the rare occurrence of these diseases.

Fidelity Level (FL) is an index, which shows the specificity of a given plant to effectively treat a particular disease. Fidelity level was then calculated for some commonly used medicinal plants to treat ailments. Result showed that Allium sativum had the highest FL followed by Buddleia polystachya, Vernonia amygdalina, Aloe macrocarpa, Calpurnia aurea, Citrus Limon, Brassica carinata and Croton macrostachyus (Table 4). The medicinal plants that are widely used by the local people to treat one or very few ailments have higher FL values than those that are less popular [22]. High FL could also be an indication of efficiency of the reported plant to cure a specific ailment.

Where Np is the number of informants that claim the use of a plant species to treat a particular disease, and N is the number of informants that use the plants as a medicine to treat any given disease.

Table 4: Fidelity index of some medicinal plants.

| Botanical Name of Medicinal Plants | Examples of ailment treated | Np | N  | FL | FL% |
|-----------------------------------|----------------------------|----|----|----|-----|
| Allium sativum                    | Malaria                    | 46 | 48 | 0.95 | 95  |
| Buddleia polystachya             | Diarrhea                   | 40 | 45 | 0.88 | 88  |
| Vernonia amygdalina              | Bloat                      | 35 | 41 | 0.85 | 85  |
| Aloe macrocarpa                  | Intestinal parasite        | 31 | 38 | 0.81 | 81  |
| Calpurnia aurea                  | Syphilis                   | 28 | 36 | 0.77 | 77  |
| Citrus limon                     | Stomach ache               | 25 | 34 | 0.73 | 73  |
| Brassica carinata                | Common cold                | 21 | 29 | 0.72 | 72  |
| Croton macrostachyus             | Ascaris                    | 18 | 26 | 0.69 | 69  |
| Dovyalis abyssinica              | Rheumatic Pain             | 14 | 21 | 0.66 | 66  |
| Carissa spinarum                 | Gonorrhea                  | 12 | 19 | 0.63 | 63  |

Table 5: Preference ranking of medicinal plants used for treating bloating.

| List of medicinal Plants | R1 | R2 | R3 | R4 | R5 | R6 | R7 | R8 | R9 | R10 | Total | Rank |
|--------------------------|----|----|----|----|----|----|----|----|----|-----|-------|------|
| Aloe macrocarpa           | 5  | 6  | 5  | 6  | 4  | 5  | 4  | 6  | 3  | 5   | 49    | 1st  |
| Capsicum annuum           | 6  | 5  | 6  | 5  | 6  | 4  | 4  | 3  | 4  | 2   | 45    | 2nd  |
| Croton macrostachyus      | 5  | 4  | 6  | 3  | 3  | 2  | 6  | 3  | 3  | 1   | 36    | 3rd  |
| Vernonia amygdalina       | 6  | 2  | 2  | 3  | 5  | 4  | 3  | 3  | 1  | 1   | 31    | 4th  |
| Hordeum vulgare           | 3  | 3  | 3  | 1  | 2  | 3  | 1  | 1  | 3  | 3   | 23    | 5th  |
| Cucurbita pepo            | 2  | 2  | 1  | 2  | 1  | 4  | 1  | 2  | 1  | 3   | 19    | 6th  |

Key: R= informant.

Preference Ranking

When there are different species prescribed for the same health problem, people show preference of one over the other. Preference ranking of six medicinal plants that were reported for treating Bloating was conducted after selecting ten key informants. The informants were asked to compare the given medicinal plants based on their efficacy and to give the highest number (6) for the medicinal plant which they thought most effective in treating Bloating and the lowest number (1) for the least effective plant in treating Bloating. Aloe macrocarpa scored 49 and ranked first indicating that it is the most effective in treating Bloating followed by Capsicum annuum and the least effective was Cucurbita pepo (Table 5).

Threats to Medicinal Plants and Indigenous Knowledge, and Conservation Efforts of Traditional Medicinal Plants.
Rural people need plants for their livelihood in different aspects. In this study several factors both human and natural were found to contribute to the threats that affect survival of medicinal plants species in the study area. From the interview with informants various factors were recorded as the main threats to medicinal plants in Dugda District. Agricultural encroachment, firewood collection, charcoal production, plant use for house and fence construction, overgrazing and urbanization were reported to the factors for the dwindling of natural vegetation in general and medicinal plants in particular. As a result, according to the respondents, the accessibility of medicinal plants has become less when compared to the previous times.  

Traditional healers also keep their knowledge on medicinal plants for the sake of securing means of income and a cultural belief that telling information may make plants ineffective to cure the ailments. Similar findings were reported elsewhere [27-29]. However, it was recognized that ethnobotanical knowledge on uses of some medicinal plants is transmitted orally to one or few family members to use in secrecy. They disclose their knowledge on medicinal plants at old age by the time when they most probably die before teaching the details of medicinal plants or when they are too old to walk to the field to show the plants in their habitats. According to the respondents, access to modern medication has also contributed to the loss of indigenous knowledge as new generations give less attention to traditional medicinal plants. As a result the indigenous knowledge seems to be endangered in the study area. Indigenous people of the study area practice some conservation measures. For instance, some medicinal plants are found in majority of household gardens and farm borders in the study area, as they need these plants in their daily life as medicine or for other values. Medicinal plants are also maintained or protected near vicinity due to their fragrance, as live fences to avoid enemies, as spices and for food. Plants are also left as remnants of forest in agricultural field due to their uses for construction, fuel wood and other values. Here, the intermixing of multi-purpose plant species by farmers on their farmland is evidence to management practices in the area. The healers conserved some medicinal plants by cultivated mixing with crops in agricultural field, planted in special places, such as, live fences of home gardens and fields.

Conclusions  
In conclusion, the study area revealed that people in the study area have substantial amount of indigenous knowledge on traditional medicine, which needs to be further strengthened by all age groups and gender. As this study revealed the knowledge of traditional medicine mainly reside in the hand of illiterate and aged groups. Indigenous people of the study area have their own ways of managing health problems of human and livestock as they are endowed with specific culture, tradition and ethical norms. Biochemical profiles of plant species used for diseases categories of high ICF should be investigated for screening of the active principles.

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