



# Ethnobotanical Study of Medicinal Plants in Chilga District, Northwestern Ethiopia

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## Abstract

The study was conducted to investigate and document medicinal plants and associated knowledge plants in Chilga district, Northwestern Ethiopia. Questionnaire survey, semi-structured interviews, ranking and transect walk techniques were employed for data collection in midland and lowland agroecologies and in natural forests, riverine forests and farmlands. One hundred one medicinal plants were used to treat 52 (41 human and 8 livestock and 3 for both) ailments. Herbs (36 %) and shrubs (30%) were the most widely used plant growth forms. About 89.8 % of remedies are prepared from roots and leaves. Wealthier groups mentioned significant number of medicinal plants than poorest groups in Quavier Lomiye Kebele. Most medicinal plants (68.48 % in lowland and 76.3 % in midland agroecology) provide other types of uses in addition to medicinal value. However, these plants are threatened by agricultural expansion, fuel wood and construction and overgrazing. Thus, conservation of these plants and associated knowledge base is very essential.

**Keywords:** Chilga district, woody species, herbaceous species, medicinal plants

## 1. Introduction

Nearly 100,000 plant species have been regularly used for food, shelter and medicines in the world<sup>25</sup>. However, most of the plant is ignored<sup>22, 25</sup> due to lack of documentation, scientific knowledge and dissemination, although these medicinal plants are the pillars to the health care system and livelihood of rural community<sup>4, 23</sup>.

Higher medicinal plant diversity is comprised in Ethiopia because of the presence of broad latitudinal ranges<sup>4</sup>. In Northwestern parts of Ethiopia, which is endowed with humid, sub-humid, dry, highland and lowland areas, plenty of medicinal plants are present. However, nowadays the extents of medicinal plant resources are highly degraded.

About 80 % of the population in Ethiopia is suffering from the lack of healthcare services<sup>4, 12</sup>. Thus, in most cases, rural communities depend on medicinal plants to meet their healthcare needs<sup>4</sup> due to their easily accessibility and affordability<sup>20</sup>.

Identifying medicinal plants, documenting their uses and assessing the threats create a base for local decision making, applying appropriate management, conduct detail pharmacological analysis and select species for different land uses. However, there is scanty of information on their medicinal uses, ecological distribution and conservation.

Medicinal plants and the associated plant use knowledge are documented in specific locations of Africa<sup>23</sup> and in some parts of Ethiopia<sup>3, 6, 35</sup>. Furthermore,

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there are many traditional management practices of medicinal plants like cultural taboos and religious rules. Yet, a comprehensive study and documentation of medicinal plants and their associated knowledge in Chilga District was not conducted. Thus, this study was initiated with the objectives to (i) identify medicinal plants in different land uses, Kebeles (Kebele- the lowest administrative unit next to district in Ethiopia) and agro-ecologies (ii) determining the role of medicinal plants in household livelihood diversification, (iii) document medicinal plant use knowledge and (iv) identify the factors that threaten medicinal plants.

## 2. Materials and Methods

### 2.1 Description of the Study Area

The study was conducted in Chilga district, North Gondar province of the Amhara Regional State. Chilga district is located  $12^{\circ}55'N$  and  $37^{\circ}06'E$ . The district had 41 rural Kebele administrative (KAs) and two town associations<sup>7</sup>.

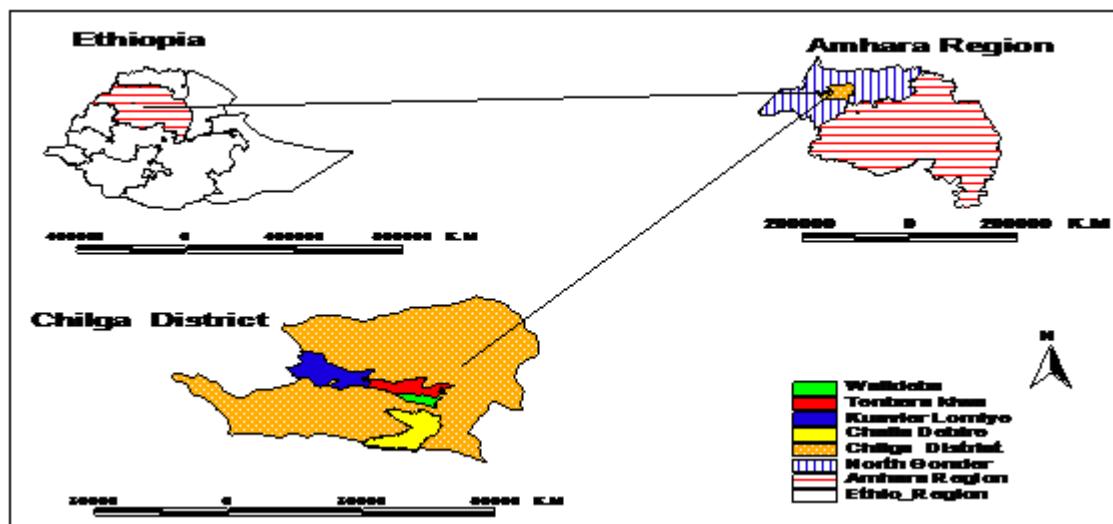
The altitude of the district ranges from 900 to 2267 meter above sea level (m.a.s.l). It had midland (1500-2267 m.a.s.l) and lowland (900-1500 m.a.s.l) agroecology. About 33% of the District is midland, while 67 % lowland agro-ecology. There are rivers and streams traversing the District and often serving as sources of water for the population<sup>7</sup>. The major soils of Chilga District are 45 % Cambisols, 40 % Vertisols, 15 %, and Nitosols<sup>7</sup>. The vegetation is predominantly composed

of different woody and herbaceous species. The natural vegetation of Chilga is mainly composed of various lowland and midland species. The temperature ranges from 11 to  $32^{\circ}C$  and mean annual rainfall is between 995 to 1175 mm. The District had a total population of 241,712 and a total area of  $3181 \text{ km}^2$ . The local people are mainly dependent on subsistence mixed agriculture (crop-livestock production and rearing).

### 2.2 Selection of Study Sites and Respondents

The study was carried out in four KAs of Chilga District from October 8 to December 20 2012. District and Kebele experts and knowledgeable persons were first contacted to have general information. In addition, secondary archived materials were reviewed from district agricultural office to get further information. Based on preliminary information, the socio-demographic and biophysical characteristics of the two agro-ecologies (midland and lowland) are not the same, while Kebeles in same agroecology are fundamentally similar from one another. Thus, based on accessibility for data collection and availability of medicinal plants, two sample KAs from each agroecology and two sample villages from each KA were selected (Table 1).

For this study, key informants (KIs) and households were participated for data collection. KIs are defined as knowledgeable persons about medicinal plants as well as local conditions. A simple stratification of households (HHs) was conducted by age ( $\leq 40$  and  $> 40$ ) and wealth



**Fig. 1.** Location of the study sites in Chilga district, Northwestern Ethiopia.

**Table 1:** Sampled Kebeles, villages, households and altitude in Chilga District, North-western Ethiopia

Study Kebeles	Sampled villages	Number of Respondents	Altitude (m.a.s.l)
Quavier Lomiye	Achera	12	Below 1500
	Bele Wuha	12	
Tenbera Kiwa	Gint	12	Below 1500
	Kilel	12	
Walideba	Bete Skangie	12	Above 1500
	Mehalgie	12	
Chalia Debire	Ateraho	12	Above 1500
	Awugiber	12	

Source: CDOA, 2012<sup>7</sup>.

(poor, medium and rich), which were commonly used methods in assessing the local knowledge and utilization following the method of Martin<sup>26</sup>. Wealth classification was done by using local wealth classification criteria's in the study KAs. Hence, 12 HHs classified by age category ( $\leq 40$  and  $> 40$  in 1:1 ratio) and wealth (4 HHs for each wealth class) were taken in each study villages. Thus, 96 HHs (78 male and 18 female) from the four KA (24 HHs from each) were interviewed for the study assuming 5 % of the population. Out of the total respondents, 24 top ranked KI (all males, three from each village) were selected based on their knowledge.

### 2.3 Data Collection

Questionnaires and checklists were prepared, pre-tested and administered to HHs and KIs, respectively. Consent and a formal permission letter were obtained from district agricultural office. All interviewees were met on a 'one-to-one' basis and were asked the same standard (open- and closed-ended) questions using the local language (Amharic). Information regarding local names of medicinal plants, parts used and diseases treated and application methods were recorded. In addition, information on other uses and threats of medicinal plants were gathered.

Field observations were conducted in areas using transect walk where most of the medicinal plants are grown/cultivated. The purpose of the field observation was to obtain actual information of presence, growth habit, habitat characteristics and identification of medicinal plant species mentioned during the interviews.

A focused group discussion of KI was conducted at each study site to verify the data. All medicinal plants listed in the socio-economic survey were verified and idiosyncratic ideas were removed from the data. Idiosyncratic ideas are ideas/data which represent only the idea of respondent and was not accepted as correct by other key informants. Some ideas of two persons were assumed idiosyncratic and were rejected.

Direct matrix ranking method was exercised for commonly reported multipurpose medicinal plants to assess their relative importance to the local people and the extent of the existing threats related to their use values following the method of Martin<sup>26</sup>. Based on their relative uses, eight most knowledgeable KIs were selected out of the entire KIs and were asked to assign use values for seven medicinal plant species (5 = best, 4 = very good, 3 = good, 2 = less used, 1 = least used and 0 = not used) to each use category. Frequency of citation as multipurpose species was used in ranking medicinal plant species. Use categories used in the comparison include construction, medicine, fruit/food, fuel wood, shade, farm and household implements, and fence.

Preference ranking was also conducted for 6 commonly reported medicinal plants used to treat rabies in the district following the method of Martin<sup>26</sup>. Rabies was the common ailment for which the local communities do not sought help from primary health services in their locality. Eight KI (most knowledgeable) were selected among 24 KI and participated in the ranking process. The ranking of selected medicinal plants was carried out in pre-designed semi-structured interview items based

on their personal preference of efficacy from highest score (supposed to be the most effective) to the lowest score (least effective).

The major human and natural factors possibly threatening the survival of medicinal plants were identified through preliminary assessment. Thus, based on the relative importance of the threatening factors, priority ranking was conducted by 8 KIs using the method of Martin<sup>26</sup>. One to five scores were assigned where 1 was for the least and 5 were for the most destructive threat. Then, all ranks were summed up and total ranking was conducted to know the main threats.

All encountered plants were identified and recorded by their vernacular names. Later, converted to their botanical names using flora of Ethiopia and Eritrea<sup>9-11,17-19</sup> (Edwards 1989), and own experience. Plant specimens were collected and taken to National Herbarium of Addis Ababa University for plant identification.

## 2.4 Data Analysis

Descriptive quantitative and qualitative data analyses were employed after the necessary data collection. Statistical Package for Social Sciences (SPSS) Version16.0 was used for data analysis. The data from ranking methods was presented in the form of ranks. T test statistical analysis was employed for mean separation. Spearman's Rank Order Correlation was used to test the relation between ages and use knowledge.

## 3. Results

### 3.1 Floristic Composition of Medicinal Plants

One hundred one medicinal plant species belonging to 58 families were recorded in the study area. Among these families, Fabaceae was represented by 7 plant species; Myrtaceae, Solanaceae, Apiaceae, Curcurbitaceae, Lamiaceae, Malvaceae and Vitaceae had 5 species each; Euphorbiaceae had 4; Acanthaceae, Aloaceae, Amaranthaceae, Asteraceae, Combretaceae and Polygonaceae 3 plant species each; Asparagaceae, Boraginaceae, Capparidaceae, Phytolaccaceae, Ranunculaceae, Rutaceae, Verbenaceae and Rhamnaceae had 2 species each and the remaining other families were represented by one species each (Table 2).

### 3.2 Medicinal Plants Habit, Parts Used and Diversity of Uses

Overall, herbaceous species were the most widely used plants for the treatment of ailments (36 % of species) followed by shrubs (30%) (Table 3). The remaining 24 % and 11 % of the medicinal species were trees and climbers, respectively. When compared at Kebele level, herbs were the most popularly used plants with proportion of 36 %, 35 % and 36 % for Walideba, Chalia Debire and Tenbera, respectively. However, in Quavier Lomiye Kebele shrubs were widely used plants (40.5 %).

Plant remedies were prepared from different parts of the plant (Table 4). About 89.8 % of remedies are prepared from roots and leafs. The remaining 10.2 % are prepared from other plant parts (Stem and root barks, apex, seed, tuber, fruits, sap, oil and fruit coats). In addition, some medicinal plants in the study area were used to treat more than one ailment (Table 2).

Medicinal plants play an important role in provision of other uses such as fuel wood, construction, food, fencing and others in addition to medicinal uses (Table 5). About 68.48 % out of 83 and 76.3 % out of 84 medicinal plants in the lowland and midland agroecology provide additional uses respectively.

### 3.3 Preference and Utilization of Medicinal Plants

Informant consensus on most commonly utilized medicinal plants in the study sites is presented in Table 7. Over all in the study area, *Zehneria scabra* (mentioned by 31% informants) and *Carissa spinarum* (mentioned by 28 % informants) were popularly used medicinal plants. Site-specific preference based on percentage of informants also assured *Zehneria scabra* was frequently cited medicinal plant in Walideba, Quavier lomiye and Tenbera. Similarly, *Carissa spinarum* was the most cited plant in Chalia Debire Kebele.

Rabies was the most common disease that the most people visit traditional healer in the study area. Through preference ranking, seven medicinal plants treating rabies were selected (Table 7). Of these, *Dorstenia barnimiana* and *Euphorbia abyssinica* were the first and the second ranked species in treating rabies, respectively. However, *Cucumis ficifolius* was the last ranked species.

**Table 2:** List of all medicinal plants encountered in Chilga district, Northwestern Ethiopia

Botanical Name [Family]	Local Name (Amharic)	GF	Disease claimed as treated	PU		Application method	AV	HB	VS
<i>Achyranthes aspera</i> L. [Amaranthaceae]	Telenj	H	wound bleeding/cuts hepatitis	R/L R	Rubbing the leaf or root and applying on the wounded part Bandage on the affected part	Fd	F,N	MT-006	
<i>Acokanthera schimperi</i> (A. DC.) Benth. & Hook. f. ex Schweinf. [Apocynaceae]	Merz	S	Bone fracture Termite kill Rat poison wound, eczema, Wart (internal)	L L L L	Grinding roots of <i>Phytolacca dodecandra</i> , <i>Achyranthes aspera</i> L., leaf, <i>Clutia lanceolata</i> leaf, <i>Euphorbia abyssinica</i> J. F. Gmel. sap and <i>Kalanchoe peltata</i> A. Rich. leaf, and preparing as powder; and preparing them as bread with <i>Eragrostis teff</i> powder Crushed and applied on the affected part Putting the leaves below the crop crashed and put around the crop Crushed and applied on the affected part	-	N, F	MT-008	
<i>Ajuga integrifolia</i> (Buch.-Ham. ex D. Don) [Lamiaceae]	Etse lebawit	H	Impotency for men	Apex	The apex is mixed with <i>Clutia lanceolata</i> subsp. <i>Lanceolata</i> , <i>Clerodendrum myricoides</i> , <i>Ajuga integrifolia</i> crashed and mixed with honey and then eaten	-	-	MT-002	
<i>Albizia anthelmintica</i> (A.Rich.) Brongn. [Mimosaceae]	Besena	T	Wart, Tumor	R	Grinding all the roots of <i>Cannabis sativa</i> , <i>Albizia anthelmintica</i> , <i>Croton macrostachyus</i> , <i>Cavratica gracilis</i> (Guill.&Perri), <i>Suesseng</i> , <i>Plumbago zeylanicum</i> L. and <i>Dracaena steudneri</i> Engl. together and mix with butter, then Applying 1 spoon on affected part	-	-	MT-035	
<i>Allium sativum</i> L. [Alliaceae]	Nech shinkurt	H	Jardasis evil eye	Tub	Mix with pepper and eating by fresh meat grinding the roots of <i>Carisa spinarum</i> , <i>Phytolacca dodecandra</i> L' Herit, <i>Capparis tomentosa</i> , <i>Securidaca longepedunculata</i> , <i>Boscia angustifolia</i> , <i>Ruta chalepensis</i> L., <i>Sida schimperi</i> ana, and <i>Croton macrostachyus</i> , then inhaling; additionally bandage	spice	F	MT-005	
<i>Aloe Vera</i> L. [Aloeaceae]	Ret	H	Impotency for men Rh disease	R	Grinding the root and mix the powder with butter, then applying on the affected part Crushed and mixed with butter, then eating in three month interval during pregnancy	Fd, mt	MT-003		
	Mefeteh serey			R	Washing by root juice of <i>Rumex nervosus</i> , <i>Rhuta myricoides</i> , <i>Asparagus africanus</i> Lam., <i>Verbascum sinaiticum</i> , <i>Verbena officinalis</i> , <i>Cucumis ficifolius</i> , <i>Plumbago zeylanicum</i> , <i>Euclea racemosa</i> Subsp. <i>schimperi</i> , <i>Calpurnia aurea</i> , <i>Justicia schimperi</i> ana, <i>Carisa spinarums</i> , <i>Ferrula communis</i> and <i>Aloe vera</i> for 7 days				

(Continued)

<i>Anogeissus leiocarpa</i> (A. Rich) Guill. & Perr [Combretaceae]	Kekera	T	Stomach ache, Diarrhea	SB		Drinking the stem bark decoction	FE,FU, CO, CH, Ft	F,N, R,H	MT-004
<i>Asparagus africanus</i> Lam. [Asparagaceae]	Yest Kest	H	Cough	R	Boiled decoction with 7 Citrus lemon juice is drunk (1 cup after cooling	Fu,	F	MT-007	
	Mefetehe serey			R	Washing by root juice of <i>Rumex nervosus</i> and <i>Rhuta myricoides</i> , <i>Asparagus africanus</i> , <i>Verbasicum sinaticum</i> , <i>Verbena officinalis</i> , <i>Cucumis ficifolius</i> , <i>Plumbago zeylanicum</i> , <i>Euclea racemosa</i> <i>Subsp. schimperi</i> , <i>Calpurnia aurea</i> , <i>Justicia schimperiiana</i> , <i>Carissa</i> <i>spinarum</i> , <i>Ferrula communis</i> and <i>Aloe vera</i> for 7 days	FU,FE	Bn	MT-009	
<i>Azadirachta indica</i> A. Juss. [Meliaceae]	Nim	T	Diabetes	L	drinking 1 cup of leaf juice	FU,FE	Bn	MT-009	
			Anti-termite, petriasis versicolor, leech infestation, poultry disease	L	Crushed and applied on the termite				
<i>Boscia angustifolia</i> A. Rich [Capparaceae]	Kermed	T	Evil eye	R	grinding the roots of <i>Carissa spinarum</i> , <i>Phytolacca dodecandra</i> , <i>Capparis tomentosa</i> , <i>Securidaca longepedunculata</i> , <i>Boscia</i> <i>angustifolia</i> , <i>Ruta chalepensis</i> , <i>Sida schimperiiana</i> , and <i>Croton</i> <i>macrostachyus</i> , then inhaling; additionally bandage	Fu	N	MT-010	
<i>Brucea</i> <i>antidysenterica</i> J.F. Mill. [Simarubaceae]	Waginos	T	Wart	L	The leaf is crashed with <i>Clematis simensis</i> , <i>Brucea</i> <i>antidysenterica</i> Swiss Chard., and <i>Oenanthe Palustris</i> , and the powder is applied on the affected part	FU	F,N	MT-015	
<i>Calotropis procera</i> L. [Asclepiadaceae]	Tobia	S	Swelling	L	Warming the leaf and rubbing the swelled part	Fu, Fe	B, FD	MT-013	
			Tumor	L	The leave is crashed with <i>Cucumis ficifolius</i> , <i>Solanum incanum</i> and <i>Solanum marginatum</i> , then the powder is added to the affected part				
<i>Calpurnia aurea</i> (Alt.) Benth. [Fabaceae]	Digitra	S	calf disease	R	Grinding the root and giving to calf	FU,FE,FT	N, R,	MT-011	
			Mefetehe serey	R	Washing by root juice of <i>Rumex nervosus</i> , <i>Rhuta myricoides</i> , <i>Asparagus africanus</i> , <i>Verbasicum sinaticum</i> , <i>Verbena officinalis</i> , <i>Cucumis ficifolius</i> , <i>Plumbago zeylanicum</i> , <i>Euclea racemosa</i> <i>Subsp. schimperi</i> , <i>Calpurnia aurea</i> , <i>Justicia schimperiiana</i> , <i>Carissa</i> <i>spinarum</i> , <i>Ferrula communis</i> , <i>Calpurnia aurea</i> and <i>Aloe vera</i> for 7 days				
<i>Cannabis sativa</i> L. [Cannabaceae]	Etse Fares	S	Wart, Tumor	R	Grinding all the roots of <i>Cannabis sativa</i> , <i>Albizia anthelmintica</i> , <i>Croton macrostachyus</i> , <i>Cavratica gracilis</i> , <i>Plumbago zeylanicum</i> and <i>Draecana steudeneri</i> together and mix with better, then applying 1 spoon on affected part	-	F	MT-014	

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<i>Capparis tomentosa</i> Lam. [Capparidaceae]	Gumero	S	evil eye	R	The root is crashed with <i>Sativum alium</i> , <i>Achyranthes aspera</i> , <i>Temenah</i> , <i>Ziziphus abyssinica</i> , <i>aliquangua</i> , <i>Ruta chalepensis</i> , <i>Carisa edulis</i> , <i>Clematis simensis</i> , <i>Withania somnifera</i> , <i>Cucumis ficifolius</i> and <i>Capparis tomentosa</i> then bandage it	Fd, Fe, Fu, N,R	MT-012		
<i>Carduus schimperi</i> Sch. Bip ex A. Rich. [Papaveraceae]	Yeahiya eshoh	H	Cattle eye pain	R	Grinding the roots of <i>Carisa spinarum</i> , <i>Phytolacca dodecandra</i> , <i>Capparis tomentosa</i> , <i>Securidaca longepedunculata</i> , <i>Boscia angustifolia</i> , <i>Ruta chalepensis</i> , <i>Sida schimperi</i> , and <i>Croton macrostachyus</i> , then inhaling; additionally bandage	Giving the decoction	FD	F,F,D, N	MT-020
<i>Carissa spinarum</i> L. [Apocynaceae]	Agam	S	"Mefeteh seray"	R	Washing by root juice of <i>Rumex nervosus</i> and <i>Rhuta myricoides</i> , <i>Asparagus africanus</i> , <i>Verbasicum sinaiticum</i> , <i>Verbena officinalis</i> , <i>Cucumis ficifolius</i> , <i>Plumbago zeylanicum</i> , <i>Euclea racemosa</i> Subsp. <i>schimperi</i> , <i>Calpurnia aurea</i> , <i>Justicia schimperi</i> , <i>Carisa spinarums</i> , <i>Ferrula communis</i> and <i>Aloe vera</i> for 7 days	F, Fd, Fe, Fu,	N,R	MT-016	
<i>Carduus schimperi</i> Sch. Bip ex A. Rich. [Papaveraceae]	Yeahiya eshoh	S	evil eye	R	The roots of <i>Croton macrostachyus</i> <i>Capparis tomentosa</i> , <i>Vermonia adoensis</i> , <i>Pterolobium stellatum</i> and <i>Carisa spinarum</i> then drinking 1 cup decoction				
<i>Carissa spinarum</i> L. [Apocynaceae]	Agam	S	"Mefeteh seray"	R	The root of <i>Carisa spinarum</i> is grind with roots of <i>Verbasicum sinaiticum</i> , <i>Sativum alium</i> , <i>Achyranthes aspera</i> , <i>Securidaca longepedunculata</i> , <i>Ziziphus abyssinica</i> , <i>Ruta chalepensis</i> , <i>Clematis simensis</i> , <i>Withania somnifera</i> , <i>Cucumis ficifolius</i> and <i>Capparis tomentosa</i> then bandage				
<i>Catha edulis</i> (Vahl) Forssk. ex Endl. [Celastraceae]	Chat	S	Devil (Jine)	R	grinding the roots of <i>Carisa spinarum</i> , <i>Phytolacca dodecandra</i> , <i>Capparis tomentosa</i> , <i>Securidaca longepedunculata</i> , <i>Boscia angustifolia</i> , <i>Ruta chalepensis</i> , <i>Sida schimperi</i> , and <i>Croton macrostachyus</i> , then inhaling; additionally bandage				
<i>Cayratia gracilis</i> (Guill. & Perri.) Sues. [Vitaceae]	Aserkush	C	Calf rejection	R	Mixing the root powder with <i>Solanum incanum</i> and stay on the vagina for 15 minute by shash then rubbing the calf	-	-	MT-019	
<i>Cathartesaura</i> L.			Wart,Tumor	R	Grinding all the roots of <i>Cannabis sativa</i> , <i>Albizia anthelmintica</i> , <i>Croton macrostachyus</i> , <i>Cavratica gracilis</i> , <i>Plumbago zeylanicum</i> and <i>Draecana steudeneri</i> together and mix with better, then applying 1 spoon on affected part	stimulant	F,H	MT-017	

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<i>Centella asiatica</i> L. [Apiaceae]	yeayit Gero	H	Wound	L	Crushed, mixed with water and decanted, then applying on the affected part	FD	F,N,R	MT-018
<i>Cicer cuneatum</i> . Hochstetter, Christian Ferdinand Friedrich. [Papilionaceae]	Yeayit shimbira	H	Poultry Vaccine	L	The leaf is crashed with the root of <i>Justicia schimperiana</i> and given by injera	Fd	MT-032	
<i>Cissus petiolata</i> Hook. f. [Vitaceae]	Alikie	C	Swelling, Tumor	R	Inhaling	rope, co	R, Mt	MT-025
<i>Clausena anisata</i> (Willd.) Hook.f [Rutaceae]	Limich	s	Devil	R	Inhaling its root powder with roots of <i>croton macrostachyus</i> and <i>Capparis tomentosa</i>	tooth Brush	N,R	MT-021
<i>Clematis simensis</i> Fres. [Ranunculaceae]	Azo areg	C	Wart	L	The leaf is crashed with <i>Brucea antidysenterica</i> and <i>Oenanthe Palustris</i> then applying the powder on the affected part	-	N	MT-031
<i>Clutia lanceolata</i> subsp. <i>Lanceolata</i> Forssk. [Euphorbiaceae]	Fiyele fej	H	Hepathites/ Jaundice	L	Grinding roots of <i>Phytolacca dodecandra</i> , <i>Achyranthes aspera</i> leaf, <i>Clutia lanceolata</i> leaf, <i>Euphorbia abyssinica</i> Sap and <i>Kalanchoe petiana</i> leaf, then preparing as powder and baking them with red teff powder, the eating	FO	F,N	MT-024
<i>Combretum sp.</i> [Combretaceae]	Fongera	T	Hepatitis	RB	The apex of <i>Jasminum floribundum</i> subsp. <i>lanceolata</i> , <i>Clerodendrum myricoides</i> , <i>Ajuga integrifolia</i> crashed and mixed with honey and then eaten	Fu	N	MT-030
<i>Corchorus olitorius</i> L. [Tiliaceae]	Kuddra	H	stomach ache	L	Grinding the root bark and <i>Ficus carica</i> leaf/seed separately then mix them with honey, drinking the tea 3 times a day using glass	vegetable or Wot	-	F
<i>Cordia africana</i> Lam. [Boraginaceae]	Wanza	T	Hepatitis	L	Crashed and then inhaled before or after boiling	F, Fd, Fe, Fu, T, HT,	N, F	MT-033
<i>Crinum abyssinicum</i> (Hochst ex A. Rich) I.Nord. [Amaryllidaceae]	Yejib shinkurt	H	Hepatitis snake bite	B	Drinking the decoction	-	N,R	MT-051
<i>Croton macrostachyus</i> Hochst. Ex. Del. [Euphorbiaceae]	Bisana	T	Bleeding	sap	Crushed and applied on the affected part	Fu, Fe, FT, FD	N, F, R	MT-060
			avoiding worm evil eye	L	The root of <i>croton macrostachyus</i> is grinded with the roots of <i>Capparis tomentosa</i> , <i>Vernonia adoensis</i> , <i>Pterolobium stellatum</i> and <i>Carica spinarum</i> then drinking 1 cup decoction	(Continue)		

Rabies	R	Grinding the roots of <i>Dorstenia barnimiana</i> , <i>Malva verticillata</i> , <i>Croton macrostachyus</i> , and <i>Cucumis ficifolius</i> separately, mix them then drinking with <b>Skimmed milk</b> , finally drinking coffee				
Wart, tumor	R	Grinding all the roots of <i>Cannabis sativa</i> , <i>Albizia anthelmintica</i> , <i>Croton macrostachyus</i> , <i>Cavratica gracilis</i> , <i>Plumbago zeylanicum</i> and <i>Draceana steudeneri</i> together and mix with butter, then applying 1 spoon on affected part				
internal wart	B	Crushing and grinding the root with leaves of <i>Verbena officinalis</i> together and preparing as bread them by black ergastris teff powder and eating				
Hepatitis and rabies	R	Grinding the roots of <i>Phytolacca dodecandra</i> , <i>Croton macrostachyus</i> , together, then drinking by <b>Skimmed milk</b> (0.25mm powder)				
evil eye	R	grinding the roots of <i>Carisa spinarum</i> , <i>Phytolacca dodecandra</i> , <i>Capparis tomentosa</i> , <i>Securidaca longepedunculata</i> , <i>Boscia angustifolia</i> , <i>Ruta chalepensis</i> , <i>Sida schimperiana</i> , and <i>Croton macrostachyus</i> , then inhaling; additionally bandage	-	N	B	MT-081
<i>Cucumis ficifolius</i> A. Rich. [Curcurbitaceae]	C	Tumor	L	The leave is crashed with <i>Calotropis procera</i> , <i>Solanum incanum</i> and <i>Solanum marginatum</i> , then the powder is added on the affected part		
Yemidir Embuay				The root is crashed with <i>Carisa spinarum</i> , <i>Sativum alium</i> , <i>Achyranthes aspera</i> , <i>Securidaca longepedunculata</i> , <i>Ziziphus abyssinica</i> , <i>aliguangua</i> , <i>Ruta chalepensis</i> , <i>Clematis simensis</i> , <i>Withania</i> , and <i>Capparis tomentosa</i> then bandage		
evil eye	R			Grinding the roots of <i>Dorstenia barnimiana</i> , <i>Malva verticillata</i> , <i>Croton macrostachyus</i> and <i>Cucumis ficifolius</i> separately mix them together then drinking with <b>Skimmed milk</b> after that drinking coffee		
rabies	R		R/L	Giving the root extract		
Ye midir hareg	H	To remove the placenta of the cow			FD	MT-101
Chigogot	H	Allergic	L	Crushed, mixed with butter and decanted, then applying on the affected part	-	H,N, F,R
Etse Zewe	C	snake bite	R	Mix the root powder with lit and then eating for avoiding and handing for prevention	FD	H
<i>Cynoglossum coeruleum</i> Hochst.ex. DC. [Boraginaceae]						MT-090
<i>Cyphostemma junceum</i> (Webb) Decoings ex Wild & Drumm. [Vitaceae]						

(Continue)

<i>Datura stramonium</i> L. [Solanaceae]	Astengir	H	Ring worm	L	Rubbing and painting	sc	H,F	MT-079
	Tumor	L	The leaf is crashed with <i>Calotropis procera</i> , <i>Cucumis ficifolius</i> , and <i>Solanum incanum</i> then the powder is added to the affected part					
<i>Desmodium gangeticum</i> (L.) DC [Fabaceae]	Ye Gint Med hanit	S	Scorpion bite	R	Grinding the root and applying on the affected part	FD	FD	MT-053
			Wound (for oxen shoulder)	R	Crashed and applied on the affected part			
			avoiding cattle worm	R	Grinding the root and giving with salt			
			epistaxis	L	The fresh leaf is crashed and applied on the mouth	-	N	MT-036
					Mix with <b>Skimmed milk</b> and injera, then giving for the dog			
<i>Dorstenia barnimiana</i> Schwentf. [Moraceae]	Work Bemedia	H	Rabies vaccine for Dog	R	Grinding the roots of <i>Malva verticillata</i> , <i>Croton macrostachyus</i> , and <i>Cucumis ficifolius</i> separately and mixing them then drinking with <b>Skimmed milk</b> , after that drinking coffee			
<i>Draceana steudeneri</i> Engl. [Dracaenaceae]	Etse Patos	S	Wart, Tumor, eti	R	Grinding root with the roots of <i>Cannabis sativa</i> , <i>Albizia onthelmintica</i> , <i>Croton macrostachyus</i> , <i>Cavratica gracilis</i> , <i>Plumbago zeylanicum</i> and together and mix with butter, then applying 1 spoon affected part	-	N	MT-075
<i>Echinops kebericho</i> Mesfn. [Compositae]	Kebercho	H	Malaria, common cold	R	Inhaling the root powder	F,B, FD	MT-061	
<i>Ehretia cymosa</i> Thonn. [Lamiaceae]	Checho	S	Tooth ache	L	Handling the leaf by teeth	Fu, Fe, Co, FL, NF	MT-056	
<i>Embelia schimperi</i> Vatke. [Myrsinaceae]	Enkoko	C	Tapeworm	F	Crashed and drinking 1 cup juice	Ht, co	N,R	MT-026
<i>Eucalyptus globulus</i> Labill. [Myrtaceae]	Nechi Bahir zaf	T	Common cold	L	Inhaling the leaf	FU,Co, CH,	Boud	MT-093
<i>Euclea racemosa</i> Murr. subsp. <i>schimperi</i> . (A. DC.) White. [Ebenaceae]	Dedeho	s	Mefeteha seray	R	Washing by root juice of <i>Rumex nervosus</i> and <i>Rhuta myricoides</i> , <i>Asparagus africanus</i> Lam., <i>Verbasicum sinaiticum</i> , <i>Verbena officinalis</i> , <i>Cucumis ficifolius</i> , <i>Plumbago zeylanicum</i> , <i>Euclea racemosa</i> Subsp. <i>Schimperi</i> , <i>Calypurnia aurea</i> , <i>Justicia schimperiana</i> , <i>Carissa spinarum</i> , <i>Ferrula communis</i> and <i>Aloe vera</i> for 7 days	FE, FU, N	MT-088	

(Continue)

<i>Euphorbia abyssinica</i> J.F. Gmel. [Euphorbiaceae]	Kulkual	T	Rabies Vaccine (for Dog)	sap	Mix the sap with wheat powder and bakery it	Fe,T	N,B, R	MT-038
<i>Euphorbia tirucalli</i> L. [Euphorbiaceae]			Hepatitis/ Jaundies	sap	Grinding roots of <i>Phytolacca dodecandra</i> , <i>Achyranthes aspera</i> leaf, <i>Cutia lanceolata</i> leaf, <i>Euphorbia abyssinica</i> Sap and <i>Kalanchoe peltiana</i> leaf, and preparing as powder; and baking them with <i>Eragrostis tef</i>	Fu,F	B,N	MT-040
<i>Ferrula communis</i> L. [Apiaceae]	Kinchib	Sh	Swelling	sap	Painting	Fe	B,N	MT-047
<i>Ficus carica</i> L. [Moraceae]	Dog	T	Mefeteh serey	R	Washing by root juice of <i>Rumex nervosus</i> and <i>Rhuta myricoides</i> , <i>Asparagus africanus</i> , <i>Verbascum sinaticum</i> , <i>Verbena officinalis</i> , <i>Cucumis ficifolius</i> , <i>Plumbago zeylanicum</i> , <i>Euclea racemosa</i> Subsp. <i>schimperi</i> , <i>Calpurnia aurea</i> , <i>Justicia schimperiiana</i> , <i>Carissa spinarum</i> , <i>Ferrula communis</i> and <i>Aloe vera</i> for 7 days	FU,F,E	N	MT-047
<i>Ficus sycomorus</i> L. [Moraceae]	Beles	S	Hepatitis/ Jaundice	L&S	Grinding the leaf/root with <i>Ficus carica</i> leaf/seed separately; mix them with honey then drinking 3 times a day by tea glass	Fu, Fe	N,R	MT-095
<i>Flueggea virosa</i> Guill. & Perr. [Euphorbiaceae]	Bamba	T	Calf warm	L	Crashed and mixed with milk, then given to calf	F,F,D, CO, HB, FE,FU	F,N,R	MT-071
<i>Hordeum vulgare</i> Convar Labile (Schiem.) Mansfeld. [Poaceae]	Shasha	S	Hepatitis	L	1 Spoon leaf powder is inhaled	Fe, FU, CO, R	F, N, R	MT-100
<i>Foeniculum vulgare</i> Mill. [Apiaceae]	Ensila	H	Cough	R/L	Crashed and mixed with <i>Trachyspermum ammi</i> and drink the decoction	FD	N	MT-059
<i>Hibiscus cannabinus</i> L. [Malvaceae]			Wayika/ Yebereha Bamia	H	Gastric	FD	F	MT-028
<i>Yebab Alenga</i>			Gebsa	H	Kidney	FD	F	MT-034
<i>Ipomoea</i> sp. [Convolvulaceae]	Filatsut	S	Emergency/ sudden disease	R	Eating the root	-		MT-044
<i>Indigofera arrecta</i> Hochst. Ex A. Rich. [Papilionaceae]	Digindig/ Gamgamina/ baros	H	Snake bite prevention	L	Rubbing the leaf and bandage	-	N,R	MT-054
<i>Indigofera spicata</i> Forssk. [Papilionaceae]	Yebab Alenga	H	Evil eye	R	Grinding the roots of <i>Polygala abyssinica</i> , <i>Carissa spinarum</i> , <i>Phytolacca dodecandra</i> , <i>Capparis tomentosa</i> , <i>Securidaca longepedunculata</i> , <i>Boscia angustifolia</i> , <i>Ruta chalepensis</i> , <i>Sida schimperiiana</i> , and <i>Croton macrostachyus</i> , then inhaling; additionally bandage	-	N	MT-066

(Continue)

<i>Jasminum floribundum L. subsp. floribundum (R.Br. ex Fresen) P.S. Green</i> [Oleaceae]	Tenbeliel	C	Impotency for men	apex	The apex of <i>Jasminum floribundum</i> , subsp. <i>floribundum</i> is mixed with <i>Clutia lanceolata</i> subsp. <i>Lanceolata</i> , <i>Clerodendrum myricoides</i> , <i>Ajuga integrifolia</i> crashed and mixed with honey and then eaten	FE, Fu	N,R	MT-074
<i>Justicia schimperiaria</i> (Hochst. ex A. Nees) [Apocynaceae]	Sensel (Smiza)	S	FMD (Foot and mouth disease)	L	Drink 0.85mm decoction for mouth disease and wash the leg and squeeze with boiled leaf for leg diseases	FU, Fe, FT,FD	B, N,R	MT-001
<i>Kalanchoe petittana</i> A. Rich. [Crassulaceae]	Endehula	H	Hen Vaccine hepatitis/ jaundices	L	The leaf is crashed with <i>Cicer cuneatum</i> , and given by injera Grinding roots of <i>Clutia lanceolata</i> subsp. <i>Lanceolata</i> , <i>Phytolacca dodecandra</i> , <i>Achyranthes aspera</i> leaf, <i>Clutia lanceolata</i> leaf, <i>Euphorbia abyssinica</i> Sap and <i>Kalanchoe petittana</i> . leaf, and preparing as powder; and baking with <i>Eragrostis tef</i> powder	-	N, FD, R	MT-084
<i>Leonotis Velutina</i> Fenzl. Var <i>rugosa</i> Bak. [Lamiaceae]	Fers zeng	H	Impotency for men	R	Grinding the root and mix with butter, the applying on the penis	-	N, F, R	MT-099
<i>Lycopersicon esculentum</i> Mill. [Solanaceae]	Timatim	H	bleeding	L	Crashed and applied on the affected part	Fd	F	MT-091
<i>Malva verticillata</i> L. [Malvaceae]	Tult	H	Boil rabies	R	Crashed the root and boiling the powder with milk	FD	F, FD, N	MT-072
<i>Momordica foetida</i> Schum.sm	Kura	C	Allergic (almaz balechira)	R	Mix with skinned milk and Injera then giving for the dog	-	N, R, Rd,	MT-042
<i>[Cucurbitaceae]</i>	Mechate				Crashed and applied on the affected part	FD	F	MT-046
<i>Monechma ciliatum</i> (Jacq.) Milne.Redh [Acanthaceae]	Yeset Guticha	H	Scorpion bite	R	Crashed and applied on affected part	FD	F	MT-046
<i>Ocimum gratissimum</i> L. [Lamiaceae]	Damakessie	H	sun strike	L	Drinking <i>Ocimum gratissimum</i> leaf tea	FU	F,N	MT-052
<i>Oenanthe palustris</i> (Chiov.) C. Norman [Apiaceae]	Etse shol	s	Wart	L	The leaf is crashed with <i>Brucea antidysenterica</i> , and <i>Clematis simensis</i> , and the powder is applied on the affected part	-	MT-080	
<i>Olea europaea</i> L. subsp. <i>cuspidata</i> (Wall. ex G. Don) Cif. [Oleaceae]	Woirra	T	Wart (internal)	oil	Drinking	Co,fe, fu	N, F	MT-050
<i>Otostegia integrifolia</i> Benth. [Lamiaceae]	Tunjut	S	Stomach-ache	apex	Decoction	smoke	N, Fd	MT-029
<i>Pavonia urens</i> Cav. [Malvaceae]	Ablait	H	Impotency for men	R	Drinking 1 cup decoction	-	N, F, R	MT-072

(Continue)

<i>Phoenix reclinata</i> Jacq. [Arecaceae]	seniel	T	Mefeteha serey	R	Washing by the root juice of <i>Solanum incanum</i> and <i>Rumex nervosus</i> , <i>Rhuta myricoides</i> , <i>Asparagus africanus</i> , <i>Verbasicum sinaiticum</i> , <i>Verbena officinalis</i> , <i>Cucumis ficifolius</i> , <i>Plumbago zeylanicum</i> , <i>Euclea racemosa</i> Subsp. <i>schimperi</i> , <i>Calpurnia aurea</i> , <i>Justicia schimperiiana</i> , <i>Carisa spinarum</i> , <i>Ferrula communis</i> , <i>Phoenix reclinata</i> and <i>Aloe vera</i> for 7 days	Ht	H, N,R	MT-094
<i>Phytolacca dodecandra</i> L.Heri [Phytolaccaceae]	Mehan endod	S	hepatitis/ jaundices	R	The same as <i>Clutia lanceolata</i> subsp. <i>Lanceolata</i>	FD	N,B,R	MT-096
<i>Phytolacca dodecandra</i> L. Herit [Phytolaccaceae]	Endod	S	Reducing the harm of poison	seed	Drinking the juice	FD, deterre gent	B,H, N,R	MT-037
<i>Plantago lanceolata</i> L. [Plantaginaceae]	Gorteb	H	Wund	L	Crashed and applied on the affected part	FD	N,F	MT-058
<i>Plumbago zeylanicum</i> L. [Plumbaginaceae]	Amira	H	Mefeteha serey	R	Washing by root juice of <i>Rumex nervosus</i> and <i>Rhuta myricoides</i> , <i>Asparagus africanus</i> , <i>Verbasicum sinaiticum</i> , <i>Verbena officinalis</i> , <i>Cucumis ficifolius</i> , <i>Plumbago zeylanicum</i> , <i>Euclea racemosa</i> Subsp. <i>schimperi</i> , <i>Calpurnia aurea</i> , <i>Justicia schimperiiana</i> , <i>Carisa spinarum</i> , <i>Ferrula communis</i> and <i>Aloe vera</i> for 7 days	-	F,H	MT-062
<i>Polygala abyssinica</i> Fres. [Polygalaceae]	Etse libona	H	Evil eye	R	Grinding all the roots of <i>Cannabis sativa</i> , <i>Albizia anthelmintica</i> , <i>Croton macrostachyus</i> , <i>Cavratica gracilis</i> , <i>Plumbago zeylanicum</i> and <i>Draceana steudneri</i> together and mix with butter, then applying 1 spoon on affected part	-	MT-057	
<i>Pterolobium stellatum</i> Forssk. [Fabaceae]	Kentetifa / Kontir	S	Tumor	L	The leave is crashed with <i>Calotropis procera</i> , <i>Cucumis ficifolius</i> and <i>Solanum incanum</i> then the powder is added to the affected part	Fe, F,FD	N, R,	MT-064

(Continue)

<i>Rotheca myricoides</i> (Hochst.) Steane & Mabb. [Lamiaceae]	Misrich	S	bleeding	R	Crushed and applied on the affected part	FU, FE, Ft	N,R	MT-063
		S	Mefetehe serey	R	Washing by juice of root <i>Rotheca myricoides</i> and <i>Rumex nervosus</i> , <i>Asparagus africanus</i> , <i>Verbasicum sinaticum</i> , <i>Verbena officinalis</i> , <i>Cucumis ficifolius</i> , <i>Plumbago zeylanicum</i> , <i>Euclea racemosa</i> Subsp. <i>schimperi</i> , <i>Calpurnia aurea</i> , <i>Justicia schimperiiana</i> , <i>Carissa</i> <i>spinaria</i> , <i>Ferrula communis</i> and <i>Aloe vera</i> for 7 days			
<i>Rumex nervosus</i> Vahl. [Polygonaceae]	Enbuacho	S	Impotency for men	apex	The apex of <i>Lasminum floribundum</i> , <i>Clutia lanceolata</i> subsp. <i>Lanceolata</i> , <i>Clerodendrum myricoides</i> , <i>Ajuga integrifolia</i> crashed and mixed with honey and then eaten	R	FU, FE, FD	N,F
		S	Mefetehe serey	R	Washing by root juice of <i>Rumex nervosus</i> and <i>Rhuta myricoides</i> , <i>Asparagus africanus</i> , <i>Verbasicum sinaticum</i> , <i>Verbena officinalis</i> , <i>Cucumis ficifolius</i> , <i>Plumbago zeylanicum</i> , <i>Euclea racemosa</i> Subsp. <i>schimperi</i> , <i>Calpurnia aurea</i> , <i>Justicia schimperiiana</i> , <i>Carissa</i> <i>spinaria</i> , <i>Ferrula communis</i> and <i>Aloe vera</i> for 7 days			MT-070
<i>Ruta chalepensis</i> L. [Rutaceae]	Tena adam	H	Ant-termite	L	Crushed and applied on the termite		spice	H
			Evil eye	L	The leaf is crashed with roots of <i>Carissa spinarum Sativum alium</i> , <i>Achyranthes aspera</i> , <i>Securidaca longepedunculata</i> , <i>Ziziphus</i> <i>abyssinica</i> , <i>Clematis simensis</i> , <i>Withtania somnifera</i> , <i>Cucumis</i> <i>ficifolius</i> and <i>Capparis tomentosa</i> then bandage			
			evil eye	L	Grinding the leaf of <i>Ruta chalepensis</i> , with the roots of <i>Carissa</i> <i>spinarum</i> , <i>Phytolacca dioecandra</i> , <i>Capparis tomentosa</i> , <i>Securidaca longepedunculata</i> , <i>Boscia angustifolia</i> , <i>Sida</i> <i>schimperiiana</i> , and <i>Croton macrostachyus</i> , then inhaling; additionally bandage			
					Inhaling the bark smoke			
<i>Schefflera abyssinica</i> (Hochst. ex A. Rich.) Harms [Araliaceae]	Getem	T	Impotency for men	B			Fu	F,B,N
			Temehie	T	evil eye	R	Fu, SH, Fe	N,F,R
<i>Securidaca longepedunculata</i> Fres. [Polygonaceae]					Grinding the roots of <i>Securidaca longepedunculata</i> , <i>Polygonal</i> <i>abyssinica</i> , <i>Carissa spinarum</i> , <i>Phytolacca dioecandra</i> , <i>Capparis</i> <i>tomentosa</i> , <i>Polygala abyssinica</i> , <i>Boscia angustifolia</i> , <i>Ruta</i> <i>chalepensis</i> , <i>Sida schimperiiana</i> , and <i>Croton macrostachyus</i> , then inhaling; additionally bandage			MT-068
			Evil eye, sinusitis, joint pain	R,				
			evil eye	R	Inhaling the root powder			
					The root is crashed with <i>Carissa spinarum</i> , <i>Sativum alium</i> , <i>Achyranthes aspera</i> , <i>Securidaca longepedunculata</i> , <i>Ziziphus</i> <i>abyssinica</i> , <i>Aliguangua</i> , <i>Ruta chalepensis</i> , <i>Clematis simensis</i> , <i>Withtania somnifera</i> , <i>Cucumis ficifolius</i> and <i>Capparis tomentosa</i> then bandage			

(Continue)

<i>Sida cuneifolia</i> Roxb. [Asteraceae]	Gurjejit	S	Dandruff Bleeding, wound	L	Crushed and washing with its decoction Crushed and applied on the affected part	FD	F, N, R, H	MT-076
<i>Sida shimperiana</i> Hochst.ex A.Rich. [Malvaceae]	Chifrig	H	Bone fracture evil eye	R	Grinding the roots of <i>Polygala abyssinica</i> , <i>Carisa spinarum</i> , <i>Phytolacca dodecandra</i> , <i>Capparis tomentosa</i> , <i>Securidaca longepedunculata</i> , <i>Boscia angustifolia</i> , <i>Ruta chaleensis</i> , <i>Sida schimperiana</i> , and <i>Croton macrostachyus</i> , then inhaling; additionally bandage	FD, detergent	B, FD, N	MT-069
<i>Solanum incanum</i> L. [Solanaceae]	Enbay	S	Tumor	L	The leave is crashed with <i>Cucumis ficifolius</i> , <i>Calotropis procera</i> and <i>Jasminum floribundum</i> subsp. <i>floribundum</i> , then the powder is added to the affected part	Tannery	N, R	MT-055
<i>Solanum marginatum</i> L. [Solanaceae]	Geber enbay	S	Tumor	R	Washing by the root juice of <i>Solanum incanum</i> and <i>Rumex nervosus</i> , <i>Rhuta myricoides</i> , <i>Asparagus africanus</i> , <i>Verbasium sinaiticum</i> , <i>Verbena officinalis</i> , <i>Cucumis ficifolius</i> , <i>Plumbago zeylanicum</i> , <i>Euclea racemosa</i> Subsp. <i>schimperi</i> , <i>Calpurnia aurea</i> , <i>Justicia schimperiana</i> , <i>Carisa spinarum</i> , <i>Ferrula communis</i> and <i>Aloe vera</i> for 7 days	Tannery	B	MT-022
<i>Stephania abyssinica</i> (Qu.-Dell & A. Rich) [Menispermaceae]	yeayit areg	C	Emergency/ sudden disease	R	The root is crashed with <i>Cucumis ficifolius</i> , <i>Calotropis procera</i> and <i>Solanum incanum</i> then the powder is added on the affected part	FD	F	MT-027
<i>Stereospermum kunthianum</i> Cham. [Bignoniaceae]	Zana	T	Bleeding, wound,	L/ apex	Crushing and applied on affected part	Fu, Fe, co, R	N, F, R	MT-098
<i>Syzygium guineense</i> (Willd.) DC. [Myrtaceae]	Dokima	T	Avoiding worm Diharia, (Tila) Amh	S/B/ RB	Mix the powder with honey/ water and then drinking	FU, Fe, Co, FO	F, R, N	MT-097
<i>Tamarindus indica</i> L. [Fabaceae]	Kumer	T	Stomach ache	F	Drinking the decoction	FO, FU, FE, SH, SC	F, N	MT-095
<i>Terminalia brownie</i> Pers. [Combretaceae]	Weyba	T	Hepatitis	B	The stem bark is boiled then drinking the decoction	Fe, Fu,	F, N	MT-092
<i>Terminalia laxiflora</i> Engl. & Diels [Combretaceae]	Wembella	T	snake bite	R	warming and rubbing the affected part by the root	co fu, FE, cha,	N, F, R	MT-089
<i>Thalictrum rhynchosporum</i> Dill. & A. Rich. [Ranunculaceae]	Sire- Bizu	H	Sun strike	R	Smoking or inhaling	FD	N	MT-087

(Continue)

<i>Verbasicum sinaiticum</i> Benth. [Scrophulariaceae]	Kutitina	H	Impotency, stomach ache	R	Drinking 1 cup decoction	H, N
	mefetehe serey		Joint pain	R	Grinding the root and drink with barely decoction morning for three days	-
	Kijet	R			mixing the powder with butter painting	MT-086
					Washing by the root juice of <i>Solanum incanum</i> and <i>Rumex nervosus</i> , <i>Rhuta myricoides</i> , <i>Asparagus africanus</i> , <i>Verbasicum sinaiticum</i> , <i>Verbena officinalis</i> , <i>Cucumis ficifolius</i> , <i>Plumbago zeylanicum</i> , <i>Euclea racemosa</i> Subsp. <i>schimperi</i> , <i>Calpurnia aurea</i> , <i>Justicia schimperiана</i> , <i>Carisa spinarums</i> , <i>Ferrula communis</i> and Aloe vera for 7 days	
	evil eye	R			The root of <i>Verbasicum sinaiticum</i> is grind with roots of <i>Carisa spinarum</i> , <i>Sativum alium</i> , <i>Achyranthes aspera</i> , <i>Securidaca longepedunculata</i> , <i>Ziziphus abyssinica</i> , <i>Ruta chalepensis</i> , <i>Clematis simensis</i> , <i>Withania somnifera</i> , <i>Cucumis ficifolius</i> and <i>Capparis tomentosa</i> then bandage	N
					Eating the root for age above 18	MT-085
	Atuch	H	Stomach ache	R		
	Mefetehe serey			R	Washing by the root juice of <i>Solanum incanum</i> and <i>Rumex nervosus</i> , <i>Rhuta myricoides</i> (Hochst.), <i>Asparagus africanus</i> , <i>Verbasicum sinaiticum</i> , <i>Verbena officinalis</i> , <i>Cucumis ficifolius</i> , <i>Plumbago zeylanicum</i> , <i>Euclea racemosa</i> Murr. Subsp. <i>schimperi</i> , <i>Calpurnia aurea</i> , <i>Justicia schimperiана</i> , <i>Carisa spinarums</i> , <i>Ferrula communis</i> and Aloe vera for 7 days	
	Wart internal	L			Grinding leaf with the root of <i>Croton macrostachyus</i> and preparing as bread by <i>Eragrostis teff</i> then eating	
	Hepatitis and rabies	R			Grinding the with the roots of <i>Croton macrostachyus</i> , <i>Phytolacca dodecandra</i> then drinking by skimmed milk (0.25 mm powder)	
	Etse Mossie/ Mererug	S	Devil	R	Its root and <i>Chatta edulis</i> leaf are crashed and prepared as decoction, then drink	FU
	<i>Vernonia adonis</i> Sch. Bip. ex Walp. [Asteraceae]		wart (internal), hypertension, Rlh	R	Crashed and mix with honey, then drinking or eating	F, N
			snake bite, Scorpion bite	R	Crashing the root and applying on the affected part	MT-082
			Stomach- ache, Jardiasis,	R	decoction	
			Diarrhea, Worm			

(Continue)

Gastric	R	Baking by <i>Eragrostise teff</i> and eating, then drinking the decoction					
Gangrin (finger pain) evil eye	R	Grinding and bandage on the finger					
<i>Vitis vinifera</i> L. [Vitaceae]	Weyne	H	The roots of <i>Croton macrostachyus</i> <i>Capparis tomentosa</i> , <i>Vernonia advensis</i> , <i>Pterolobium stellatum</i> and <i>Carisa spinarum</i> then drinking 1 cup decoction	L&R	Grinding the leaf/root with <i>Ficus carica</i> leaf/seed separately; mix them with honey then Drinking 3 times by tea glass	preparation of alcohol	F
<i>Withania somnifera</i> L. Dunal. [Solanaceae]	Gizewa	S	evil eye	R	The root of <i>Carisa spinarum</i> is grind with roots of <i>Verbasicum sinaiticum</i> , <i>Sativum alium</i> , <i>Achyranthes aspera</i> , <i>Securidaca longepedunculata</i> , <i>Ziziphus abyssinica</i> , <i>Ruta chalepensis</i> , <i>Clematis simensis</i> , <i>Withania somnifera</i> , <i>Cucumis ficifolius</i> and <i>Capparis tomentosa</i> then bandage	FD	H
<i>Ximenia americana</i> L. [Olivaceae]	Enkoye	s	wound	SB	Applying 1mm powder on the wound	F, Fd, Fe, Fu,	MT, N
<i>Zehneria scabra</i> (L.f.) Sond. [Cucurbitaceae]	Haregresa	C	Sun strike	L	Crushed and mixed with water then drink one cup / or boiled and inhaled the stem.		N,R
<i>Zingiber officinale</i> Rosc. [Zingiberaceae]	Zingible	H	Tumor	R	The root is crushed with <i>Ziziphus abyssinica</i> stem bark and then ejected to swelled part		MT-065
<i>Ziziphus abyssinica</i> Hochst. Ex A. Rich. [Euphorbiaceae]	Abetere	T	Common cold, Stomach pain, Corneal opacity, Termite kill	tub	Taking the <i>Zingiber officinale</i> tea	spice	H, F
				Tub	Crushed and applied on the termite to swelled part		

Key to abbreviations: GF= Growth Form; H= Herb; SH= Shrub; T= Tree; C= Climber; PU= Parts Used; R= Root; L= Leaf; SB= Stem Bark; RB= Root Bark; S= Seed; FB= Fruit Bark; AV= Added Value; FD= Fodder; Fu= Fuel Wood; Fe= Fencing; Sh= Shading; Co= Construction; Ft= Farm and House Hold Tools; F= Food; T= Timber; Sc= Soil and Water Conservation; CH= Charcoal; HB= Haney be Production; HAB= Habitat; N= Natural Forest; F= Farmland; R= Riverine; H= Home Garden; Fld = Field; B=Boundary; Mt= Mountain. VS= Voucher Specimen; Merti= is equivalent to 850milliliter. Ingera: is a prepared Ethiopian food made from *Eragrostis tef*.

**Table 3:** Growth forms and number of medicinal plants in the study sites, North western Ethiopia

Growth Form	Number of medicinal plants in each study sites				
	Walideba	Chalia Debire	Quavier Lomiye	Tenbera	Total
Herb	22	19	11	21	36
Shrub	21	16	17	20	30
Tree	11	11	10	13	24
Climber	7	8	4	4	11
Total	61	54	42	58	101

**Table 4:** Plant parts used in the preparation of therapies in Chilga district, North Western Ethiopia

Parts Used	Total no. of species
Root only	51
Leaf	37
Stem Bark	9
Apex	6
Seed	4
Tuber	3
Fruit	3
Sap	3
Oil	2
Fruit Coat	1
Root Bark	1

**Table 5:** Service categories of medicinal plants in Lowland and midland agroecology of the study area, Northwestern, Ethiopia

Use Category	Number of species	
	Lowland agroecology	Midland agroecology
Medicinal use only	23	26
Medicinal & other Use	50	58
Fodder	17	26
Fuel wood	28	29
Fencing	24	27
Construction	11	8
Charcoal	2	3
Farm and household tools	8	6
Food	7	8
Spice	2	2
Shade	3	3
Timber	2	1
Soil and water conservation	2	2
Others	7	5

**Table 6:** List of frequently cited medicinal plants and diseases treated in Chilga district, Northwestern Ethiopia (Cited by  $\geq 9$  informants)

Medicinal plant (Scientific Name)	Ailments Treated	Parts Used	Walideba	Chalia Debire	Quavier Lomiye	Tenbera	Total
<i>Zehneria scabra</i>	Sun strike	L	10	7	6	7	30
<i>Carissa spinarum</i>	Evil eye, "meftehe seraye" (Amh)	R	5	10	6	6	27
<i>Croton macrostachyus</i>	Evil eye, hepatitis and rabies for human, wart, tumor, bleeding	R, RB, L, S	1	8	3	4	16
<i>Boscia mossambicensis</i>	Evil eye, epilepsy, sinusitis, joint pain	R	4	1	6	5	16
<i>Achyranthes aspera</i>	Bleeding, hepatitis/jaundice, evil eye	L, R	6	6	0	2	14
<i>Capparis tomentosa</i>	Evil eye, devil	R	1	5	4	3	13
<i>Desmodium gangeticum</i>	Scorbia	R	6	3	2	2	13
<i>Vernonia adoensis</i>	Snake bite, diharia	R	2	6	1	1	10
<i>Bidens pilosa</i>	Bleeding, bone fracture, dandruff	L, R	4	3	2	1	10
<i>Euphorbia abyssinica</i>	Rabies, hepatitis	S	3	4	1	1	9
<i>Allium sativum</i>	Evil eye, giardiasis	TB	2	2	1	4	9
<i>Ruta chalepensis</i>	Evil eye, ant-termite	L	4	1	1	3	9

Note: L=Leaf; R=Root; RB= Root Bark; S= Sap; TB=Tuber

**Table 7:** Preference ranking of six medicinal plants used for treating rabies in Chilga district, Northwestern Ethiopia

Plant Species	Respondents (R1-R8)								Total	Rank
	R1	R2	R3	R4	R5	R6	R7	R8		
<i>Dorstenia barnimiana</i>	6	6	6	6	6	3	5	5	43	1
<i>Euphorbia abyssinica</i>	4	4	5	5	5	4	6	6	39	2
<i>Malva verticillata</i>	5	5	4	4	4	2	4	3	31	3
<i>Croton macrostachyus</i>	3	1	3	3	2	5	3	4	24	4
<i>Phytolacca dodecandra</i>	2	2	2	1	3	6	1	2	19	5
<i>Cucumis ficifolius</i>	1	3	1	2	1	1	2	1	12	6

Selection and direct matrix ranking of seven multipurpose medicinal plants was also conducted to know the relative importance of these plants to the local community (Table 8). *Cordia africana* and *Syzygium guineense* were the first and the second ranked multipurpose species. Of the seven-selected use categories, medicinal and fuel wood were ranked first and second.

### 3.4 Health Problems Treated by Medicinal Plants in the Study Area

Medicinal plants in the study area are used to treat 52 ailments (41 human, 8 livestock and 3 both). Most of medicinal plants (78.2 %) are used to treat only human

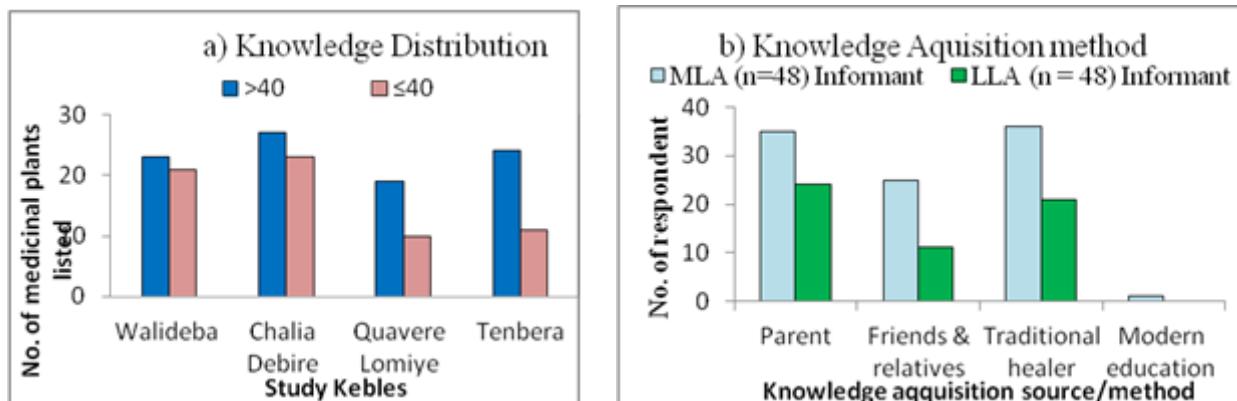
disease while 12 % are used to treat only livestock diseases. Of the total underutilized medicinal plants, 15.8 % are used to treat evil eye. Hepatitis and tumor are also treated by 14 plants each (13.9 %). Wart and "Meftehe serey" (Amh) were also treated by 13 plants each. In addition, impotency for men and stomachache were treated by 9 and 8 plants, respectively. According to informants, the majority of underutilized medicinal plants can be used to treat more than one ailment.

Rabies and poultry disease were the most commonly cited livestock diseases which were reported to be treated by seven (6.9 %) and three (3.0 %) medicinal plants, respectively. Two medicinal plants treated others for example, calf disease (Yetija beshita), bone

**Table 8:** Average direct matrix score of seven medicinal plants and seven use categories in Chilga district, Northwestern Ethiopia

Service category	<i>Cordia africana</i>	<i>Syzygium guineense</i>	<i>Croton macrostachyus</i>	<i>Securidaca longepedunculata</i>	<i>Ximenia americana</i>	<i>Justicia schimperi</i>	<i>Capparis tomentosa</i>	Total Score	Rank
Medicinal	3	4	5	5	3	4	4	27	1
Fuel wood & Charcoal	4	3	4	2	3	4	3	23	2
Fencing	1	2	3	1	2	3	4	16	3
Food	4	5	0	0	5	0	0	13	4
Construction	5	1	1	3	0	0	0	10	5
Farm & household tools	3	1	2	1	1	2	0	10	5
Shade	2	3	2	3	0	0	0	10	5
Total score	20	18	17	15	14	13	11		
Rank	1	2	3	4	5	6	7		

Score criteria: 5 = best, 4 = very good, 3 = good, 2 = less used, 1 = least used and 0 = not used.



**Fig. 2.** Knowledge distribution and transfer methods of medicinal plant in Chilga district, Northwestern Ethiopia.  
MLA=Midland agroecology; LLA= Lowland agroecology

fracture (Tigen / Siberate), emergency/sudden diseases (Abasenga/Qureba) and breast swelling (Yetute ebetete).

### 3.5 Medicinal Plant Knowledge Distribution

The study proved presence of difference in medicinal plant citation among age classes in each study sites (Fig. 2a). Accordingly, elders know better than younger's do. The Spearman's Rank Order Correlation test also confirmed that there was a significant positive correlation between age and medicinal plant list ( $r = 0.587$ ,  $P < 0.01$ ). Majority

of respondents (73%) from Midland agroecology and 50% of respondents from Lowland agroecology indicated that they acquire knowledge from their parent (Fig. 2b). Almost the same proportions of informants got knowledge on medicinal plants from traditional healer. Modern education was the least method of acquisition and transfer in both lowland and midland agroecologies.

The free-list exercise of respondents also shows the presence medicinal plant citation between wealth categories in Quavier Lomiye Kebele (Table 9). Medicinal plant citation of wealthier people were significant ( $p < 0.05$ ) than poorest.

### 3.6 Threats of Medicinal Plants

Plant identification and preference ranking of major medicinal plant threats was conducted based on their destructive effect. Thus, illegal charcoal production (36 total score) and fuel wood collection (31 total score) were the first and second ranked threats (Table 10).

## 4. Discussion

### 4.1 Floristic Composition, Diversity and Distribution of Medicinal Plants

The study area contains high floristic profile of medicinal plant families compared to other semi-arid areas of Ethiopia<sup>28, 33, 35</sup>. Fabaceae is the most widely used family for medicine purpose. Hailermariam et al.<sup>15</sup>, Yineger et al.<sup>32</sup>, also report the higher contribution of Fabaceae family in medicinal value.

Of the total medicinal plants (101), 52 medicinal plants were recorded in the field walk plots from the three land uses. Like the present study, the local community elsewhere in Ethiopia collects medicinal plants both from the wild and semi-wild environments<sup>13, 24, 27</sup> (Girmay et

al. 2012, Yirga 2009). Ethnobotanical studies elsewhere in Ethiopia such as Lulekal et al.<sup>24</sup> and Mesfin et al.<sup>27</sup> in the humid areas, and Adefa<sup>1</sup>, Zenebe et al.<sup>35</sup>, Yirga<sup>33,34</sup> in semi-arid areas of Ethiopia also documented an appreciable number of medicinal plants.

### 4.2 Utilization and Socioeconomic Implication

Herbaceous plants were the most widely used medicinal plants followed by shrubs and trees in the treatment of ailments in the study sites. The wide utilization of herbs is also reported in other areas of Ethiopia (Adefa<sup>1</sup> in Tehuledere district, South Wollo, Ethiopia, Amsalu 2010 in Farta district, North Western Ethiopia, Hailemariam et al.<sup>15</sup> in lowlands of Konta Special Woreda, SNNP of Ethiopia). Contrary to this finding, a greater number of shrubs<sup>24</sup> (Lulekal et al. in Mana Angetu district, Southeastern Ethiopia, Mesfin<sup>27</sup> in Wonago district, southern Ethiopia, Teklehaymanot and Giday<sup>29</sup> in Zegie Peninsula, Northwestern Ethiopia) and trees (Zenebe et al.<sup>35</sup> in Asgede Tsimbila district, Northern Ethiopia) were recorded. This indicates medicinal plant utilization

**Table 9:** Mean ( $\pm$ std) of medicinal plants free-list exercise by wealth classes in Chilga district, Northwestern Ethiopia

Wealth category	Walideba (mean $\pm$ std)	Chalia Debire (mean $\pm$ std)	Kuavier Lomiye (mean $\pm$ std)	Tenbera Kiwa (mean $\pm$ std)
Rich	5.38 <sup>a</sup> $\pm$ 1.18	4.88 <sup>a</sup> $\pm$ 0.85	3.88 <sup>a</sup> $\pm$ 0.72	3.13 <sup>a</sup> $\pm$ 1.22
Medium	4.88 <sup>a</sup> $\pm$ 1.23	4.25 <sup>a</sup> $\pm$ 0.62	2.88 <sup>ab</sup> $\pm$ 0.69	4.13 <sup>a</sup> $\pm$ 1.36
Poor	4.63 <sup>a</sup> $\pm$ 1.59	4.13 <sup>a</sup> $\pm$ 0.93	1.88 <sup>b</sup> $\pm$ 0.52	5.50 <sup>a</sup> $\pm$ 1.67
Over all mean	4.96 $\pm$ 0.75	4.42 $\pm$ 0.45	2.88 $\pm$ 0.40	4.25 $\pm$ 0.81

Means with the same letters ordered vertically are not significant ( $P < 0.05$ )

**Table 10:** Preference ranking of the major threats for underutilized medicinal plants in Chilga district, Northwestern Ethiopia

Major Threats	Respondents (R1-R8)								Total	Rank
	R1	R2	R3	R4	R5	R6	R7	R8		
Illegal Charcoal Production	5	4	5	5	3	5	4	5	36	1st
Fuel Wood	3	5	4	4	4	2	5	4	31	2nd
Construction	2	3	3	3	4	3	2	3	23	3rd
Agricultural Expansion	4	2	1	3	2	4	3	2	21	4th
Over Grazing/ Free Grazing	1	3	1	2	3	3	0	1	14	5th
Fire	0	1	0	1	1	1	1	1	6	6th

Ranking criteria: 1-5 and 5-highly destructive, while 1 not destructive

difference because of variation in culture<sup>8</sup> agroecologies and topographic features<sup>4</sup> and easily availability of the species in question<sup>5</sup>.

More than half of plant remedies in the study area were prepared from roots and leaves. Flatie et al.<sup>13</sup> and Lulekal et al.<sup>24</sup> also found roots take the highest proportion due to the efficacy of roots in treating the ailments. Conversely, leaves were the most widely used parts of plants<sup>1, 2, 28, 32, 35</sup>.

Utilization of a greater number of medicinal plants (101 species) in the study area indicated the strong dependency of the local community on plants to sustain their health care. It also revealed that the endowment and the depth of local people with the associated plant lore. The study conducted in other semi-arid areas of Ethiopia<sup>8,28,35</sup> (Mesin et al. 2009, Yirga 2009) also proved the dependence of the local community especially rural people on plants to keep up their primary health care. The medicinal plants utilized in this area are reported in other areas of Ethiopia. For instance 22 species by Birhanu<sup>6</sup> in Gondar Zuria district, Northwestern Ethiopia; 14 species by Giday (2001) by Zay people, Ethiopia; 31 species by Zenebe et al.<sup>35</sup> in northern Ethiopia; 13 species by Ranguatha and Mequanente (2006) in Northwestern Ethiopia and 7 species by Yirga (2010) in Northern Ethiopia. This proves popularity of medicinal plants in treating ailments.

Medicinal plants were utilized for the treatment of both human and livestock ailments. However, the number of diseases treated and plants used for treatment of human ailments were larger. Adafa (2007) and Zenebe et al.<sup>35</sup> also reported higher number of plants used for treatment of human ailments. Most of the medicinal plants used to treat ailments mixed other plant species. The mixing up of more than one medicinal plant species could attribute to the additive or synergistic effects of the mixtures<sup>32</sup>.

Some medicinal plants were most preferred and commonly used (e.g. *Dorstenia barnimiana* and *Euphorbia abyssinica* were used for treatment of rabies) due to their efficacious and low cost (affordable) for the community for specific ailments. Although some plants were available for rabies vaccine they were not popular by most community. Since, the use of the plants was acknowledged only by a few people. Like the present finding other plants e.g *Flueggea virosa* (Roxb.

ex Willd.) Royle (Zenebe et al.<sup>35</sup> in other areas also used for treatment of rabies virus. Some ailments such as mental problem/ mental disorder (the abnormality of a person mentally or a person unable to do his day to day activities due to illness of the mind), evil spirit (illness of a person due to the force of the devil), Meftehe sery (illness of a person when he given mind distorting plant medicine by other person secretly), evil eye (the evil eye is a specific type of magical curse which is believed to cause harm, illness and even death) and impotency for men were also believed to be cured only by traditional healers using medicinal plants. Similarly, Flatie et al.<sup>13</sup> and Zenebe et al.<sup>35</sup> reported "mental problem" believed to cure only by traditional healers and traditional medicines. Medicinal plants were also used for protection and promotion of human physical, spiritual, social, mental and material wellbeing. For instance, traditional healers used medicinal plants to fix bone fracture in the study area. Similarly, Deribe et al.<sup>8</sup> report the use of medicinal plants for settlement of bone fracture.

Most medicinal plants (67.3 %) in Chilga district provide multiple uses in addition to their medicinal values (food, construction, fence, fuel wood, farm tools and household implements, fodder, timber or commercial purpose and toothbrush). Other researchers elsewhere in Ethiopia also reported multi-purpose roles of medicinal plants<sup>1,21,32,34,35</sup>. Some medicinal plants such as *S. guenees* and *X. Americana* were eaten to supplement the normal food diet. Medicinal plants were also the means of livelihood especially for traditional healers that they fetch income by preparing and selling traditional medicines. Medicinal plants are economically affordable and easily accessible to the rural community and poorest communities. This indicates the contribution of medicinal plants in the livelihood diversification of the local community.

#### 4.3 Knowledge Distribution and Threats of Medicinal Plant

The distribution of knowledge varies between different social categories. There is a positive correlation between age and numbers of plants cited i.e. elders cited higher number of medicinal plants than younger people did. Medicinal plant knowledge increases as age increases due to accumulation of knowledge through

experience<sup>1,21,30,35</sup> (Giday 2001). In contrary, Yineger and Yewhalaw<sup>31</sup> reported the loss of such correlation.

The knowledge of medicinal plant transferred from parents, traditional healers and friend to generations. The report of Bekele<sup>4</sup> and Yirga<sup>33</sup> is in agreement with the present result that parents, traditional healers and friends are the major sources of knowledge. Mostly it is passed to generations orally and in some cases is secretly. Thus, traditional knowledge of medicinal plants might be lost over time.

Agricultural expansion, over grazing, fire and utilization related factors such as fuel wood and charcoal, construction, house and farm implements are the major threatening factors in both agroecologies. Different researchers have also accounted for these threats<sup>4,15,24,27,33</sup>. Furthermore, most of the plants are collected in the natural environments that are subjected to less management and anthropogenic factors<sup>15</sup>.

## 5. Conclusion and Recommendations

Good numbers of medicinal plants were recorded in lowland and midland agroecologies of the study area. These medicinal plants were claimed by KIs to treat 52 (human and livestock) ailments. Majority of medicinal plant used for treatment of ailments were herbs and shrubs. Most of the encountered medicinal plants provide other services including food, fuel wood and charcoal, construction, timber, farm and household implements, generating income from selling the products and their parts. Medicinal plants were suffering from the threats of agricultural expansion, fuel wood, and construction and over grazing in both agroecologies. Thus, conservation activities from local and national level are needed before the extinction of these plants.

## 6. Competing Interest

The authors declare that they have no competing interests.

## 7. Authors' Contributions

MT: conception and design, data collection and analysis, manuscript writing and final approval of the manuscript.

ZA: data analysis, critical revision and final approval of the manuscript. SZ: critical revision and final approval of the manuscript. All authors read and approved the final manuscript.

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