

Review Article

Study on Medicinal Plant Use and Conservation Practices in Selected Woreda around Harar Town, Eastern Ethiopia

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Abstract

An ethnobotanical data was collected from August, 2022 to April, 2023 on the use and conservation of medicinal plant. Medicinal plants are dominantly used in the healthcare system and easily accessible source of treatment. Purposive sampling technique was used to select a total of 120 knowledgeable respondents with different age groups. Data were analyzed using descriptive statistical methods. Most of the respondent had formal education and (58.33%) of them were used medicinal plant for regular treatment. Forty two medicinal plant species belonging to 26 Families were identified and documented. The most dominant families were Solanaceae (5) followed and Fabaceae. Home garden (38.33%) is a principal method of cultivation medicinal plant whereas road side is least methods of cultivation. Herbs (45.24%) were mostly occurred growth habits of medicinal plant. Leaf (38.67%) was the most common plant part used followed by root (18.67%). Dominantly used method of preparation traditional medicinal plant product is pounded (28.04%) followed by crushing (14.63%). Oral (49.28%) is the dominantly route of administration plant remedies. The cause that threatens medicinal plants and associated knowledge are natural and human factors. Most commonly causes of threatened to medicinal plants and associated knowledge were urbanization, agricultural expansion, lack of awareness to the community, Charcoal production, firewood, construction, modern health expansion, drought and overgrazing. Sixty one percent of the respondents clarify that no attempt for conservation of medicinal plants and (38%) of them have conservation attempt on medicinal plants.

Keywords: Medicinal plant; Use; Ailment; Conservation; Threatened; Harar

Introduction

Medicinal plant is any plant which, in one or more of its organs, contains substances that can be used for therapeutic purposes or which are precursors for the synthesis of useful drugs. Those plants play an important role in the maintenance of health, well-being, livelihood and every day-to-day life of a population worldwide [1]. Medicinal plants are dominantly used in the healthcare system and easily accessible source of treatment in the world [2]. These plants are the base for development of new pharmacopoeial and non-pharmacopoeial drugs, which providing a vital contribution to human and livestock health care [3]. Throughout the centuries plant leaves, stems, flowers, seeds, fruits, shots, latex, barks and roots were used for healing and managing of various human and livestock ailment.

Ethiopia has amazing and long history of using traditional medicinal plants for their primary health care system and treating various ailments in the country [4]. From the beginning of humanity, indigenous people have developed their own local specific knowledge on plant use, management and conservation [5]. Around Harar town medicinal plants are widely used and practiced in health care system but this medicinal plant resources and knowledge may be threatened due to the rapid environmental degradation, cultural and socio-economic changes, death of elders and urbanization. Lack of systematic conservation, research, influence of modern

health expansion, sustainable utilization and written documents may cause to threatened medicinal plant and indigenous knowledge [6]. It is important to conduct significant study and documenting as well as recommend an appropriate conservation measure and sustainable utilization of medicinal plants and associated knowledge. However, there is no comprehensive systematic study on the use and conservation practices of medicinal plants in the current study districts. Therefore, the present study aims to fill this gap through documenting indigenous knowledge on medicinal use, methods of preparation, routs of administration, and conservation practices of medicinal plants around Harar town.

Materials and Methods

Description of study area

The age-old, historic town of Harar and its surrounding is situated in eastern part of Ethiopia, 525 km from the capital city, Addis Ababa. Harar town was founded 1000 years ago (UNESCO, 2006). The dominant in the town and its vicinities are Oromo and Harari communities. Topographic feature of Harar and the surrounding is dominated by mountainous and undulating landforms, including rugged terrain, steeply sloping hills and valley bottoms. In this age-old and historic place, a peculiar mountain locally called Gaara Hakiim (in Afaan Oromo) or Aw Hakim (in Harari language) is abounding with main source of medicinal plants. The average annual daily temperature of the area is 19.3°C, while the annual average minimum and average maximum daily temperatures are 13.1°C and 25.3°C respectively. There is high variability of annual rainfall, ranging between 275 mm to 1000 mm and the average annual rainfall being 669 mm. The rainfall pattern of the area is bimodal, occurring from February to April (short rainy season) and June to August (long rainy season).

Study site

The study was conducted from August, 2022 to April, 2023 in selected Woreda around Harar town. Those selected Woredas were

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Erer Woreda, Sofi Woreda, Shankor Woreda and Abadir Woreda. Purposive sampling techniques were used to select the study Woreda.

Sampling techniques and data collection methods

Sampling techniques: Purposive sampling technique was used to select a total of 120 knowledgeable respondents with different age groups, where they have been provided their comprehensive ethnomedicinal knowledge, use and conservation of medicinal plant species. Twenty four (16 men and 8 women) key informant were selected using community leader, elder people and herbalists [7]. Samples of all medicinal plant species encountered in the study were collected and recorded in their local names and later converted into the scientific name based on researcher own experience, referring to "Useful Trees and Shrubs for Eritrea" [8] and useful trees and shrubs for Ethiopia and Flora of Ethiopia [9,10].

Data collection methods: Ethnobotanical data were collected from August, 2022 to April, 2023 on the use and conservation of medicinal plants by the people with their indigenous knowledge from selected Woreda following [5,7]. The key informants share their knowledge on the method of preparation, plant parts used and route of administration remedy of different medicinal plants that are used to treat health problems. Semi-structured interviews were conducted with 120 respondents and group discussions were administrated by the local language to collect ethnobotanical data. The detailed information of ethnobotanical data collected were sex, age, medicinal plant and parts used, methods of preparation, and route of administration, conservation and threats of medicinal plants. Interviews with key informants were also carried out in the field in order to validate the data and to avoid the likely chance of confusing identities of plant species by repeated inquiries. These activities were done twice with the same and different respondents to confirm the validity and reliability of the recorded data.

Data analysis

The number of medicinal plant species, growth habit, parts used, route of administration remedies, methods of preparation and factors of medicinal plant threatened data were analyzed by using SPSS version 20 software and descriptive statistical methods following [5,7].

Results and Discussion

Demographic characteristics of respondents

Male (63.33%) and female (36.67%) respondents were involved in the data collection. From the total respondents (55.83%) were found between the age ranges 36 to 65, followed by (26.67%) respondents between the age ranges 20 to 35 year, while the remaining, above 66 years were (17.5%), which was the least compared to the other age groups (Table 1). The educational status of respondents was (53.33%) of had formal education followed by Illiterates (29.17%), whereas (13.33 %) of them had religious education. In the studied area most of the respondent had formal education and least illiterates. Majority of the respondents (58.33%) are used medicinal plant for regular treatment of health problems. The most commonly source of knowledge of medicinal plant in the study area is family 55.83% followed by family and exercise 23.33%.

Medicinal plant species diversity in the study area

A total of 42 medicinal plant species belonging to 26 Families were identified and documented with their scientific name, family, local name, sources, growth habit, parts used, rout of administration, methods of preparation and ailments treated in the study area. As the

Table 1: Sociodemographic characteristics of respondent.

Criteria	Characteristics	Frequency	Percentage
Age	20-35	21	26.67
	36-65	32	55.83
	Above 66	67	17.5
Gender	Male	76	63.33
	Female	44	36.67
Years of experience	None	10	8.33
	0-5	11	9.17
	6-10	46	38.33
	Above 11	53	44.17
Treatment incidence	No response	14	11.67
	Irregular	36	30
	Regular	70	58.33
Source of knowledge	Friends	14	11.67
	exercise	11	9.17
	family	67	55.83
	family and exercise	28	23.33
Educational status	Illiterates	35	29.17
	Religious education	16	13.33
	Modern education	64	53.33

respondents reported most dominant families were *Solanaceae* (5), *Fabaceae* (4), followed by *Alliaceae* (3), *Lamiaceae* (3), *Asteraceae* (3). These plant species were used to treat major health problems of human and livestock as well as foods and other multipurpose utilization. From the total 42 medicinal plant species (47.62%) of them were used to treat human health problems, (4.76%) of them used to treat livestock health problems and (47.62%) of them were used to treat both human and livestock health problems (Figure 1). This result is lineup with kindie et al. [11] reported that *Solanaceae* (28.57%) species were the most frequently used to Treat Human and Livestock Ailments in Fadis District, Eastern Ethiopia.

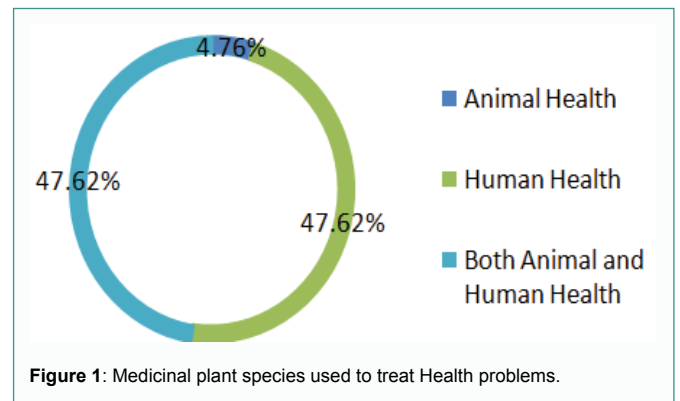
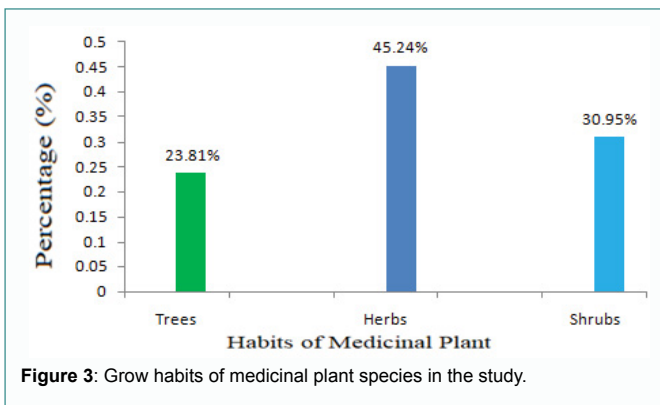
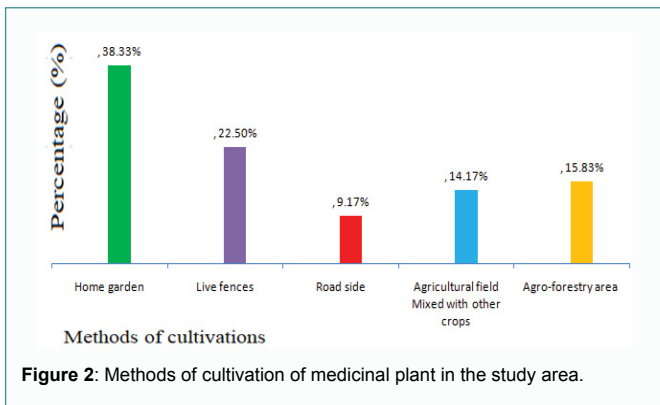


Figure 1: Medicinal plant species used to treat Health problems.

Cultivation of medicinal plant: As the study indicated that respondent are cultivated medicinal plants for their day-to-day use in the study area. These medicinal plant species are not cultivated for medicinal use only; somewhat they have used for food and food industrials, commercial value and other uses. Most commonly used method of cultivations medicinal plant species are home gardens, live fences, agro-forestry, and agricultural field and mixed with other crops and road side. As the result Home garden (38.33) is the principal methods of cultivation medicinal plant followed by live fences (22.50%), whereas road side is least methods of cultivation and resulted threatened of medicinal plant species (Figure 2).

Growth habit of medicinal plant: Based on the growth habits of medicinal plant species in the study were categorized as trees, herbs and shrubs. As the study indicated that herbs (45.24%) were mostly occurred growth habits of medicinal plant followed by shrubs

(30.95%), whereas (23.81%) were trees (Figure 3). This is similar to the reported conducted by indicated that 39.9% to 56.6% of medicinal plants were constituted of herbs [12-14].

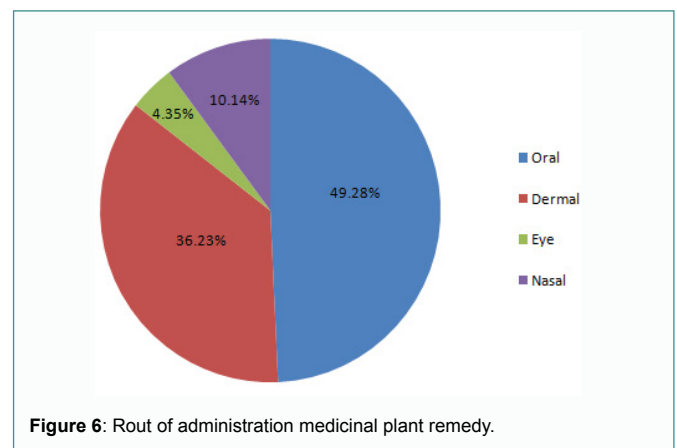
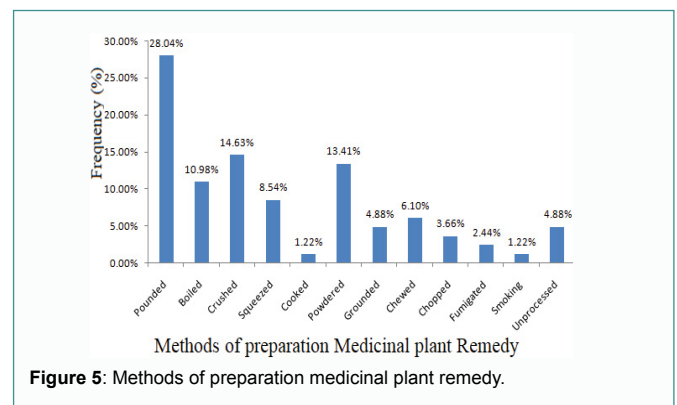
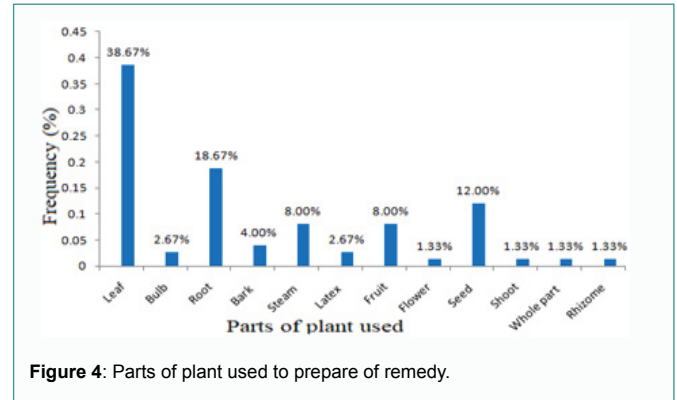


Medicinal plant parts used to treat ailments: As the result of the study on medicinal plant parts used to treat various human and livestock health problems in the study area were leaf (38.67%), root (18.67%), shoot (1.33%), bark (4.00%), whole plant (1.33%), fruit (8.00%), latex (2.67%), stem (8.00%), seed (12.00%), flower (1.33%), and rhizome (1.33%), Bulb (2.67%) presented in (Table 2) (Figure 4). Leaf (38.67%) was the most commonly used plant parts followed by root (18.67%) and seed (12.00%) parts. This result is similar to the research conducted that leaves are the most widely used medicinal plant parts [12,15].

Methods of preparation and route of administration of plant remedy: Regarding to the preparation of plant remedy the local community employs various methods of preparation of traditional medicines for different types of ailments. The principal methods of plant remedy preparation were pounded (28.04%), boiled (10.98%), crushed (14.63%), squeezed (8.54%), cooked (1.22%), powdered (13.41%), grounded (4.88%), chewed (6.10%), chopped (3.66%), smoking (1.22%), unprocessed (4.88%) and fumigate (2.44%). Pounded is the dominant method of preparation remedy followed by crushing (14.63%) and powdered (13.41%) in the study area (Figure 5). This finding is agreed with report conducted by Kindie et al. [11] pounding is the most methods of preparation plant remedy followed by crushing in Fadis District, Eastern Ethiopia.

There are various routes of administration medicinal plants prepared products by the local community. The result showed that route of administration medicinal plant remedy is oral (49.28%), dermal (36.23%), nasal (10.14%) and eye (4.35%). Oral (49.28%)

administration is dominantly used route of administration followed by dermal (36.23%) (Figure 6). This result is similar with various studies conducted [12,15-17] that the major way of medicinal plants administration was the oral route of administration methods in Ethiopia and other countries.



Threat and Conservation of Medicinal Plants in the Study Area

Threats of medicinal plant

The cause to threats medicinal plants and associated knowledge can be natural and human factors. As this study conducted and respondents reported the most commonly causes of threatened medicinal plants and associated knowledge were urbanization, agricultural expansion, lack of awareness to the community, Charcoal production, firewood, construction, modern health expansion, drought and overgrazing. Similarly, to the report [18,19] and indicated

that medicinal plants have been affected by a dramatic decrease in the area of native vegetation due to agricultural expansion, deforestation, fire, overgrazing, and charcoal. Agricultural expansion (30.83%) was the major factor for medicinal plant threatened followed by urbanization (21.67%) and charcoal production (18.33%) presented in (Figure 6). This finding is agreed with the report conducted [2,20,21] that agricultural expansion (34% to 55%) as the main factor for disappeared of medicinal plants in different parts of the country. Moreover, informants reported that the young generation refused to know or inherit knowledge and use of traditional medicine, therefore valuable information could be lost whenever traditional medicinal practitioners die without sharing their knowledge with others (Figure 7).

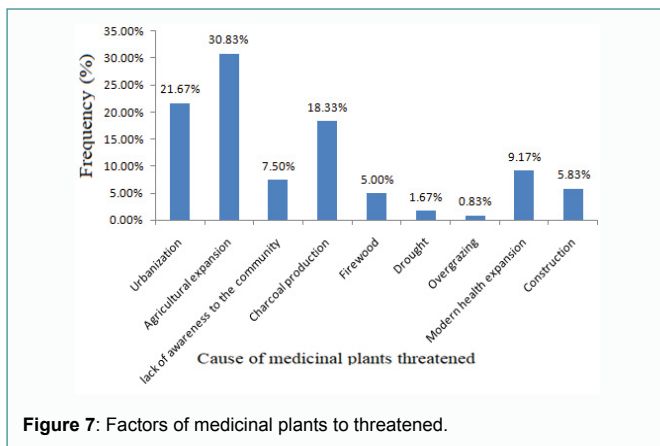


Figure 7: Factors of medicinal plants to threatened.

Conservation efforts of medicinal plant

The result of this study showed that (61%) of the respondents clarify that no attempt for conservation of medicinal plants, whereas (38%) of respondents have conservation attempt on medicinal plants. But all respondents agreed that there is no particular attention given to medicinal plants conservation. Respondents in study district suggested conserving medicinal plants in the Home garden, cultivating in fence, road side, mosques and churches, raising awareness and Community-based biodiversity conservation practices are the best conservation approaches for the plants used in traditional medicine. Home garden is a strategic and ideal farming system for conservation and enhancement of medicinal plants diversity and valuable indigenous knowledge [22,23]. according to the informants reported that traditional practitioners and local communities in the study areas mainly depend on the natural environment for collecting medicinal plants, therefore the effort to conserve and sustainably utilize medicinal plant resources was weak [24-27].

Conclusion

To summarized medicinal plants are used in the healthcare system in the world and most affordable and easily accessible source of treatment. Majority of the respondents (58.33%) are used medicinal plant for regular treatment of health problems and the most common source of knowledge of medicinal plant in the study area is family 55.83% followed by family and exercise 23.33%. Most dominant medicinal plant families were *Solanaceae* (5) and followed by *Fabaceae* (4) species. From the total 42 medicinal plant species (47.62%) of them were used to treat human health problems, (4.76%) of them used to treat livestock health problems and (47.62%) of them were used to treat both human and livestock health problems.

Home gardens (38.33%) are the principal methods of cultivation

medicinal plant followed by live fences (22.50%), whereas road side is least methods of cultivation and mostly occurred medicinal plant growth habit is herbs (45.24%), followed by shrubs (30.95%). Leaves (38.67%) are the most widely used medicinal plant parts followed by root (18.67%). Regarding to the preparation of plant remedy pounded (28.04%) is commonly used method followed by crushing (14.63%) and powdered (13.41%). There are various routes of administration of medicinal product where oral (49.28%) is dominantly used route of administration followed by dermal (36.23 %).

Factors to threatened medicinal plants and associated knowledge are grouped into natural and human factors. The major factor that threatened medicinal plants is agricultural expansion (30.83%), followed by urbanization (21.67%), charcoal production (18.33%). All respondents agreed that there is no particular attention given to medicinal plants conservation. However, respondents in study district suggested conserving medicinal plants in the home garden, cultivating in fence, road side, mosques and churches, raising awareness are the best conservation approaches.

References

- Sofowora A. Medicinal plants and Traditional medicine in Africa. New York: John Wiley and Sons; 1982.p.255-6.
- Yineger H, Yewhalaw D. Traditional medicinal plant knowledge and use by local healers in Sekoru District, Jimma Zone, Southwestern Ethiopia. J Ethnobiol Ethnomed. 2007;3(1):24.
- Bussmann RW, Swartzinsky P, Worede A, Evangelista P. Plant use in Odo-Bulu and Demaro, Bale region Ethiopia. J Ethnobiol Ethnomed. 2011;7:28.
- Dawit A. The role of medicinal plants in health care coverage of Ethiopia the possible benefits of integration. In: Proceedings of the National Workshop on Conservation and Sustainable use of Medicinal Plants in Ethiopia. Addis Abada; 2001.
- Cotton CM. Ethnobotany: Principles and applications. Chichester, New York: John Wiley and Sons Ltd; 1996.
- Moravec I, Fernández E, Vlkova M, Milella L. Ethnobotany of medicinal plants of northern Ethiopia. Boletín Latinoamericano del Caribe de Plantas Medicinal Aromáticas. 2014;13(2):126-34.
- Martin GJ. Ethnobotany: A Conservation Manual. Chapman and Hall, London: Springer; 1995.
- Bein E, Habte B, Jaber A, Birnie A, Tengnaes B. Useful trees and shrubs in Eritrea: Identification, propagation and management for agricultural and pastoral communities. Regional Soil Conservation Unit, RSCU/SIDA, Nairobi; 1996;12:422.
- Bekele-Tesemma A, Birnie A, Tengnas B. Useful trees and shrubs for Ethiopia: identification, propagation and management for agricultural and pastoral communities. Regional Soil Conservation Unit, Nairobi; 1993;194-5.
- Bekele-Tesemma A. Useful Trees and Shrubs of Ethiopia: Identification, Propagation, and Management in 17 Agro-ecological Zones. Nairobi: RELMA in ICRAF Project; 2007.
- Kindie B, Tamiru C, Abdala T. Ethnobotanical Study of Medicinal Plants and Conservation Status Used to Treat Human and Livestock Ailments in Fadis District, Eastern Ethiopia. Int J Hom Nat Med. 2021;7(1);7-17.
- Amsalu N, Bezie Y, Fentahun M, Alemayehu A, Amsalu G. Use and conservation of medicinal plants by Indigenous People of Gozamin Wereda, East Gojjam Zone of Amhara Region, Ethiopia: An Ethnobotanical Approach. Evid Based Complement Alternat Med. 2018;2018:2973513.
- Sulaiman, Shah S, Khan S, Bussmann RW, Ali M, Hussain D, et al. Quantitative ethnobotanical study of Indigenous knowledge on medicinal plants used by the tribal communities of Gokand Valley, District Buner, Khyber Pakhtunkhwa, Pakistan. Plants (Basel). 2020;9(8):1001.
- Kidane L, Gebremedhin G, Beyene T. Ethnobotanical study of medicinal plants in

Table 2: List of medicinal plants used for treating human ailments in the study area with scientific name, family, local name, shrub (S), Growth Habit (GH), Cultivation (CT), Tree (T), Herb (H), Disease Treated (DT), Seed (Se), Fruit (Fr), Flower (Fl), Shoot (Sh), Parts Used (PU), Root (R), Leaf (L), Latex (La), Stem (St), Bulb (Bu), Bark (Ba), Rhizome (Rh), Methods of Preparation (MP), Home Gardens (HG), Route of Administration (RA), Oral (O), Dermal (D), Nasal (N) and Eye (E).

Scientific name (Family)	Local name	CT	GH	Pu	MP	Disease treated	RA
<i>Allium sativum L.</i> (Alliaceae)	Nechshinkurt	HG	H	Bu	Bulb mixed with fruit of <i>Capsicum annum</i> are boiled with butter then drunk	Stomach complaints*	O
				Bu	Blub is crushed together with rhizome of <i>Zingiber officinale</i> , <i>Lepidium sativum</i> adding with honey and taken 2 tea spoons	Evil eye*	O
				Bu	Blub is pounded and mixed with the crushed fresh leaves of <i>Ruta chalepensis</i> and <i>Solanum nigrum</i> then applied externally.	Malaria*	D
				Bu	The dried bulb is pounded mixed with seed of <i>Lepidium sativum</i> and <i>Ricinus communis</i> and tied on the wound every two days for one week.	Wound*	D
<i>Croton macrostachyus</i> (Euphorbiaceae)	Bisana	Agricu tural field	T	Ba	Fresh bark together with bulb of <i>Allium sativum</i> , is pounded, mixed with butter and then eaten.	Stomachache*	O
				L	Fresh shoot tips are cut, cooked and two spoonful of the solution is drunk per a day for five consecutive days.	Gonorrhea*	O
				L	Fresh leaf Cooked, pasted with honey and then eaten.	Jaundice*	O
				Ba	The fresh bark is grounded, mixed with water and given to the animal by drinking material.	Bloat**	O
				La	Sap juicy is produced and applied on the skin	Ringworm*	D
				L	Boil fresh leaf in water, filter and drink with milk or tea	Malaria*	O
				L/Ba	Fresh leaf or bark is pounded and boiled adding with butter after solidifies given to the patient.	Ascaris*	O
<i>Datura stramonium L.</i> (Solanaceae)	Astenagir	Road side	H	Fl	Flower is Pounded and the dried powder is given with honey to the women after 10 days of menstruation.	infertility in women *	O
				L	Seeds are boiled in water and inhaled the vapour.	toothache*	O
				L	The fresh Leaf is squeezed and the juice is applied to the eye	Eye disease*	E
				L	Crushed and homogenized leaves drunk with water	Rabies*	O
				L	Fresh leaf with <i>Withania somnifera</i> and <i>Laggera tomentosa</i> , are pounded, half spoon is added to a cup of coffee and then drunk every morning until recovery.	Cough*	O
<i>Aloe macrocarpa Tod.</i> (Alliaceae)	Ret	HG	H	La	The latex of the species is squeezed and then taken once.	Stomachache*	O
				L	Fresh Leaves are crushed and tie on.	Nose bleeding*	N
				L	Fresh leaf is pounded with <i>Ruta chalepensis</i> , <i>Allium sativum</i> , <i>Foeniculum vulgare</i> , mixed with water and given to cattle.	Bloat**	O
				L	Fresh Leaves are pounded and mixed with butter then applied on the skin.	Leprosy*	D
				L	Fresh leaves chewed and swallow the juice	Intestinal parasite***	O
<i>Calpurnia aurea.</i> (Fabaceae)	Digita	HG	S	L/Se	Fresh leaf or seed are pounded together with leaf of <i>Nicotiana tobaccos</i> are taken through the nostrils.	Leech**	N
				L	Fresh leaves are chewed and swallow for humans or the seeds are roasted, pounded, mixed with water and drunk by cup and leaf is pounded, mixed with water and given to animal until the diarrhea stops	Diarrhea***	O
				Se	Seeds are crushed, mixed with honey and one teaspoon is eaten for five consecutive days.	Syphilis*	O
				L	Fresh leaves are pounded, mixed with water and wash the boy of the animal every morning until the parasites are eradicated.	Lice**	D
				L,Se,& Fr	Fresh leaf, fruit and seeds are crushed, mixed with food and given to dogs	Rabies**	O
<i>Cordia africana Lam.</i> (Boraginaceae)	Wanza	Live fence	T	L	Leaf is pounded mixed with butter and applied on the affected part	Wound*	D
				Ba	Fresh bark is pounded then mixed with water and drunk with one coffee cup for three to four consecutive days.	Continuous flow of menstruation*	O
				L	Fresh leaves boiled in water after mixing it with <i>Sorghum bicolor</i> , chewing	Jaundice*	O
<i>Eucalyptus globulus Labill.</i> (Myrtaceae)	Nech bahir zaf	Agroforestry	T	L	Fresh young leaves are boiled in water the fumigated the vapour under sealed clothes at morning time.	Asthma*	D
				L/Sh	Washing the sol with young shoot or putting under the sock.	Athlete's foot*	D
				L	Fresh young leaves are boiled in water and fumigate the vapour under sealed clothes at bed time.	Cough*	D
<i>Hordeum vulgare L.</i> (Poaceae)	Gebis	Agricultural field	H	Se	The roasted seed powder is boiled in water and drunk until relief.	Gastritis*	O
				Se	Fresh dried Seed with dry leaf of <i>Melia azedarach</i> is crushed and sprinkled on the feed.	Bloat**	O

<i>Justicia schimperiana</i> (Acanthaceae)	Smiza	Live fence	S	L	Dried leaf is decoctions mixed with <i>Calpurnia aurea</i> and wash the body.	Lice***	D
				L	Dried leaf powder with the powder of leaf of <i>Croton macrostachyus</i> are pasted with butter and apply once a day for five.	Eczema*	D
				L	Newly growing fresh leaves milled on palms and the squeezed liquid added to a coffee cup 4. Drink the liquid every night time for a week.	Jaundice***	O
				R&L	Roots and leaves are pounded together then mixed with water and given orally for human and animals in the morning before food	Rabies***	O
<i>Linum usitatissimum L.</i> (Linaceae)	Telba	Agricultural field	H	Se	Powdered seeds immersed in water and drunk one glass continuously.	Gastritis*	O
				Se	The dried seeds are soaked in water and the water solution is drunk.	Constipation***	O
				R	Dried seed is boiled and adding salt then to give the animal a day.	Retention Of placenta***	O
				Se	Powdered seed is adding with water and drunk in an empty stomach.	Amoebiasis*	O
<i>Lepidium sativum L.</i> (Brassicaceae)	Feto	HG	H	Se	Seeds ground into paste-like food and mixed with butter and water then drunk.	Diarrhea*	O
				Se	The seeds are inserted in to fire and smoking to the patient.	Mich*	D
				Se	Fresh seed is pounded and mixed with water the drunk.	Stomach complaints*	O
<i>Milletia ferruginea</i> (Fabaceae)	Birbira	Agroforestry	T	Fr	Dry fruit is powder and mixed with butter and salt then after applied to the infected skin.	Skin infection*	D
				Fr	Crushed fruits are spread on the water surface.	Fish poison**	O
				Fr	Fruits are pounded and mixed with butter then applied to the affected area.	Scabies*	D
				Fr	Fresh fruit is Chewing.	Goiter*	O
<i>Nigella sativa L.</i> (Ranunculaceae)	Tiqur-azmud	HG	H	Se	Fresh Seed is ground into powder and inhaled three to four times per day.	Common cold*	N
				Se	The fresh Seeds are boiling into the water then steam is inhaled.	Asthma*	N
				Se	Seed is Pounding and mixing with <i>A. sativum</i> , <i>Ruta chalepensis</i> , and <i>A. cepa</i> and then drinking adding with lemon juice	Stomach complaints *	O
<i>Ocimum lamiiifolium</i> (Lamiaceae)	Damakese	Road side	H	L	Fresh leaves are cutting from three places and crushed then squeezed the body.	Sun-strike*	O
				L	Fresh leaf together with leaf of <i>Eucalyptus globulus</i> , <i>Silene macroselen</i> , is pounded, mixed with water and drunk.	Mich*	O
<i>Olea europaea L.</i> (Oleaceae)	Woirra	HG	T	L	Fresh leaf is boiled in water and steam the vapour.	Itchy* skin*	D
				St	Dried stem is inserting into fire and the oily liquid produced is applied on the wound.	Wound***	D
				St	Dried Steam is pounding and produced oily liquid then drunk after meal for four consecutive days.	Gastritis*	O
<i>Phytolacca dodecandra L'Herit.</i> (Phytolaccaceae)	Endod	Live fence	S	L	Fresh leaf is crushed and mixed with water then after filtered and drunk.	Abortion*	O
				R	Fresh root is pounded with <i>Artemisia abyssinica</i> and <i>Justicia schimperiana</i> and mixed with water then a glass of solution is given for 7-10 day for humans and 15-20 days for animals.	Rabies***	O
				R	Fresh root is grounded and mixed with water then drunk in the morning for five consecutive days.	Malaria*	O
<i>Ruta chalepensis L.</i> (Rutaceae)	Tila-adam	HG	H	St/L	Fresh stem or leaf are boiled into coffee or tea then drunk.	Common cold*	O
				R	Fresh root chewed and swallowed the juice.	Abdominal pain*	O
				L	Fresh leaf pounded with garlic and mixed with a glass of milk and drunk.	Stomachache***	O
				L	Fresh leaf with leaf of <i>Datura stramonium</i> is wash on the body of the patient.	Evil eye*	D
				L	Fresh leaf is pounded with <i>Zingiber officinale</i> and adding with coffee and drunk	Headache*	O
				L	Fresh leaf is pounded with <i>Zingiber officinale</i> and added to coffee then a cup of coffee is drunk every morning for three consecutive days.	Fever*	O
<i>Vernonia amygdalina</i> (Asteraceae)	Girawa	HG	S	L	Fresh leaf is mixed with water, crushed, and squeezed then drunk.	Stomachache*	O
				L	Fresh leaves chopped and produced Juice then mixed with locally beer and salt then given to the animal.	Intestinal parasite**	O
				L	Fresh leaf is pounded and mixed with water after filter drunk it.	Jaundice*	O
				L	Leaf is pounded and mixed with coffee seeds and mixed with butter and eaten	Diarrhea*	O
				L	Fresh leaf Pounded and mixed with water and given orally	Bloat**	O
<i>Withania somnifera (L.)</i> (Solanaceae)	Gizewa	HG	S	L	Fresh leaf is crushed and with <i>Allium sativum</i> then rubbed the whole body.	Fibril illness*	D
				R	Root is pounded with <i>Phytolacca dodecandra</i> , bark of <i>Croton macrostachyus</i> and mixed with water then given to animal.	Anthrax**	O
				L	Fresh leaf is chewed and swallowed.	Mich*	O

<i>Zingiber officinale</i> (Zingiberaceae)	Zingible	HG	H	Rh	Fresh Rh is Chewing and eating.	Stomachache***	O
				Rh	Fresh Rh is chopped and pounded then adding in the boiling water with honey or sugar and drinking.	Cold*	O
<i>Catha edulis</i> (Celastraceae)	Catii	Agricultural fields	S	L	The leaf is chopped and mixed with water then drink.	Cough, chest disease *	O
				L	Fresh leaf is pounded and mixed with <i>Ruta chalepensis</i> and <i>Foeniculum vulgare</i> and adding with water and local katkala then drinking.	Urine retention**	O
<i>Moringa stenopetala</i> (Moringaceae)	Sheferaw	Agroforestry	T	L	Fresh drying leaf is Pounding and mixed with water after filtering drinking it.	Hypertension*	O
<i>Echinops kebericho</i> (Asteraceae)	Kebericho	Agroforestry	H	R	The root is powdered and applied on the affected area during the bed time.	Scabies*	D
				R	Dried root is adding with <i>Silene macroselen</i> root then smoked to the patient.	Evil eye*	D
<i>Ocimum basilicum</i> (Lamiaceae)	Besobila	HG	H	L	Fresh leaves pounded with <i>Aloe macrocarpa</i> and water then drink it.	Flu*	O
<i>Mentha spicata</i> (Lamiaceae)	Nana	HG	H	L/St	Leaf /stem are Pounding and mixing with <i>Nigella sativa</i> and <i>A. sativum</i> then drunk.	Diarrhea*	O
<i>Lantana camara L.</i> (Verbenaceae)	Bekerkitie	Live fence	S	L	Fresh leaf is pounded with leaf of <i>Ocimum lamiiifolium</i> and the squeezed out liquid drink with tea.	Fungi /Mich*	O
<i>Phoenix reclinata</i> (Arecaceae)	Meexx	Agroforestry	T	L /St	Fresh leaf and stem of <i>Phoenix reclinata</i> are chewed together then spitted on cattle eye.	Eye disease**	D
<i>Solanum incanum L.</i> (Solanaceae)	Hiddii	HG	S	R	Fresh root is powder and drunk with coffee.	Snake bite*	O
				R	Fresh root is chewed and hold between the teeth.	Toothache*	O
	Embuay	Agroforestry	S	Fr	Root is pounded and mixed with water and drunk.	Placenta retention**	O
				Fr	Fruit is pounded and tie on the bleeding part.	Bleeding*	D
				St	Fresh stem is warm on the fire and placed it on the wound again and again.	Wound*	D
				R	Fresh root is fumigated	Evil eye*	D
				L	The leaf is chopped and the juice is placed in the nostrils.	Nose bleeding*	O
				Fr	Fruit is squeezed and the juice is mixed with milk and applies through the nostrils.	Leech*	N
				R	Fresh root is crush then boiling the part then the steam is inhale or smoke.	Rabies	O
<i>Psidium guajava L.</i> (Myrtaceae)	Roqaa	Agroforestry	S	Ba	Fresh bark is pounded and mixed with butter paint on the wound.	Wound**	D
<i>Trigonella foenum graecum L.</i> (Fabaceae)	Abish	Agricultural field	H	L	Fresh leaf is crushing and adding on fire then Fumigation	Evil eye*	N
				Se	Fresh seed is pounding and boiling with water applied on the broken bone	Broken leg*	D
				L	Leaves are pounded with toasted seeds of <i>Coffea arabica</i> and mixed with butter then rub the external eye.	Eye disease**	E
<i>Brucea antidysenterica</i> (Simaroubaceae)	Avalo	Agroforestry	T	R /L	Dry root is crushed and dissolved in water and half of coffee cup is drunk.	Bloody diarrhea*	O
				Fr	Dried fruit is crushed and applied on wounds.	Wound***	D
				L	Fresh leaf is placed in the nostrils.	Evileyes*	N
				Se	Dried seed crushed and added with wheat four then applied on wounds	Leishmaniasis*	D
				Fr,R&L	Squeezed with teff flour, <i>Croton macrostachyus</i> and <i>Rumex nervosus</i> then given for 3 days	Rabies* *	O
<i>Capsicum annuum L.</i> (Solanaceae)	Barberee	HG	H	Fr	Fresh fruits is powdered with <i>Allium sativum</i> , <i>Zingiber officinale</i> , and <i>Nigella sativum</i> are immersed with water and drunk for 2-3 days continuously	Dysentery & vomiting*	O
				Fr	Dried fruit Pounded and mixed with water then given to orally	Bloat**	O
<i>Coffea arabica L.</i> (Rubiaceae)	Bunna	HG	S	Se	Fresh seeds are roasted and powdered then put on the part of the wound.	Wound*	D
<i>Acacia abyssinica Hochst.</i> (Fabaceae)	Grar	Agroforestry	T	L	Fresh leaf is pounding and then squeezing	Allergy*	D
				L	Fresh leaves are pounded and squeezed then the juice is added to the eye.	Eye disease**	E
				R /Ba	Fresh root and bark grounded together with water then wash the animal.	Horse scabies**	D
<i>Allium cepa L.</i> (Alliaceae)	Key shinkur	HG	H	Bu	Fresh bulb is pounding with <i>A. sativum</i> and <i>Ruta chalepensis</i> then adding honey and drunk	Stomach Complaints*	O
				R	Dried root powder with the leaf concoction of <i>Vernonia amygdalina</i> and <i>Premna schimperi</i> then Tie up.	Poisoning*	D
<i>Artemisia absinthium L.</i> (Asteraceae)	Natra	HG	H	Wh	Squeezing and producing juice then drunk	Uvula infection*	O
				L	Smoking	Evil eye*	N

<i>Brassica nigra</i> L. (<i>Brassicaceae</i>)	Senafich	HG	H	Se	Dying, then grinding after mixing it with <i>A. sativum</i> and <i>Vicia faba</i>	Stomach complaints*	O
				Se	Seeds were processed into a paste and used as a poultice to treat swelling of lymph nodes	swelling of lymph nodes*	D
				Se	Mustard seeds were dry and decocted in water poultice then applied on the affected part.	cracked skin and acne*	D
<i>Citrus limon</i> (L.) (<i>Rutaceae</i>)	Lomi	HG	S	Fr	Fresh Fruit and bulb of <i>Allium sativum</i> are pounded together and mixed with honey and eaten with wheat bread.	Stomach ache*	O
				Fr	Fruit juice mixed with fine powder, root of <i>Acokanthera schimperi</i> , and applied to the affected part and sit under the sun for about half an hour	Scabies*	D
<i>Rumex nervosus</i> Vahl (<i>Polygonaceae</i>)	Embacho	Agroforestry	S	L	Grounding the fresh leaf and drinking one cup of the solution.	Retained placenta**	O
				St	The powder of stem is mixed with butter and applied on the skin.	Burn	D
				R	The root is pounded and mixed with <i>Phytolacca dodecandra</i> , <i>Brucea antidysenterica</i> , <i>Croton macrostachyus</i> then one tea spoon is drunk with coffee	Rabies*	O
				R	Crushed root together with butter is placed on the wound	Wound***	D
<i>Plantago lanceolata</i> L. (<i>Plantaginaceae</i>)	Gorteb	Agricultural field	H	L	Crush and apply it on the cut part.	Cut*	D
				L	Fresh leaves are squeezed and rub the body.	Mitch*	D
<i>Ziziphus spinachristi</i> (L.) (<i>Rhaminaceae</i>)	Kurkura	Agroforestry	T	L	The fresh leaf is Pounding then squeezing	Devil's illness*	O

Animal disease** Human disease* Animal and human disease***

- Ganta Afeshum District, Eastern Zone of Tigray, Northern Ethiopia. J Ethnobiol Ethnomed. 2018;14(1):64.
- Tefera BN, Kim YD. Ethnobotanical study of medicinal plants in the Hawassa Zuria District, Sidama zone, Southern Ethiopia. J Ethnobiol Ethnomed. 2019;15(1):25.
 - Chekole G, Asfaw Z, Kelbessa E. Ethnobotanical study of medicinal plants in the environs of Tara-gedam and Amba remnant forests of Libo Kemkem District, northwest Ethiopia. J Ethnobiol Ethnomed. 2015;11(1):4.
 - Eshete MA, Kelbessa E, Dalle G. Ethnobotanical study of medicinal plants in Guji Agro-pastoralists, Bule Hora District of Borana Zone, Oromia Region, Ethiopia. J Med Plants Studies. 2016;4(2):170-84.
 - Giday M, Asfaw Z, Elmqvist T, Woldu Z. An ethnobotanical study of medicinal plants used by the Zay people in Ethiopia. J Ethnopharmacol. 2003;85(1):43-52.
 - Balemie K, Kelbessa E, Zemedu A. Indigenous medicinal utilization, management and threats in Fentale Area, Eastern Shewa, Ethiopia. Ethiop J Biol Sci. 2004;3(20):37-58.
 - Lulekal E, Kelbessa E, Bekele T, Yineger H. An ethnobotanical study of medicinal plants in Mana Angetu District, South eastern Ethiopia. J Ethnobiol Ethnomed. 2008;4:10.
 - Tamene S, Addisu D, Debela E. Ethnomedicinal study of plants in Boricha district: Use, preparation and application by traditional healers, Southern Ethiopia. J Med Plants Res. 2020;14(7):343-53.
 - Asfaw Z. The role of home gardens in production and conservation of medicinal plants, in Conservation and Sustainable Use of Medicinal Plants in Ethiopia. 2001;7:76-91.
 - Etana B. Ethnobotanical study of traditional medicinal plants of Goma Wereda, Jima Zone of Oromia Region, Ethiopia. Addis Ababa University, Addis Ababa, Ethiopia; 2010.
 - Lulekal E, Asfaw Z, Kelbessa E, van Damme P. Ethnomedicinal study of plants used for human ailments in Ankober District, North Shewa Zone, Amhara Region, Ethiopia. J Ethnobiol Ethnomed. 2013;9(1):63.
 - Yirga G. Use of traditional medicinal plants by indigenous people in Mekele town, capital city of Tigray regional state of Ethiopia. J Med Plants Res. 2010;4(17):1799-804.
 - Yigezu Y, Haile DB, Ayen WY. Ethnoveterinary medicines in four districts of Jimma zone, Ethiopia: Cross sectional survey for plant species and mode of use. BMC Vet Res. 2014;10(1):76.
 - Kassa Z, Asfaw Z, Demissew S. An ethnobotanical study of medicinal plants in Sheka Zone of Southern Nations Nationalities and Peoples Regional State, Ethiopia. J Ethnobiol Ethnomed. 2020;16(1):7.