The ethnomedicinal plants used for human ailments at Mojana Wodera District, central Ethiopia

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Abstract. *Abebe M. 2021. The ethnomedicinal plants used for human ailments at Mojana Wodera District, central Ethiopia. Biodiversitas 22: 4676-4686.* An ethnobotanical study was carried out from March 2020 to February 2021 in selected sites of Mojana Wodera District to assess, identifying, and document medicinal plants to treat human ailments. Purposely and volunteer sampling techniques were applied to select 73 practitioners. Of those, 10 practitioners were key informants. Data was collected from informants using semi-structured interviews, focus group discussions, participant observation, and walk-in-the-word. The collected data were entered into an excel spreadsheet for statistical analysis. ANOVA and t-test were applied to compare the knowledge of the informants in different groups. ICF and FL values were calculated to identify the most common human ailments and heal the potential of medicinal plants. The result showed that a higher average (p< 0.05) was recorded for crucial informants, illiterate and higher aged group. Still, there was a significant difference between male and female informants (p=0.032) on knowledge of medicinal plants. A total of 45 medicinal plant species (41 genera and 27 families) were identified to treat 35 types of ailments. From this total, 15.6% were endemic for Ethiopia. Family Euphorbiaceae was dominant (11.1%) for this study. In the finding, the leaf was the most widely plant part which is used to prepare remedies (29.79%), followed by root (28.72%), and the most popular remedy preparation was pounding (31.18%). A higher ICF value (0.78) was recorded for dermatological category ailments, and the highest FL (94.12%) occurred for *Laggera tomentosa*, which was under the therapeutic category of the throat and respiratory.

Keywords: Ailments, ethnobotany, illiterate, key informants, pounding

Abbreviations : FL: fidelity level; ICF: informant consensus factor

INTRODUCTION

The term traditional knowledge is defined as the total of knowledge, skills, attitude, and experiences used in the protection of health as well as in the prevention, diagnosis, and improvement or treatment of physical and social imbalance, and relying exclusively on practical experience, and observation (Marsh et al. 2018). This practice passes verbally or in written form (Battiste 2016; Vansina et al. 2017).

People of different countries globally have indigenous knowledge of various medicinal plants based on the type of disease that occurred in their local environment and locally available plants with their effectiveness for specific ailments (Teka et al. 2020). The uses of traditional medicinal plants have significant advantages to cultural development, acceptability, economic affordability. In addition, these medicinal plants cure certain types of diseases compared to modern medicines (Belayneh and Bussa 2014; Aragaw et al. 2020).

In Ethiopia, about 80% of the people and 90% of livestock depend on traditional medicinal plants to heal different ailments (Asmare et al. 2018; Kidane et al. 2018). This is due to difficulties to gain modern medicine and facilities, high acceptance of the healer by the people, low cost of traditional medicine than modern medicine, and availability of traditional medicinal plants in their local environment for immediate action (Hailu et al. 2020).

Ethiopia reaches in biological resources and has about 6,500 species of higher plants, with approximately 12% endemic (Seid 2019; Wassie 2020). This gives good opportunities for the country where medicinal plants play a significant role in supporting the country's primary healthcare system. However, like other parts of the country, only a minor attempt has been made to explore and document medicinal plants and associated knowledge scientifically. Moreover, the indigenous knowledge of the people and medicinal plants in the study district are at risk by different factors such as an expansion of agriculture, habitat loss, deforestation, climate change, overexploitation, urbanization, and use of plants for firewood and charcoal, etc. In addition to this, the traditional knowledge of medicinal plants has mainly been stored in the aged people, and might been could cause for loss of this golden knowledge of the people in the new generation. In addition to this, no research has been conducted in the study district regarding medicinal plants used to treat human ailments. Thus, the current study aims to explore, identify and document medicinal plant species used to heal human ailments and to document traditional medicinal knowledge of the local people in the study district.

MATERIALS AND METHODS

Description of the study area

The study was conducted in Mojana Wodera District, North Showa zone, Amhara region, central Ethiopia. It is 202 km far from the capital city of Ethiopia, Addis Ababa, and 72 km from the town of North Showa zone, Debre Brehan, in the north direction. The district is bordered with Menze Mama Mider in the north, Menze Lalo Mider in the North West and Menze Keya Geberieal in south, Basona Worena in west and Tarmaber district in the east (Figure 1). The administrative center of the study district is Sela Dingaye, and the elevation of the study district ranges between altitudes of 1459-3172 m above sea level. Traditionally, the study district is divided into three agricultural zones: Dega (28%), Woyna Dega (69%), and kola (3%). The annual rainfall of the districts ranges from 800-1000 mm, and the annual temperature ranges from 10-18°C.

Demographic

The district has a total population of 83814 (44,489 (53.08% men) and 39325 (46.92% women), of whom 7799 (9.31%) are urban inhabitants. Most people's economic income depends on both crop production and livestock. Most people are followers of Ethiopian Orthodox Tewahedo Christianity (99.94%), and the remaining 0.059% are followers of Protestantism.

Informant selection

A total of 73 (51 males and 22 females) informants were selected from seven district sites. Purposive and volunteer sampling techniques were applied to choose the representative general informants and key informants suggested by (Mitchell et al. 2018). The informants' age ranges from 17-85 years old (33 were between 17-39 years old; 24 were between the ages 40 and 59; the other 16 informants were 60 and above years old). In addition, a total of 10 key informants were selected based on the information gotten from the community members, informants themselves, and elders about their better knowledge.

Data collection

An Ethnobotanical survey was conducted from March 19, 2020, to February 10, 2021 (in all seasons) to collect plant specimens in flowering and availability. The data were collected using semi-structured interviews, focus group discussions, participant observation, and walk-in-the-word with their local language, Amharic. Information regarding local names of medicinal plants, part of the plant used for medicine, gathering and preparation methods, the dosage used, diseases treated, route of application, use of the plant other than medicinal uses, and management methods were recorded at the spot. The collected data was dried, deep-frozen, and identified at the national herbarium of Ethiopia in Addis Ababa University.
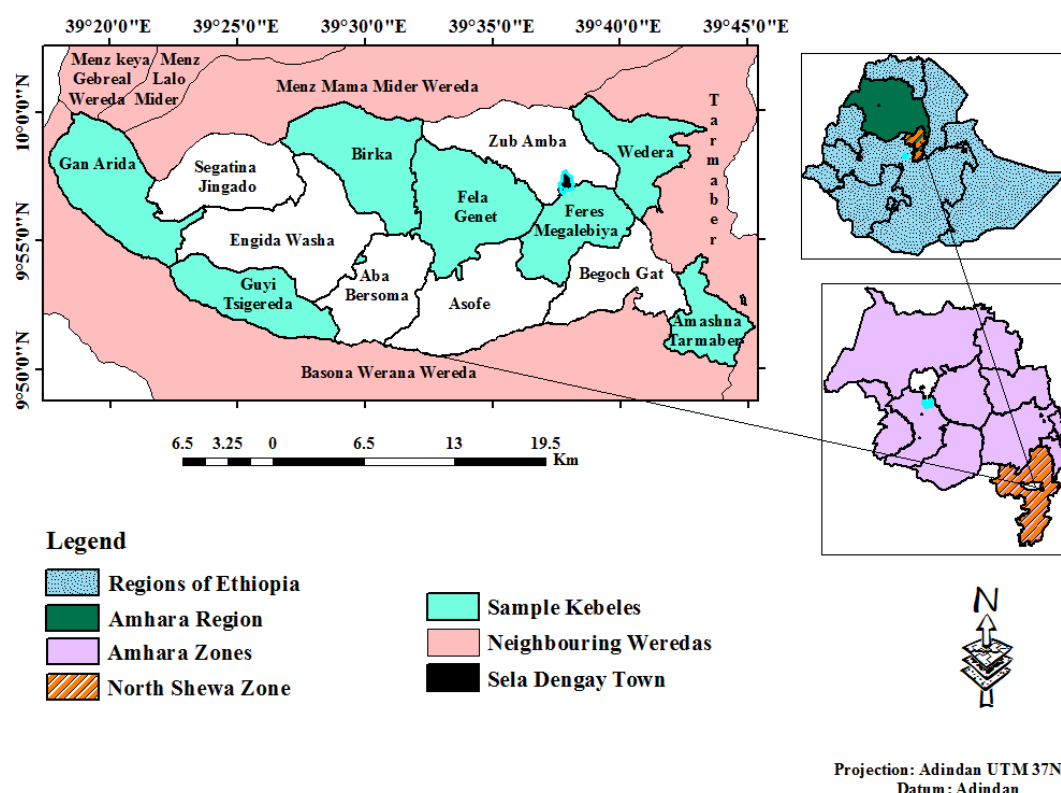

Figure 1. Map of the study in Mojana Wodera District, North Showa zone, Amhara region, central Ethiopia

Data analysis

The data gained from informants were entered to excel spreadsheet software (Microsoft Corporation 2010) and organized for statistical analysis. The descriptive statistical method was employed to analyze and summarize the ethnobotanical data obtained from the interviews and observation, such as medicinal value, methods of preparation, application, disease treated, route of application, the dosage of medicine, and growth forms of and parts of the plants. Traditional knowledge differences between men and females, young and elder, illiterate and educated informants were analyzed using t-test and one-way ANOVA (SPSS software, version 20) at a 95% confidence level. Informant Consensus Factor (ICF) values were applied to determine the most common human ailment categories that occurred in the district and identify potentially effective medicinal plant species in respective disease categories as mentioned by (Lulekal et al. 2013). The ICF was calculated as follows: Number of use citations in each category (nur) minus the number of species used (nt), and divided by the numbers of use citations in each category minus one (Cerqueira et al. 2020)

$$ICF= n_{ur-nt}/n_{ur}-1$$

Preference ranking was done to evaluate the effectiveness of certain medicinal plants against the most prevalent disease in the study district.

The relative healing potential of each identified medicinal plant were calculated by using the formula: $FL= Ip/Iu *100$, where FL is fidelity level index, Ip is the number of informants who cited the importance of the species to treat a particular ailment, and Iu is the informants who cited the species for any ailments (Tounekti et al. 2019).

RESULTS AND DISCUSSION

Indigenous knowledge of the people to medicinal plants

Key informants reported significantly higher averages ($p < 0.05$) than general informants. Significance difference ($p < 0.05$) was observed in naming of medicinal plants between the illiterate informants and primary education informants; at the same time, there was also a significant difference ($p < 0.05$) between informants of informal education and primary education informants. Illiterates and casual education informants could name more medicinal plants. But, there was no significant difference observed in other educational levels. There was a significant difference ($p < 0.05$) between the age groups to nominate medicinal plants. On average, the informants above 60 years were nominated a higher number of plants, followed by 40-59. Even though men informants reported more medicinal plants than females, there was no significant difference ($p = 0.032$) between the average reported by men and females.

Diversity of medicinal plants

A total of 45 medicinal plant species belonging to 41 genera and 27 families treated 35 human ailments. Family Euphorbiaceae was the leading 5 (11.1%) Plant species, followed by family Asteraceae 4 (8.9%) plants species. Family Lamiaceae, Rutaceae, and Solanaceae were represented by 3 (6.7%) plants species each. The other 5 families (Aloaceae, Apocynaceae, Cucurbitaceae, Myrsinaceae, and Myrtaceae) were represented by 2 (4.4%) species each, and the remaining seventeen families had a single species (Table S1).

Growth habit and their habitat

Regarding their growth form, herbs were the most harvested to treat human aliments and represented with 18 (40%) species, followed by shrub 14 (31.1%) and tree 11(24.4%) species, respectively. On the other hand, the climber was a minor plant habit 2 (4.4%), used to treat human ailments in the study district (Figure 2). From the total of 45 plant species, 25 (55.6%) plant species were obtained from the wild, 14 (31.1%) from the home garden, and the remaining 6 (13.3%) were obtained from both wild and home gardens (Figure 3).

Endemics of the plants for Ethiopia

Of the 45 plant species recorded in the study district, 28 (62.2%) plants species were indigenous to Ethiopia, and the other 10 (22.2%) plant species were introduced. The remaining 7 (15.6%) plants species were Endemic for Ethiopia.

Parts of plants used to prepare remedies

In the study district, the most widespread plant parts used to prepare remedies was leaf (29.79%) followed by root (28.72%), fruit (15.96%), bulb (6.38%), Latex (5.32%), all parts (4.26%) and seed (3.19%) respectively. In addition, the reaming sap and stem were contributed for (2.13%) remedies preparation while Bark and flower were contributed for (1.06%) heals practice (Figure 4).

Mode of preparation and routes of administration

Various methods of remedy preparation were employed by the practitioners depending on the type of ailments. The most popular mode of remedy preparation was pounding (29 in frequency, 31.18%), followed by smashing (15, 16.13%), squeezing (10, 10.75%), respectively (Figure 5). Regarding the routes of administration, the oral application was the most common type of administration 46(52.87%) followed by dermal 21(24.14%), nasal 14 (16.09%), anal 5(5.75%), and ocular 1 (1.15%) respectively (Table S1).

Dosage and antidotes

In the study district, the practitioners did not use standardized measurement units even though they are used different traditional measurement methods such as SHEKENA, SENE, SENZER, etc. In addition, the system of the measurement varies depending on the age and sex of patients.
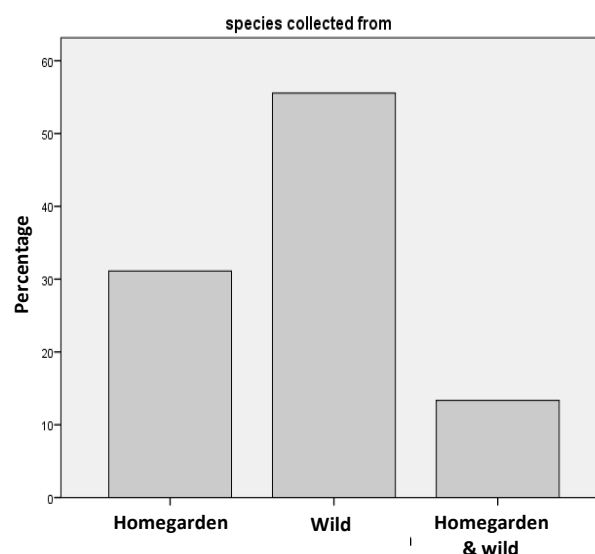
Figure 2. The habit of the plant
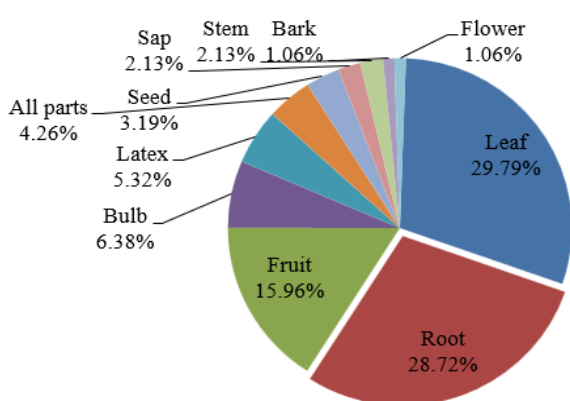

Figure 3. Habitat of the plant

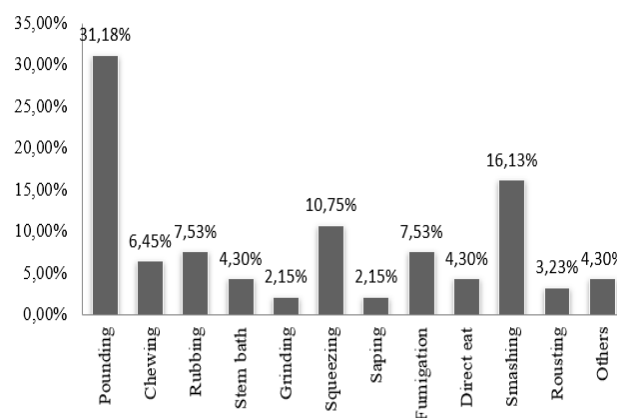**Figure 4.** Plant parts used to treat human ailments

Figure 5. Mode of preparation of medicinal plants

Marketable medicinal plants

A survey took place in five local markets of the district (Seladingaye 01, Sasit, Asofe, Begochgate, and Tarmaber). The result showed that, from the total of 45 plant species, 26 (57.78%) were marketable. Out of these 26 (57.78%), medicinal plant species were reported as commercial; only 4 (15.38%) species (*Echinops kebericho*, *Embelia schimperi*, *Hagenia abyssinica*, and *Lepidium sativum)* were sold and purchased entirely for medicinal purposes. The remaining 84.62% were sold for various food, fence, firewood, timber, beverage, spice, etc. (Table S1).

Efficacy of medicinal plants

From the total of 35 human ailments that occurred in the study district, 10 categories were identified based on humans' effects. Among these categories, the highest ICF value was recorded for the dermatological category (0.78), followed by gastrointestinal and parasitic disease and evil spirit with ICF values of 0.76 each. Conversely, the least ICF (0.5) value was recorded for musculoskeletal and

nervous systems categories (Table 1).

The healing potential of medicinal plants

The highest fidelity level (94.12%) was recorded for *Laggera tomentosa*, which was obtained under the therapeutic category of the throat and respiratory; followed by *Capsicum annuum* (93.75%; obtained under gastrointestinal and parasitic), *Carissa spinarum* (91.67%; obtained under animal bite disease), and *Croton macrostachyus* (90.91%); under the therapeutic category of dermatology (Table 2).

Preference ranking

Based on the information obtained from 10 key informants, *Acmella caulirhiza* was the preferable medicinal plant to treat abdominal pain, the most frequently reported disease under the category of gastrointestinal and parasitic, followed by *Ruta chalepensis* and *Thalictrum rhynchocarpum* (Table 3).

Direct matrix method

Direct matrix ranking (DMR) was done for 9 multipurpose medicinal plants to identify the most under pressure medicinal plants and the corresponding factor that threaten the plants. Accordingly, *Olea europaea* was the most threatened in this study, followed by *Croton macrostachyus* and *Eucalyptus globulus.* According to this study, the most factors for the exploitation of medicinal plants were firewood, construction, and charcoal, respectively (Table 4).

Discussion

A comparison of medicinal plant knowledge between communities was held. The result showed that a significant difference was observed between key and general informants. The cause for this higher difference could be the result of experience and the use of different references (Chekole 2017; Kidane et al. 2018). A significant difference was also observed between illiterate informants and primary education informants and informal education and primary education informants. The cause could be primary education informants did not give attention to traditional medicine. Instead, they prefer the modern types of medication in compression. The same finding was reported by (Eshete et al. 2016; Miara et al. 2018; Mbuni et al. 2020). Even though the average result varies in other groups of informants, it was not significant.

Table 1. Informant Consensus Factor (ICF) value of medicinal plants to treat human ailments in the study districts

Disease category	No. of plant species	% of plant species	Use citations	%use citations	ICF
Dermatological	15	33.33	64	22.54	0.78
Gastrointestinal and parasitic diseases	13	28.89	52	18.31	0.76
Evil sprit	6	13.33	22	7.75	0.76
Throat and Respiratory	14	31.11	54	19.01	0.75
Animal bite disease	9	20.00	32	11.27	0.74
Bleeding and toothache	5	11.11	14	4.93	0.69
Mechanical injury	3	6.67	7	2.46	0.67
Febrile	4	8.89	10	3.52	0.67
Internal disease	9	20.00	22	7.75	0.62
Musculoskeletal and Nervous system	4	8.89	7	2.46	0.5

Table 2. Fidelity level of medicinal plants for a given ailments

Medicinal plants	Therapeutic category	Ip	Iu	FL value
Croton macrostachyus	Dermatological	20	22	90.91
Capsicum annuum	Gastrointestinal and parasitic	15	16	93.75
Carissa spinarum	Animal bite disease	11	12	91.67
Allium sativum	Gastrointestinal and parasitic	12	14	85.71
Echinops kebericho	Evil sprit	6	7	85.71
Artemisia abyssinica	Evil sprit	7	9	77.78
Ocimum lamiifolium	Febrile	4	6	66.67
Verbascum sinaiticum	Animal bite disease	10	12	83.33
Laggera tomentosa	Throat and respiratory	16	17	94.12
Verbena bonariensis	Febrile	4	5	80.00

Table 3. Preference ranking of medicinal plants to treat abdominal plain

Types of medicinal plants	Informants labeled A to J										Total	Rank
	A	B	C	D	E	F	G	H	I	J		
Acmella caulirhiza	8	6	5	8	5	6	5	8	4	6	61	1
Ruta chalepensis	5	7	6	3	8	4	7	3	8	7	58	2
Thalictrum rhynchocarpum	3	8	8	6	4	8	3	7	5	5	57	3
Capsicum annuum	7	1	3	7	3	5	1	6	7	8	48	4
Citrus aurantiifolia	6	4	2	5	7	2	6	5	6	3	46	5
Allium sativum	2	3	4	4	6	7	8	1	3	4	42	6
Carissa spinarum	4	5	7	1	2	1	2	4	1	1	28	7
Lepidium sativum	1	2	1	2	1	3	4	2	2	2	20	8

Note: Scores in the table are based on their efficiency to cure abdominal pain. I.e., number 8 indicate high effectiveness, and 1 shows minor point according to the informants

Table 4. Average DMR scores of 10 critical informants for 9 medicinal plants and their different uses with factors that threaten their exploitation

Use diversity	*B. abyssinica*	*C. myricoides*	*C.abyssinica*	*C. spinarum*	*C.macrostachyus*	*E. globulus*	*M. lanceolata*	*M. arbutifolia*	*O. europaea*	Total	Rank
Firewood	4	4	5	5	4	5	4	5	5	41	1
Construction	2	3	2	3	5	5	3	3	5	31	2
Charcoal	3	2	3	4	5	5	4	2	2	30	3
Fence	1	3	3	4	3	5	3	3	4	29	4
Medicinal	2	3	4	4	5	2	3	3	3	29	4
Agricultural tool	2	2	1	1	4	4	1	4	5	24	6
Food	0	3	1	4	1	0	0	1	4	14	7
Total	14	20	19	25	27	26	18	21	28		
Rank	9	6	7	4	2	3	8	5	1		

Note: 5: Best; 4: Very good; 3: Good; used; 1: lest used 0: no value.

This study also showed that a significantly higher average number of medicinal plants ($p < 0.05$) was reported by the age above 60 and 40-59. Generally, this finding revealed that the knowledge of medicinal plants declined from elder to younger informants. During the interview and collection of medicinal plants, the interest and belief of the elder informants to express their effectiveness were high. In contrast, the youngest informants showed low interest (Araújo et al. 2018). The main reason for this common interest of the youngest informants was an expansion of modern medication. Thus, decreasing positive attitude towards medicinal plants is an indication of the erosion of medicinal plants. The same finding was conducted in Tefera et al. (2019) and Azis et al. (2020). Regarding sex, the informants do not have significant differences in the naming of medicinal plants ($p =0.032$). This finding agrees with the result of Alalwan et al. (2019).

In the present study, a total of 45 medicinal plants and their uses were documented. This indicates the study district is reached in biodiversity. Regarding families, Euphorbiaceae and Asteraceae have accounted for the highest number (Temam 2019). This indicates that the availability of these families in the study district showed the family's effectiveness in treating different ailments compared to other families.

The high usage of herbs for medicinal plants to treat different health problems indicates the availability of herbs than trees and shrubs in the study district. The same finding was reported by (Giday et al. 2016). Out of the total listed medicinal plants in the study cites about 55.6% were obtained from the wild (Wondie 2018; Yohannis et al. 2018). In the study district, medicinal plants harvested from the wild are highly affected by factors such as the expansion of agriculture, urbanization, and natural elements. This causes the loss of many medicinal plants from the districts. In turn, this loss of medicinal plants causes the youngest practitioners' degradation of medicinal plant knowledge (Yohannis et al. 2018; Aman et al. 2020; Mosissa and Atinafu 2021).

The result showed that 77.8% of medicinal plants were endemic and indigenous to the country. This means the practitioners were familiar with the plant, which is available in their local area than exotic species. This indicated that the knowledge of medicinal plants is not recent; instead, it passes from generation to generation (Tuasha et al. 2018).

This study also revealed that leaf and root were the main plant parts used to treat human ailments (Araya et al. 2015). Using the leaf is simple to prepare and to extract the chemicals from it for remedies. At the same time, it has a more negligible effect on mother plants. The current study agrees with the work of (Ahmed et al. 2016). However, using root for preparation of remedies cause for loss of mother plants it will also cause for the local extinction of the plants. The same result was reported by (Agisho et al. 2014).

The result showed that the pounding method of remedies preparation was dominant for the study district, followed by the smashing method. Pounding method remedies preparation has a significant advantage in preserving it in powder, essential during the dry season. This finding coincided with the result by Gebre (2018), Demssie (2020), Taha and Woldeyohannes (2020). Regarding on mode of administration, the oral application was dominant, followed by dermal and nasal. Both oral and nasal routes of administration are considered to undergo rapid physiological reactions with the causative agents and increase the curative power of the remedies. This finding agrees with the result of Chenthamara et al. (2019). In addition to this, the herbalist applied the treatments on the skin if the illness was dermal. Most of the time, water is used to process the plants as universal solvents. However, some plant parts didn't require water to process.

Regarding the dosage of the remedies, the practitioners had their measurement tools, which were not scientific. This unscientific measurement could lead to erroneousness. However, the practitioners have used antidotes if the remedies hurt the patient.

The result showed that about 42.22% of medicinal plants were not purchased for either medicinal or other uses in the district. Of the total of 57.78% marketable medicinal plants, only 15.38% were purchased for therapeutic value. The remaining 84.62% were available for different purposes other than medicinal value. The only medicinal plants purchased for traditional medicinal value were *Echinops kebericho, Embelia schimperi, Hagenia abyssinica,* and *Lepidium sativum.* This indicates that most medicinal plants are harvested from the wild when people want to use them for health care. Medicinal plants of the district are under pressure because the people use them for income generation and other uses in their homes. The current result agreed with the finding of (Lulekal et al. 2013).

Best agreements among informants on medicinal plants were reported to treat dermatological, gastrointestinal & parasitic diseases and evil spirits, respectively (with ICF values of 0.78, 0.76, and 0.75, respectively). The result assured that these diseases are frequent and familiar for the district. At the same time, it also confirmed the effectiveness of the listed medicinal plants to treat these ailments. In other words, the plants cited by critical informants were bioactive for ailments for the above disease.

The highest-fidelity levels for *Laggera tomentosa* (94.12%) to treat throat and respiratory disease, *Capsicum annuum* (93.75%) to treat gastrointestinal and parasitic disease, *Carissa spinarum* (91.67%) to treat animal bite disease, and *Croton macrostachyus* (90.91%) to treat dermatological disease. The highest value of fidelity level indicated the high healing potential of the plants to related diseases.

Abdominal pain was the most frequent disease in the districts. To treat this ailment, a total of 8 medicinal plants were used. *Acmella caulirhiza* was the most effective medicinal plant to treat abdominal pain, *Ruta chalepensis*, and *Thalictrum rhynchocarpum*. These medicinal plants also were more effective in treating other ailments. The result showed that the biochemical of the plants have the potential to treat other health.

According to the direct matrix ranking result, *Olea europaea, Croton macrostachyus*, and *Eucalyptus globulus* were the most threatened medicinal plant species. As a result, these multipurpose plants are exploited more for their nonmedicinal uses, such as firewood, construction, charcoal, etc. The benefits of medicinal plants for purposes other than their medicinal values have a significant effect on the survival of the plants. The same finding occurred in (Giday et al. 2003).

The district was reached in medicinal plants and endemic plant species diversity, but the attempt to conserve these medicinal plants and indigenous knowledge of the people was not significant. On the other hand, at the moment of expansion of agriculture, urbanization dramatically affects the survival of these medicinal plants in the district. So the district requires special attention from the government and stakeholders as well as the people are mandatory. It also suggested healers' association which professionals support, and the government should encourage in situ and ex situ conservation strategies for medicinal plants of the districts.

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Table S1. Additional file (scientific name, family name, local name, additional use, parts used, used to treat, mode of preparation and mode of application)

Code no.	Scientific name	Family name	Local name	Other uses	Parts used	Used to treat	Preparation	Taken through
M4	*Acmella caulirhiza* #	Asteraceae	Yemider berebere	M	R	Abdominal pain	Direct chewing the fresh root	O
					Fl, R	Tonsillitis	Chewing the root and flower	O
M5	*Acokanthera schimperi* (A.DC.) Schwein #	Apocynaceae	Merenze	M,SPI	R	Hemorrhoids	Pound the root and put it on the affected part.	An
					L	Tumor	Extract liquid from the leaf by squeezing the drink and spill on the affected part	O, Dr
M19	*Allium sativum* *	Alliaceae	Nechi shenkurt	FO, SPI, M	Bu	Abdominal pain	Pound the bulb and mix with water and drink it	O
					Bu	Evil eye	Chewing the bulb	O
					Bu	Common cold	Peel the bulb and insert it in the hole of nose	Na
					Bu	Granule	Cut bulb then rubbed on the affected part	Dr
					Bu	Dandruff	Include in our daily food	O
					Bu	Toothache	Pound and hold with teeth	O
M11	*Aloe pulcherrima* Gilbert and Sebsebe @	Aloaceae	Sete eret	M	Sa	Snake bite	Take the sap with mouth	O
M6	*Aloe trichosantha* #	Aloaceae	Wende eret	M	Sa	Snake bite	Take the sap with mouth	O
M8	*Artemisia abyssinica* #	Asteraceae	Chiqugn	M	L	Evil eye	Sniff the fresh leaf	Na
					L and S	Cough	Pound the leaf and stem then drink its extracts	O
					L and S	Fever	Pound the leaf and stem then drink its extracts	O
M10	*Becium grandiflorum* (Lam.) Pic.Serm @	Lamiaceae	Muatishe	FIW, M	L	Pneumonia	Pound the leaf; then extract the liquid and drink it.	O
M7	*Bersama abyssinica* #	Melianthaceae	Azamer	FIW, M	R	Rabies	Pound the root then drink the extract and put the decoction on the bite site	O, Dr
M9	*Calotropis procera* (Ait.) Airf #	Asclepiadaceae	Kinbo	M	L	Hemorrhoids	Rubbed the latex on the affected parts.	An
					R	Hemorrhoids	Pound the root and incarceration on the affected part	An
					La	Wound	Take single oral dose dry latex	O
					La	Wound	Put the latex on the affected part	Dr
M14	*Capsicum annuum* L.*	Solanaceae	Berbere	FO, SPI, M	Fr	Abdominal pain	Grind it and drink it with water	O
					Fr	Toothache	Grind the fruit then put on the affected part and hold with teeth	O
					R	Evil eye	Pound the root and put it on the fire then sniff it.	Na
M18	Carica papaya *	Caricaceae	Papaya	FO,M	Fr	Heartburn	Eat the fruit	O
					Fr	Granule	Smear on the affected part	Dr
M15	*Carissa spinarum* L. #	Apocynaceae	Agam	FEN, FIW, M	R	Snake bite	Pound the root then drink the extract	O
					R	chest pain	Boiled the root and drunk the extract	O
					R	Rheumatism	Pound the root incarceration on the affected part	Dr
					R	Toothache	Chewing the root	O
					R	Abdominal pain	Chewing the root	O
M12	*Citrus aurantiifolia* *	Rutaceae	Lomi	FO, M	Fr	Abdominal pain	Squeezed the fruit and drunk its extract.	O
					Fr	Vomiting	Squeezed the fruit and drunk the liquid of it	O

M17	*Citrus aurantium* *	Rutaceae	Comtate	FO, M	Fr	Vomiting	Squeezed the fruit and drunk the liquid of it	O
M13	*Clerodendrum myricoides* (Hochst.) Vatke #	Lamiaceae	Miserch	FIW,M	Al	Asthma	Pound all parts then drink the extract	O
					Al	hemorrhoids	Pound all parts then put on the affected parts	An
M16	*Clutia abyssinica* Jaub. & Spach. #	Euphorbiaceae	Fyele fegi	FIW, M	Al	Cancer	Pound all parts and extract its decoction then drink it.	O
					R	Snake bite	Pound and extract its decoction. Then .0put on the decoction on the affected parts.	Dr
M23	*Coffea arabica* #	Rubiaceae	Buna	FO, M	Se	Headache	Roust the seed and pound; then boil with water. then drink it	O
					Se	Diarrhea	Roust the seed and pound it then mix with milk. Then drink it	O
M22	*Croton macrostachyus* Del. #	Euphorbiaceae	Besana	TIM FIW, M	L	Allergic	Rubbed with the liquid of the leaf on the affected part	Dr
					L	Wart	Smashed the leaf and put on the affected part	Dr
					R	Dandruff	Pound its root then put on the affected part	Dr
					L	Snake bite	Extract the liquid by smashing immature leaf and drink it. The remaining crude put on the affected part.	O, Dr
					L	Eye diseases	Immature leaf is smashed and put on the affected eye	Oc
M21	*Cucumis ficifolius* #	Cucurbitaceae	Yemider enmbuye	M	R	Tumor	Pound the root and incarceration on the affected parts.	Dr
M26	*Cucurbita pepo* *	Cucurbitaceae	Duba	FO,M	Fr	Dizziness	Eat the fruit after cook it	O
M27	*Cyphostemma* sp.@	Vitaceae	Aserkushe tebtebkushe	M	R	Tumor	The root is pounded and tied on affected part	Dr
M24	*Datura stramonium* L.*	Solanaceae	Astengere	M	L	Scabies	The leaf is Smashed and put its extract on the affected part.	Dr
M25	*Echinops kebericho* @	Asteraceae	Kebercho	M	R	Evil eye	The dry root is put on the fire then sniff the smoke	Na
					R	Diarrhea	The dry root is put on the fire then sniff the smoke	Na
M20	*Embelia schimperi* #	Myrsinaceae	Enkoko	M	R, Fr	Asthma	Dry fruit and root put on the fire and sniffed it	Na
					R,Fr	Tania	The fruit and root pound then drink by mixing with water.	O
M28	*Eucalyptus camaldulensis* *	Myrtaceae	Keye beharzafe	TIM, FIW,M	L	Common cold	Boil in water and fumigated it.	Na
					L	Pneumonia	Boil in water and fumigated it.	Na
M30	*Eucalyptus globules* Labill *	Myrtaceae	Nech beharzafe	TIM, FIW,M	L	Common cold	The leaf is boiled in the water and fumigated it.	Na
					L	Pneumonia	The leaf is boiled in the water and fumigated it.	Na
M32	*Euphorbia tirucalli* L. #	Euphorbiaceae	Kenchib	M	R, La	Rabies	Pound the root then mix with its latex then drink it	O
M35	*Euphorbia abyssinica* #	Euphorbiaceae	Kulkual	M	R, La	Gonorrhea	Pound the root and mix with its latex then rubbed on the affected part	Dr
					R, La	Hemorrhoides	Pound the root and mix with its latex then rubbed on the affected part	An
M36	*Hagenia abyssinica* #	Rosaceae	Koso	M	Fr	Tania	Pound and mix with water and drunk it	O
M31	*Hordeum vulgare* #	Poaceae	Gebse	FO, BE,M	L	Dandruff	Pound the leaf and then smear n the affected part	Dr

M38	*Kalanchoe petitiana* @	Crassulaceae	Endahula	M	L	Tumor	Heat the leaf on the fire the put it on the affected part	Dr
M37	*Laggera tomentosa* (Sch.Bip. ex A. Rich.)Olivo @	Asteraceae	Kesekeso	M	L	Tonsillitis	Smashed and squeezed the life and extract its decoction and drink it.	O
					L	General malaise "Mich"	Smashed and squeezed the life and extract its decoction and drink it.	O
M34	*Lepidium sativum* *	Brassicaceae	Feto	M	Fr	Abdominal pain	Pound and mix with water and drink it	O
M33	*Maesa lanceolata* Forssk. #	Myrsinaceae	Feto Kelewa	FIW,M	Fr, Se	Ascaries	Pound and mix water and drink it	O
M29	*Maytenus arbutifolia* (A. Rich.) Wilczek @	Celastraceae	Atate	FIW, M	Ba, R	Evil eye	Put on fire and sniff it	Na
M41	*Musa acuminata* #	Musaceae	Muz	FO, M	Fr	Granule	Smear the affected parts with peel of banana.	Dr
M39	*Ocimum lamiifolium* Hochst. Ex Benth #	Lamiaceae	Muz Damakese	M	L	Tonsillitis	Smashed and squeezed the life and extract its decoction and drink it.	O
					L	General malaise "Mich"	Smashed and squeezed the life and extract its decoction and drink it.	O
M40	*Olea europaea* L.subsp. *cuspidate* (Wall. Ex G.Don #	Oleaceae	Weyera	FIW,M FUM	L	Tonsillitis	Smashed and squeezed the life and extract its decoction and drink it.	O
M44	*Rhamnus prinoides* #	Rhamnaceae	Gesho	BE, M	L	Tonsillitis	Smashed and squeezed the life and extract its decoction and drink it.	O
M43	*Ruta chalepensis* L. #	Rutaceae	Tenadam	SPI, M	Fr	Abdominal pain	Pound it and drink it with water	O
M42	*Solanum marginatum* L.#	Solanaceae	Enbuaye	M	L	nosebleed	Smashed the leaf and insert in the hole of nose	Na
					L	Bleeding	Smashed and put it on the affected part	Dr
M45	*Thalictrum rhynchocarpum* Dill. & Rich. #	Ranunculaceae	Sere bizue	M	R	Abdominal pain	Chewing the root	O
M2	*Tragia cinerea* #	Euphorbiaceae	Albelabit	M	R	Tumor	Pound the root and put it on affected part	Dr
M1	*Verbascum sinaiticum* Benth. #	Scrophulariaceae	Yeaheya joro	M	R	Evil eye	put the root on fire and sniffed it	Na
					L	Scabies	Smashed the leaf and extract its decoction then spill it on the affected part	Dr
					R	Snake bite	Pound the root and mix its extract wit water then drink it	O
M3	*Verbena bonariensis* #	Verbenaceae	Hulegebe	M	Al	Snake bite	Pound and drink its extract with water	O
					L	General malaise "Mich	Smashed the leaf and extract its decoction then drink it.	O
					L	Epilepsy	Put the leaf on the fire and sniffed it	Na

Note: For Ethiopia (Endmic (@), indigenous (#) and introduced (*)); Plant part (leaf (L), root (R), all part (Al), flower (FL), bulb (BU), sap (Sa), stem (S), latex (La), fruit (Fr), seed (Se) and bark (Ba); Uses (medicinal (M), spice (SPI), food (FO), firewood (FIW), fence (FEN), timber (TIM), beverage (BE) and fumigation (FUM); Mode of application (oral (O), anal (An), dermal (Dr) andnasal