

An Ethnobotanical Study of Traditionally Used Medicinal Plants for Treatment of Human Diseases in Goba District of Bale Zone, Southeast Ethiopia

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Abstract

An ethnobotanical study of traditionally used medicinal plants to treat human disease was conducted in Goba District of Bale Zone, Ethiopia. Information was gathered from 60 informants using semi-structured interview. For data collection the site and the informants were selected purposively. During the study, a total of 42 medicinal plant species belonging to 24 families were recorded. The family *Euphorbiaceae* has four different species and *Apocynaceae*, *Asteraceae*, *Cucurbitaceae*, *Ranunculaceae*, *Rosaceae* and *Solanaceae* each with 2 species. Each of the rest families had one species. The result of growth forms diversity analysis of medicinal plants reveals that herbs constitute the largest category 38% followed by shrubs 33%. From the total medicinal plant parts used for treatment of disease, the leaves and the roots were the most commonly used plant parts in the preparation of remedies accounting for 33.3% and 21.4% of the total medicinal plants, respectively. The results of preference ranking showed that *Zingiber officinale* scored the highest mark and ranked first indicating that it was the most effective in treating Tonsillitis disease. The least preferred plant species compared to the other four species were *Schinus molle*. The study was limited to three kebeles of Goba district due to many limitations, thus to give more support to the above findings and find more diversities of medicinal plants, further scientific investigations of medicinal plants in the whole parts of the districts are needed.

Keywords: Ethnobotany, Goba District, Human ailments, Medicinal plants

1. Introduction

Since ancient times, plants have been indispensable sources of both preventive and curative traditional medicine preparations for mankind (Khandel et al., 2012). Historical accounts of traditionally used medicinal plants depict that different medicinal plants were in use as early as 5000 to 4000 BC in China, and 1600 BC by Syrians, Babylonians, Hebrews and Egyptians (Dery et al., 1999). Much of an indigenous knowledge system, from the earliest times is also found linked with the use of plant based traditional medicine in different countries (Farnsworth, 1994).

In every country of developing world, 60-85% of the population has to rely on plant based traditional medicine (Sofowora, 1982). Even today, plants remain the source for majority (80%) of people in developing countries to alleviate health problems (Maki, 2008). The practice of traditional medicine is widespread in China, India, Japan, Pakistan, Sri Lanka, Thailand, and Korea (Park et al., 2012). In developed countries such as United States, plant drugs constitute as much as 25% of the total drugs, while in fast developing countries such as China and India, the contribution is as much as 80% (Joy et al., 1998).

In Ethiopia, plants have been used as a source of medicine from time immemorial to treat different ailments due to its long history, and traditional medicine has in fact become an integral part of culture (Pankhurst, 1965). In the country, the long history of using traditional medicinal plants for combating various ailments can be confirmed by referring to the medico-religious manuscripts in the country (Kibebew, 2001). Plant remedies are still the most important and sometimes the only source of therapeutics for nearly 80% of the population in Ethiopia (Abebe, 2001).

The various literature available show the significance role of medicinal plants in primary health care delivery in Ethiopia where 70% of human and 90% of livestock population depends on traditional medicine similar to many developing countries particularly that of sub-Saharan Africa countries (Bekele, 2007).

Ethiopia is endowed with a diverse biological resources including about 6,500 species of higher plants, out of which more than 14% are said to have been used as traditional plant medicines to treat different human and livestock ailments, while more than 1,000 species have been documented at the Ethiopian National Herbarium database (Getnet et al., 2015). The local people in different parts of Ethiopia depend on traditional medicine, which mostly relies on medicinal plants to fulfill their healthcare needs (Zegeye et al., 2011). Traditional medicinal plant practice in the country is still continue and widely accepted to use in the prevention and treatment of various ailments due to easily accessible (Gebeyehu et al., 2013).

Similarly in Goba district the society widely uses traditionally used medicinal plants to treat different human diseases. These plants are obtained from wild habitat, grassland, shrubs, in field margin and garden fence as weeds and in many micro habitat from where they are harvested when the need arise. However, the

ethnomedicinal healing systems vary across cultures and there is no such ethnomedicinal research and documentation carried out in and around the study site.

Therefore, the present study focused on the identification of medicinal plants and documentation of their use in treatment of human ailments in the study area. This is believed to add up to the country's database of medicinal plants and in documenting the indigenous knowledge of the people.

2. Methodology

2.1 Description of the Study Area

Goba District is one of the Districts' found in Bale Zone South East of Ethiopia. The district is located in the eastern edge of Robe town, at about 446 kms South East of Addis Ababa. It is located between $39^{\circ} 37' 30'' - 40^{\circ} 12' 00''$ E and $6^{\circ} 38' 0'' - 7^{\circ} 4' 0''$ N (Figure 1).

About 45% of the land scape in this District is rugged or mountainous. Mountain Tullu Demtu is the highest point in this District, Zone and Region. The district possesses Togona and Shaya rivers. A survey of the land in this District shows that 13% is arable or cultivable, 27.6% pasture, 54.6% forest (or part of the Bale Mountains National Park), and the remaining 4.8% is considered degraded or otherwise unusable (BOARD, 2012).

As a part of Bale zone, Goba District has two types of rainfall regime. The long rainy season extends from March to April with high rain fall during June, July and August. The second rainy season of rain fall regime is influenced by equatorial westerly and easterly winds with rainfall during spring and autumn. The altitude of the District ranges from 1500-4377m a.s.l and the temperature varies from some times less than $0^{\circ}\text{C} - 23^{\circ}\text{C}$ (BZMED, 2007).

The common vegetation are Afro-alpine and sub Afro-alpine vegetation which are prevailing in limited areas above 3400m of massif and found in mountain tops of Sanete plateaus and surrounding prominent mountain peaks. *Junipers procera* forest associated with *Hagenia abyssinica* and *Olea* trees are foud at altitudes ranging from 2300-3100mm. The forest areas are also well known for their flora and fauna diversities. The economic activities of the local people are primarily based upon mixed farming that involves pastoralism and cultivation of crops such as wheat and barley.

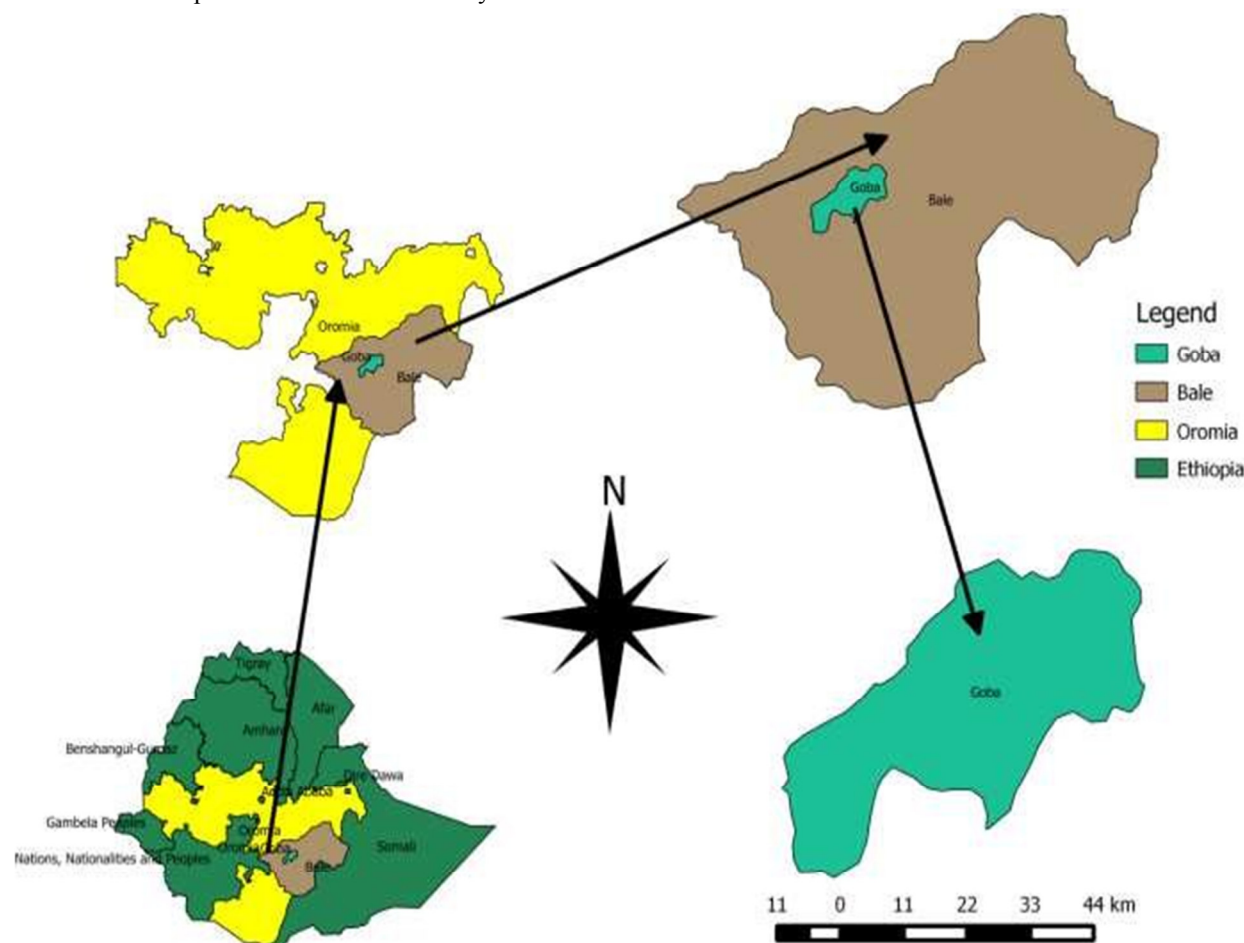


Figure 1: Map of the Study Area (Goba District) (Wubishet and Yacob, 2017)

2.2. Method of Data Collection

A primary survey of the study area was conducted in February to march 2018. During this survey, information about the physical features of the study area was collected. The study sites were selected purposively based on the availability of the practice on traditional medicine and availability of better vegetation cover following the recommendations of the local elders. Three Kebeles (3 rural kebeles were selected in the study district. The selected kebeles were, Fasil Sura, Burkitu, Alloshe Tilo. The identification was assisted by the district and local authorities, elders and knowledgeable persons to gather diversified information on the ethnobotany of medicinal plants to treat different human disease.

The data were collected using purposive sampling method (Bernard, 2002). This technique was preferred because the study focuses on specific issues that it was gathered from the most knowledgeable representatives of the society. Representative sample of the local people of different age and social groups were included. Accordingly, 60 informants were selected from the kebeles for this study. Out of the total informants, 45 were males and 15 were females. From each kebele, 20 informants were selected based on their willingness. The informants were aged between 20 and 75. These informants were selected for interview based on the assumption that they are members of the community most knowledgeable about traditionally used medicinal plants.

Group as well as individual interview was conducted with them. The interview prepared in English was translated in to local language Afaan Oromo. The methods employed in the data collection were group discussion, semi-structured interviews, open ended questions, field observation, market survey and preference ranking methods. All the relevant data including the vernacular name, plant habit, part of the plant used, medicinal values (uses) of the plant, preparation, were gathered during the interviews.

Voucher specimens (Plants) were collected from each sample site, dried and brought to national herbarium found in Addis Ababa for identification. Then, identification was performed by experts in the herbarium using flora books of Ethiopia and Eritrea.

2.3. Method of Data Analysis

The collected ethnobotanical data were entered into Excel spreadsheet 2013 and summarized using descriptive statistical methods such as percentage, tables, and graphs. Preference ranking were computed following (Alexiades, 1996). Preference ranking was conducted for five important medicinal plants used to treat tonsillitis. Ten randomly selected participants from total key participants were participated in this exercise to identify the best preferred medicinal plants for treatment of tonsilites.

3. Results and Discussion

3.1. Medicinal Plant Species of the Study Area

A total of 42 plant species representing 24 families were reported by the informants for their medicinal use by the peoples in Goba district. The family *Euphorbiaceae* has four different species and *Apocynaceae*, *Asteraceae*, *Cucurbitaceae*, *Ranunculaceae*, *Rosaceae* and *Solanaceae* each with 2 species. Each of the rest families had one species (Table 1).

Table 1. Medicinal plants used for the treatment of human ailments, Scientific names, family, local names, habits, parts used and Methods of preparation. (Key: Herb=H, Shrub=Sh, Tree=T, Climber= Cl, Bark=B, Latex =La, Root =R, Leaf=L, Fruit=Fu, Flower=Fl, Seed=Se, Stem=St, Bulb=Bu)

Scientific Name	Family Name	Local Name	Habit	Plant part used	Method of preparation	Disease threatened
<i>Acmella caulirhiza</i> Del.	Asteraceae	Guticha	H	Fl	Flower chewed and swallowed	Tonsillitis
<i>Allium sativum</i> L.	Alliaceae	Qullubi Adi	H	Bu	Eaten or crushed and applied on skin	Malaria
<i>Asparagus africanus</i> Lam.	Asparagaceae	Saritii	Sh	L	Crushed leaves applied on the affected part	Spider poison
<i>Brucea antidysenterica</i> J.F. Mill.	Simarubaceae	Qomanyo	T	R	Root powdered and drink with water	Diarrhea
<i>Carissa spinarum</i> L.	Apocynaceae	Agamsa	Sh	Ba	Chewed early before having breakfast	Stomach ache
<i>Clematis simensis</i> Fresen.	Ranunculaceae	Hidda fiit	L	L	Leaves are dried, crushed and drunk.	Diarrhea
<i>Clerodendrum myricoides</i> (Hochst.)	Lamiaceae	Marasisaa	Sh	R	Butter paste of fresh stem is heated on fire and put on the tumor	Tumor

Scientific Name	Family Name	Local Name	Habit	Plant part	Method of preparation	Disease threatened
<i>Coffea arabica</i>	Rubiaceae	Buna	Sh	S	Powdered seed puts on bleeding body	bleeding
<i>Croton macrostachyus</i> Del.	Euphorbiaceae	Bakanisa	T	L	Juvenile leaves smashed and rubbed on affected part	Ring worm
<i>Cucurbita maxima</i>	Cucurbitaceae	Dabaqula	H	S	The dried seed roasted and eaten	Tape worm
<i>Cymbopogon citratus</i> (DC.) Stapf	Poaceae	Marga cita	H	R	Root chewed with salt to get relief from stomach ache	Stomach ache
<i>Datura stramonium</i> L.	Solanaceae	Asangira	Sh	S	Seed put on fire and the smoke inhaled	
<i>Dovyalis abyssinica</i>	Flacourtiaceae	Koshimi	Sh	Fu	Fruit is eaten to expel intestinal parasites.	Parasite
<i>Echinops hispidus</i> Fresen.	Asteraceae	Kebercho	H	Ba	Dried bark put on fire and the smoke inhaled	Evil eye
<i>Erythrina brucei</i>	Fabaceae	Walensa	T	Ba	Chewing internal part of stem bark	Tooth ache
<i>Eucalyptus globulus</i> Labill.	Myrtaceae	Baargamo Adi	T	L	Fresh leaves boiled in water and inhale	Common cold
<i>Euphorbia candelabrum</i> L.	Euphorbiaceae	Adami	T	La	The drops collected, baked with wheat powder and eaten to the empty stomach.	Gonorrhoea and Ascariasis
<i>Euphorbia depauperata</i>	Euphorbiaceae	Gurii	H	La	The latex is applied on the infected part.	Ring worm
<i>Ficus sur</i>	Moraceae	Harbu	T	La	The latex is applied to the affected body	Ring worm
<i>Hagenia abyssinica</i> (Brace) J.F.Gmel.	Rosaceae	Heexo	T	Fl	The flower powdered and drunk with water	Tape worm
<i>Justicia schimperiana</i> (Hochst. Nees)	Acanthaceae	Dhummuugaa	Sh	L	Leaves put in boil water and inhale the steam	Headache
<i>Kalanchoe species</i>	Crassulaceae	Bosoqe	H	R	Root is chewed and swallowed with salt.	Stomach ache
<i>Lagenaria siceraria</i> Standl.	Cucurbitaceae	Buqqe	H	L	Fresh leaf is crushed and applied on the hair	Dandruff
<i>Linum ustitatisimum</i> L.	Linaceae	Talba	H	S	Dried seed put in eye	Eye pain
<i>Lippia adoensis</i> Hochst. ex Walp	Verbenaceae	Kusaye	Sh	L	Fresh leaves are chewed	Chest burn
<i>Negella Sativa</i>	Ranunculaceae	Tikur azmud	H	S	The seed crushed and inhaled by nose	Common cold
<i>Nicotiana tabacum</i> L.	Solanaceae	Tambo	H	L	Leaves crushed, mixed in water and drunk	Snake bite
<i>Ocimum basilicum</i> L.	Labiatae	Besobila	H	L	Pounding and squeezing the juice	Abdomen coli
<i>Olea europeae</i> L.	Oleaceae	Ejarsa	T	L	Leaves are boiled and n taken when cold	Tooth ache
<i>Prunus africana</i> (Hook.f.) Kalkm.	Rosaceae	Hoomii	T	Ba	Powdered and tied for five days	Wound
<i>Rhamnus prinoides</i> L Herit.	Rhamnaceae	Gesho	Sh	L	Fresh leaves chewed and swallowed	Tonsillitis
<i>Ricinus communis</i> L.	Euphorbiaceae	Qobbo	Sh	R	Root crushed, mixed in water and drunk.	Rabies
<i>Rumex nepalensis</i> Spreng.	Polygonaceae	Ximiji	H	R	Few root chewed and swallowed	Gastric
<i>Rumex nepalensis</i> Spreng.	Poaceae	Tulti	H	R	The root is chewed	Amoeba
<i>Ruta chalepensis</i> L.	Rutaceae	Xenadami	H	L	The leaf is chewed together and swallowed	Stomach ache
<i>Schinus molle</i> L.	Anacardaceae	Qindo barbore	T	S	Chewed and swallowed	Tonsillitis

Scientific Name	Family Name	Local Name	Habit	Plant part	Method of preparation	Disease threated
<i>Solanum incanum</i>	Solanaceae	Hiddi	Sh	L	Fresh leaves smashed and smelled	Nasal bleeding
<i>Syzygium guineense</i> L.	Myrtaceae	Baddesa	T	Ba	Bark is crushed and drunk with coffee	Internal parasite
<i>Triticum aestivum</i>	Poaceae	Qamadi	H	S	Chewing the seeds and placing on the swelling	Body swelling
<i>Vernonia auriculifera</i>	Asteraceae	Reeji	Sh	S	Peeling the young stem and chewing it.	Amoeba
<i>Withania somnifera</i>	Solanaceae	Lallaafa	Sh	R	Chewing the root and swallowing it	Snake bite
<i>Zingiber officinale</i> Roscoe	Zingibraceae	jinjibila	H	R	Chewed and swallowed	Tonsillitis
<i>Ziziphus mucronata</i>	Rhamnacea	Hunqura	Sh	L	Chopping the leaves and applying on the wound.	Wound

3.2. Habits of Medicinal Plants

The result of growth forms diversity analysis of medicinal plants reveals that herbs constitute the largest category 38% (16 species) followed by shrubs 33% (28 species). Trees growth for accounted to 26%(11 species). The others Liana constitute the least category which was 2.4% (1 species) (Figure 2). As a general, herbs and shrubs make up the highest proportion which was 71% of the medicinal plant species in the area. Relatively high number of herbs and shrubs for medicinal purpose were also previously reported in Ethiopia (Balcha, 2014).

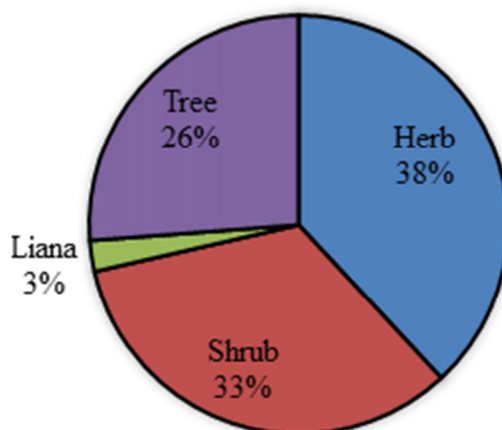


Figure 2: Growth forms of Medicinal Plants

3.3. Parts of Medicinal Plants Used as Medicine

From the total medicinal plant parts used for treatment of disease, the leaves and the roots were the most commonly used plant parts in the preparation of remedies accounting for 33.3% (14 species) and 21.4% (9 species) of the total medicinal plants, respectively. These parts of medicinal plants were followed by seed which was 19.1 (8 species) and lower values for other parts used to treat various health problems (Figure 3).

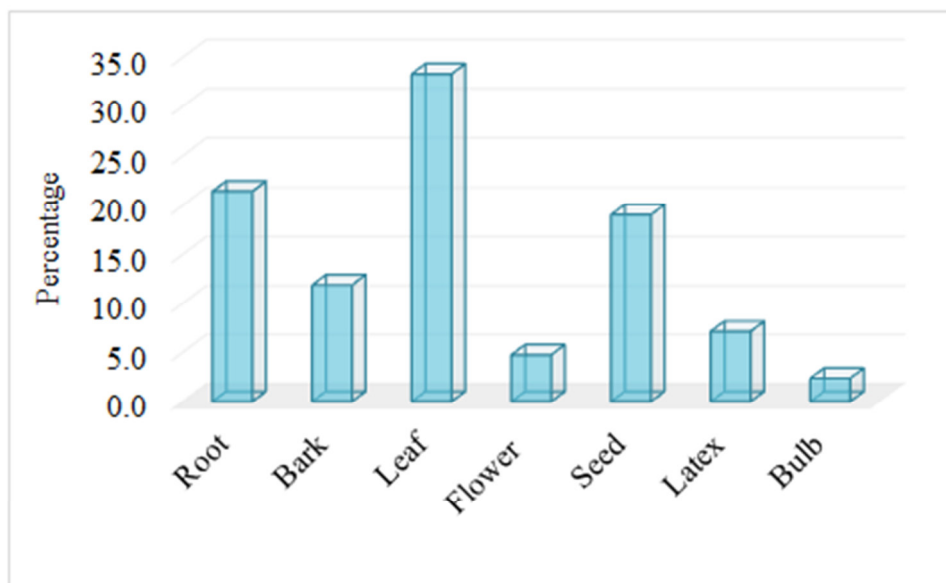


Figure 3: Parts of medicinal plants

3.4. Ranking of Medicinal Plants Used to Treat Tonsillitis

There are different species prescribed for the same health problem. In that situation, people show preference of one over the other. Preference ranking of four medicinal plants that were reported as effective for treating Tonsillitis was conducted after selecting ten key participants. The informants were asked to compare the given medicinal plants based on their effectiveness and to give the highest number (5) for the medicinal plant which they thought most effective in treating Tonsillitis and the lowest number (1) for the least effective plant in treating Tonsillitis.

Accordingly, the results showed that *Zingiber officinale* scored the highest mark and ranked first in dicating that it was the most effective in treating Tonsillitis disease and followed by *Acmella caulirhiza*. The least preferred plant species compared to the other four species were *Schinus molle* (Table 2).

Table 2: Preference ranking of medicinal plants used to treat Tonsillitis.

Medicinal Plants	Respondents R1-R10										Total	Rank
	R ₁	R ₂	R ₃	R ₄	R ₅	R ₆	R ₇	R ₈	R ₉	R ₁₀		
<i>Acmella caulirhiza</i>	5	4	4	5	3	4	3	4	5	5	42	2 nd
<i>Rhamnus prinoides</i>	4	5	3	4	2	1	4	5	3	3	34	3 rd
<i>Schinus molle</i>	4	3	3	2	2	3	1	2	3	5	28	4 th
<i>Zingiber officinale</i>	4	5	5	5	4	3	5	4	4	5	44	1 st

4. Conclusion and Recommendation

In this study, 42 plant species of medicinal importance were recorded and documented from three kebeles of Goba District. Most of these medicinal plants are harvested from natural stands and homegardens. They are also found growing sporadically in natural forests, hills, mountains, churches, river and roadsides. They are the predominant sources of traditional medicine for traditional healers. Herbs were found to be the most dominant growth forms in the preparation of traditional remedies followed by shrubs, trees and Liana.

Like in other parts of Ethiopia, people of the Goba district have traditional practices which have been accumulated for generations to treat human diseases. They use different parts of plants to prepare remedies (roots, leaves, stems, barks, and other plants structures). People in the study area use medicinal plants not only for healthcare but also as financial income. However, due to various reasons, many of medicinal plants were reported to be threatened and lost. It was also reported that the elders, who know more about medicinal plants, might die without sharing their traditional knowledge to the young generation.

Therefore, documentation is important in order to transfer the knowledge to the next generation since it can be the base for the invention of modern drugs. This work is based on the Indigenous knowledge on medicinal plants and methods of treatment against common ailments prevailing among the people of three kebeles in Goba district.

Based on the results found, the following Recommendations are forwarded: this study was limited to three kebeles of Goba district due to many limitations, thus to give more support to the above findings and find more diversities of medicinal plants, further scientific investigations of medicinal plants in the whole parts of the

districts are needed.

Conflict of Interests

The author declare that he has no competing interests.

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