

Ethnobotanical study on assessment of Practice on Traditional Plant Medicine Use among People of Wonchi District, central Ethiopia

Gadissa Melkamu Bulcha

Department of biology, University of Gondar, Ethiopia

*Corresponding Author: Gadissa Melkamu Bulcha, Department of biology, University of Gondar, Ethiopia.

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Abstract

Ethiopia is a country characterized by a wide range of climate and ecological condition which helped to have high diversity of medicinal plants and up to 80% of the population use traditional medicine for primary health care. Studies on the current practices of the communities in the area are vital to document the basic information in these regions. Therefore, this study was aimed in assessing the practices of traditional plant medicine use among communities of Wonchi District.

Results: The most widely used route of administration in the study area was oral accounted for (56.67%) followed by dermal (29.63%) This is the reason that oral and dermal routes permit rapid physiological reaction of the prepared medicines with the pathogens and increase its curative power. The prepared traditional medicines were applied in a number of ways, among which drinking (37.57%), creaming (16.76%), and eating (10.40%) were mentioned frequently.

Keywords: indigenous practice, local people, medicinal plants, traditional medicine, wonchi district

Abbreviations

IK; indigenous knowledge, MM; modern medicine, MP; medicinal plants, TMPU; Traditional medicinal plant use

1. Introduction

According to WHO (1979), consultation of medicinal practitioners is very helpful for the development and incorporation of useful approaches in planning and budgeting system for health care provision of most developing nations and indigenous communities. In Africa, traditional medicine plays a central role in health care needs of rural people and urban poor. Here, it is said that, this situation would remain so long as modern medicine continues to be unable to meet the health care of the people of the continent effectively (Jansen, 1981). The value and role of this health care system will not diminish in the future, because they are both culturally viable and expected to remain affordable, while the modern health care service is both limited and expensive (WHO, 1979).

Indigenous traditional medicinal practices were carried out essentially based on private practice, i.e. private agreement between consenting parties, and the knowledge of traditional practice in most cases has descended through oral folk lore (Asfaw Debela *et al.*, 1999). The secret information retained by traditional healers is relatively less susceptible to distortion but less accessible to the public. However, the knowledge is dynamic as the practitioners make every effort to widen

their scope by reciprocal exchange of limited information with each other (Dawit Abebe, 1986).

Incomplete coverage of modern medical system, shortage of pharmaceuticals and unaffordable prices of modern drugs, make the majority of Ethiopian still to depend on traditional plant medicines (Dawit Abebe and Ahadu Ayehu, 1993; Teferi Gedif and Hahn, 2003). Hence the present study was initiated to investigate the indigenous practice of traditional plant medicine use among local communities of Wonchi District, Western Ethiopia.

1.1. Statement of the Problem

Traditional medicine is an ancient form of health care practices long before appearance of scientific medicine which have played and continue to have important role in providing curative services to very large number of people particularly in the rural areas of almost all countries of Africa (Getachew Addis *et al.*, 2000). It is the culture of many people because of its accessibility to the people even in most remote areas particularly in the community where care is given at low cost to patients in their home. Most people have good attitude towards traditional plant medicine, although it is not always the best form of health care system (Getachew Addis *et al.*, 2000).

In many parts of Ethiopia, considerable numbers of researches have been done on those practice of traditional plant medicine (Aschalew Lata and Takele Etana, 2014). Like in other parts of country, in the

current study area, the knowledge on medicinal plants depth and width become lesser and lesser due to its secrecy, unwillingness of young generation to gain the knowledge, influence of modern education, religious and awareness factors, which all results in gradual disappearance of indigenous knowledge on medicinal plants (Researcher long term direct observation). But there was no much formal research work that had been done on the indigenous practice of traditional plant medicine in the study area. Therefore, this study was aimed to document the traditional medicinal plant species practices in the study area.

2. Materials and Method

2.1. Descriptions of the Study area and Location

Wonchi District is one of the Districts in the Southwest Shoa Zone, Oromia Region, Ethiopia, which is located 124 km away from southwest of Addis Ababa with the area coverage of 460,516 hectare and the altitude range between 1798m to 2118m above sea level. The administrative center of Wonchi is Chitu and it has beautiful Creator Lake known as Wonchi Lake from which the district has got its name. As a result many tourists from inside and outside visit this natural lake every year and it is source of income for the country (Wonch District Health Office report, 2017).

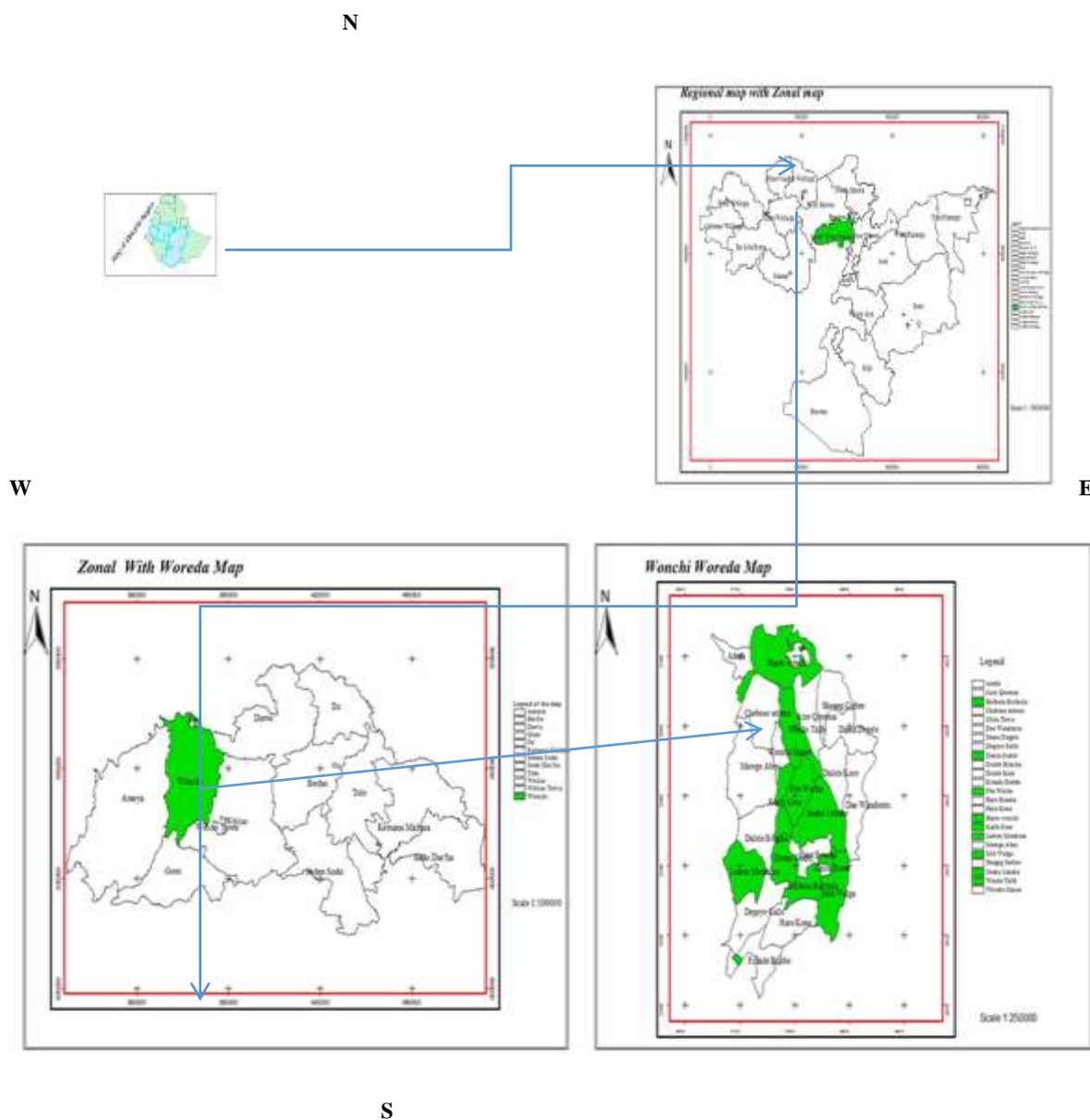


Figure 1: Map of the Study Area

2.2. Population

Demographically the district has a population of 119, 736 with almost equal gender ratio of 49.8% male and 50.2% female. The average

family size is 6 and the average number of children perhousehold was nearly 4 indicating that it is found to focus of development intervention addressing child wellbeing to bring real development in the

community. Religion wise, Orthodox constitute 58.9%, Protestants 39.6% and Muslims constitute 1.3% while the ethnic group composition, as per the Terminal evaluation findings of 2013, more than 99% are Oromo, the remaining being Amhara, Gurage and others (CSA, 2007).

2.3. Climate

Ecologically the district is divided in to *dega* or high land (40%) and *woina dega* or mini land (60%). The mean annual rain fall of the area

ranges from 1650-1800mm with annual temperature range of 10-30°C and mean average of 19.6 °C. The study area had 28.7°C annual mean maximum and, 19.6°C annual mean minimum temperature. The annual mean maximum and minimum temperature were recorded in March and November respectively. The highest rainfall distributions occur from June to September (Figure 2).

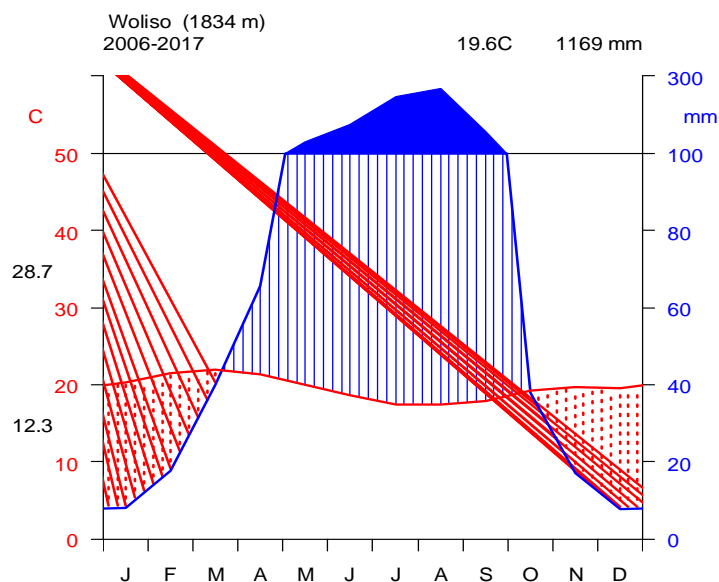


Figure 2: Climadiagram of the study area from 2006-2017

2.4. Land use types

Out of the total areas of the District, 82% is cultivated land, 11.7% grazing land, 8.9% covered by natural forest, 1.03% is water body while others is 18.6% (World Vision Ethiopia Woncha area Office report, 2018).

2.5. Vegetation of the study area

Due to variation in altitude and topographical features, the wonchi district vegetation shows three different zones, namely: Afromontane forest, sub alpine and afroalpine) vegetation (Zerihun Woldu, 1999; Puff and Sileshi Nemomissa, 2005; Getinet Masresha, 2014). The common plant species of the study area include: *Achyranthes aspera*, *Albizia schimperiana*, *Alchemilla pedata*, *Apodytes dimidiata*, *Brucea antidysenterica*, *Dombeya torrida*, *Embelia schimperi*, *Erica arborea*, *Festuca gilbertiana*, *Lobelia rhynchopetalum*, *Hagenia abyssinica*, *Hypericum revolutum*, *Jasminum abyssinicum*, *Juniperus procera*, *Kniphofia foliosa*, *Lobelia giberroa*, *Maytenus arbutifolia*, *Milletia ferruginea*, *Nuxia congesta*, *Olea capensis*, *Olea europaea subsp. caspidata*, *Papaneasimensis*, *Pittosporum viridiflorum*, *Prunus africana*, *Phytolacadicandra*, *Salix subserrata*, *Schefflera abyssinica*, *Thymus schimperi* and *Zehneria scabra* Vegetation.

2.6. Study Design

Field survey design was employed together information on the indigenous knowledge, attitude and practice of traditional plant medicine of the local people in the study area. During the survey, both

qualitative (none numerical) and quantitative (numerical) data were collected.

2.7. Reconnaissance Surveys

Preliminary survey was conducted from march 20- 25, 2018. During the preliminary survey general information about the study area were gathered. Based on the information sampling technique, Sampled Kebeles, number of informants and study sites were determined.

2.8. Study Site Selection

From a total 23 Kebeles in the District, nine study Kebeles were selected purposively based on availability of key informants following the recommendation of government officials, stakeholders, and religious leaders during reconnaissance survey. The sampled Kebeles are (Belbela, Dimtu, Fite, Haro wanch, Kurfo gute, Lemen meta hora, Miti welga, Sonkole kake, Waldo telfa).

2.9. Informant Selection

A total of 198 informants were selected. From these 27 were key informants (3 informants per Kebele) which were selected purposively and 171 (19 per Kebele) of them were general informants which were selected randomly (simple random sampling technique following lottery method). Age range of informants selected for the study were from 20 to 80 who lived 5 year and above in the study area. According to storck *et al.* (1991) and Jarso belay (2016), the size of the sample depends on the available fund, time and other reasons and not necessarily depends on total population.

2.10. Data Collection Method

Semi-structured interview, observation and guided field walks with informants were employed to obtain ethnobotanical data as used by Gidey Yirga (2010). Interview was based on a checklist of questions prepared beforehand in English and translated to local languages (Afaan Oromo). Information regarding indigenous practice of local community towards traditional plant medicine of healers was recorded at the spot. Guided field observation was made on the medicinal plants to check the availability of the plant in the area, to know the habit and habitat of the plant. Focus group discussion was also made to get more information on medicinal plants practice

2.11. Data Analyses

Descriptive statistics were used to analyze the data on medicinal plants use and associated indigenous knowledge of local community, their attitude on traditional plant medicine use and medicinal plant used by traditional plant medicine healers of the study area. The results were displayed and summarized in tables and figures by using percentage,

frequency and texts. The most useful information gathered on medicinal plants which were analyzed through the descriptive statistics include application, methods of preparation, route of application, disease treated, and parts used and the habit of the plant.

3. Results and discussion

3.1 Socio-demographic characteristics of respondent's

A total of 198 informants including 27 key informants were selected. As pointed out by Martin (1995), the selection of key informants is commonly systematic. Most of the respondents (77.77%) were males (Table 1). The majority of respondent's age range was from 40-60(51.5%). Most of the participants (86.86%) were married (Table 1). Almost all religious leader respondents were followers of Orthodox Christian. From all respondents 33.83% were able to read and write. Number of farmers' respondents predominated (33.33%) other respondents while NGO workers are lower in number (5.05%) (Table 1).

No	Variables	Response option	Frequency	Percentage (%)
1.	Sex	Male	154	77.77
		Female	44	22.23
		Total	198	100
2.	Age	20-40	14	7.07
		41-60	102	51.51
		61-80	82	41.41
3.	Marital status	Single	12	6.06
		Married	171	86.86
		Windowed	15	7.57
4.	Religion	Christian	142	71.71
		Muslim	27	13.63
		Waqefata	25	12.62
		Others	4	2.02
5.	Education	Uneducated	41	20.70
		Able to read and write	67	33.83
		12 complete	10	5.05
		10 complete	38	19.19
		Diploma	39	19.69
		Degree	3	1.51
6.	Occupational status.	Farmers	66	33.33
		Merchants	25	12.62
		Government employer	36	18.18
		NGO worker	10	5.05
		Others	61	30.80

Table 1: Socio-demographic characteristics of respondents in the study area

No	Respondents	Male	Female	Total	Percentage (%)
1	Farmers	26	7	33	16.66
2	Merchants	16	9	25	12.62
3	Religious leaders	26	6	32	16.16
4	Health care workers	26	10	36	18.18
5	Traditional plant medicine users	46	8	54	27.27
6	Traditional plant medicine healers	14	4	18	9.10
7	Total	154	44	198	100

Table 2: Distribution of informant groups by number

3.2. Mode of preparation and route of administration

Concerning the preparation of traditional medicine, the local people employed various methods of preparation of traditional medicines for different types of ailments. The most principal method of TMP preparation reported was in the form of crushing (20%) and the least

was cooking (1.6%) (Table 8). This might be the effective extraction of the plant gives immediate response for health problems when crushed or pounded to increase its curative potential. The result is consistent with the findings of Getnet Chekole *et al.* (2015) in which crushing is highly reported method of remedy preparation. But it

disagrees with the report of Jarso Belay (2016) which revealed that squeezing is the most used preparation method.

The most widely used route of administration was oral accounted for (56.67%) followed by dermal (29.63%) (Table, 8). This is the reason that oral and dermal routes permit rapid physiological reaction of the prepared medicines with the pathogens and increase its curative power

(Fisseha Mesfin *et al.*, 2009). These results are consistent with findings of various ethnobotanical researches elsewhere in Ethiopia and other countries such as that of (Mirutse Giday *et al.*, 2003; Endalew Amenu., 2007; Haile Yinger *et al.*, 2008; Fisseha Mesfin., *et al.*, 2009; Behailu Etana, 2010; Ermias Lulekal and Ketema Tolossa *et al.*, 2013; Getnet Chekole, 2015 and Patience *et al.*, 2016).

Forms of preparation	Total	% of total	Administration	Remedy counts	Percentage(%)
Crushing	25	20	Oral	153	56.67
Pounding & mixing	25	18.4	Dermal	80	29.63
Pounding&powdering	23	17.6	Nasal	19	7.04
Squeezing	21	16	Optical	6	2.22
Chewing	18	14.4	Auricular	5	1.85
Pounding & squeezing	6	4	Nasal and oral	4	1.48
Decoction	5	4	Neck	3	1.11
Cooking	2	1.6			
Total	125	100		270	100

Table 3: Mode of preparation and route of administration

3.3. Ways of applications and dosage of plant remedies

The prepared traditional medicines were applied in a number of ways, among which drinking (37.57%), creaming (16.76%), and eating (10.40%) were mentioned frequently (Figure 6). This finding is consistent with the finding of Endalew Amenu (2007) and Behailu Etana (2010) in which drinking accounted the largest percentage of remedy.

The dosage of medicine to be administered is given by estimating age, the physical condition of the patient and the severity of the diseases. Amounts to be administered is also estimated by the use of measurements such as length of a finger (for bark, root and stem length), pinch (for powdered plant material) different measuring materials (e.g. spoon, coffee cup, tea cup and glass cups) and number count (for sap/extract drops, leaves, seeds, fruits, bulbs, rhizomes and

flowers). But these measurements are not accurate enough to determine the precise amount. Some of the medicinal preparations are reported to have adverse effects on the patients. Informants reported that *Hagenia abyssinica*, *Phytolacca dodecandra* and some others are found to have adverse side effects like stomach pain, vomiting and diarrhea. The informants recommended additives for some of these adverse side effects, such as drinking of milk and barley soup immediately after intake of medicinal plants (Mirutse Giday *et al.*, 2003; Mirutse Giday and Gobena Ameni, 2003; Kebu Balemie *et al.*, 2004). This study agreed with study made by Abraha Teklay *et al.* (2013) in Kilde Awlaelo District, Eastern zone of Tigray region of Ethiopia and Getu Alemayehu (2017) in Amaro district, southern nations and nationalities of Ethiopia showed no agreement in accurate measurement or unit used among informants.

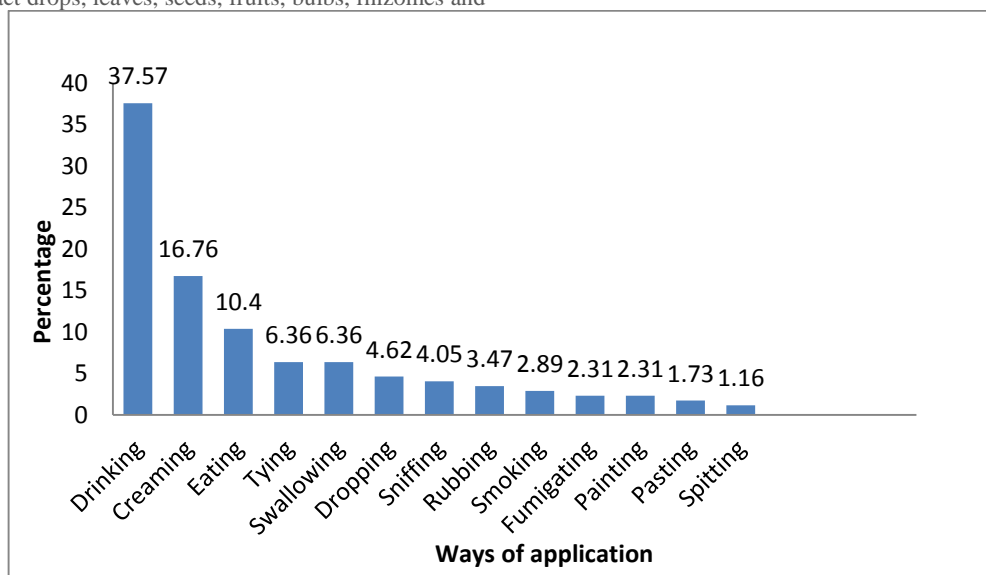


Figure 3: Application ways of remedies for human and livestock ailment treatment

3.4. Conditions of preparation of remedies

The results showed that majority of the remedies were prepared using fresh material (50, 53.76%), while 15 species (16.13%) were used in the dried form and 28 (30.11%) either fresh or dried. Similar studies

were also conducted by Mengistu Gebrahiwot (2010) and Tadesse Beyene (2015) which showed that using fresh materials for different health problems is more than dry materials or dry or fresh. This could

be due to the fact that the fresh materials did not lose their volatile bioactive chemicals like oils, which could deteriorate on drying.

3.4. Disease types and related medicinal plants in the study area

In the area a total of 57 ailment types (both human and livestock ailments) were recorded along with the medicinal plants. From these disease types, wound is the most frequently mentioned ailment type and it is claimed to be treated by many number (25 species) of medicinal plants. This is followed by Malaria and stomach ache which are claimed to be treated by 14 and 13 species respectively. While Abortion, back pain, bilharzia, ear defect, goiter, infertility, retained placenta and syphilis are claimed to be treated by only a single medicinal plant species (Appendix 7).

Paired-wise comparison analysis on six most important TMPs claimed to treat wound was performed. The result showed that *Acacia abyssinica* is the most useful and effective plant to treat wound followed by *Kalanchoe petitiata* while *Olea europaea* ranked sixth. (Table 9) Preference ranking was also made on other six TMPs which were mentioned to treat malaria (Table 10). The result showed that *Vernonia amygdalina* is the most preferred species that ranked first followed by *Juniperus procera*. *Eucalyptus globulus* is the least preferred species followed by *Lepidium sativum* (Table 10). All of the species particularly the top ranked ones by preference and pair wise needs special urgent conservation action and sustainable uses. In this regard the results agree with the findings of Behailu Etana (2010).

Species name	Respondents (1-7)							Sum	Rank
	1	2	3	4	5	6	7		
<i>Acacia abyssinica</i>	3	5	2	2	5	3	4	24	1 st
<i>Kalanchoe petitiata</i>	4	0	3	2	3	4	5	21	2 nd
<i>Asparagus africanus</i>	5	3	4	1	1	2	3	19	3 rd
<i>Euphorbia abyssinica</i>	2	4	1	4	0	3	2	16	4 th
<i>Rumex nervosus</i>	1	2	2	1	4	2	1	13	5 th
<i>Olea europaea</i>	0	1	3	5	2	1	0	12	6 th
Total	15	15	15	15	15	15	15	105	

Table 4: Pared-wise comparison on six more mentioned medicinal plants against wound

Species name	Respondents							Sum	Rank
	1	2	3	4	5	6	7		
<i>Vernonia amygdalina</i>	6	2	4	5	1	2	6	26	1 st
<i>Juniperus procera</i>	5	3	3	2	4	4	4	25	2 nd
<i>Allium sativum</i>	4	6	5	1	2	3	3	24	3 rd
<i>Zingiber officinale</i>	3	5	4	2	6	1	2	23	4 th
<i>Lepidium sativum</i>	3	5	2	4	2	1	3	20	5 th
<i>Eucalyptus globulus</i>	2	4	1	3	5	1	2	18	6 th

Table 5: Preference ranking on six most frequently reported plants claimed to treat malaria

3.5. Major human diseases in the study area

In the study area, a total of 44 diseases of humans recorded were treated with a total of 50 plant species, where one species can treat a single disease or a number of diseases (Appendix 5). Similarly, one ailment can be treated with a combination of plant species or single plant. For example, wound is treated with 25 species of plants, malaria and stomach-ache with 14 species each; body swelling and evil eye treated with 10 species each, tonsillitis with 9 species. Fibril illness, scabies (itches) and skin rash treated with 7 species each (Appendix 5). Most of the reported medicinal plants were used to treat human ailments (Appendix 5). This showed that, the people of the study area are more knowledgeable and give great attention about human ailments as compared to livestock diseases. Similar results were recorded by Seyoum Getaneh (2009) in Debre Libanos District, North Shewa Zone of Oromia Region, Ethiopia. Medicinal plants recorded in this study also used as remedies in other part of the country. For instance, 28 species were mentioned in Mesfin Tadesse (1986), 9 species in Debela Hunde (2004), 10 species in Abiyot Berhanu (2006), 61 species in Endalew Amenu (2007), 30 plant species in Fisseha Mesfin (2009), and 59 plant species in Seyoum Getaneh (2009).

3.6. Livestock diseases in the study area

In comparison to human diseases, livestock diseases were treated with a few number of plant species in the study area. A total of 13 livestock ailments were identified that were treated by traditional medicinal plants in the area (Appendix 8) Common diseases affecting livestock

health in the study area were bloating which was treated by 10 species, anthrax and leech by 6 species each, ectoparasite (lice) by 5 species, rabies by 3 species, erythroblasts, horse disease, retained placenta and coccidiosis are treated by 2 species each and the remaining diseases are treated by 1 species each (Appendix 8) In addition, proper documentation and understanding of farmer's knowledge, attitude, and practices about the occurrence, cause, treatments, prevention and control of various ailments is important in designing and implementing successful livestock production (Tafesse Mesfin and Mekonen Lemma, 2001).

3.7. Threats and conservation of medicinal plants in the study area

3.7.1. Threats to medicinal plants

The causes of threats to medicinal plants in the study area were both natural and anthropogenic factors. The most dominant factors affecting the medicinal plants in the study area was agricultural land expansion (34.34%) followed by charcoal production (16.16%). While, the least serious factor was wild fire (4.04%) and then overflowing (4.54%) (Table 11). Similar problems were also emphasized by Ensermu Kelbessa *et al.* (1992) and Vivero *et al.* (2005). Moreover, the problems identified so far during the course of this study are almost similar to what other literature sources studied in many parts of the country have already stated (Getachew Addis *et al.*, 2001; Mirutse Giday *et al.*, 2003; Tilahun Teklehmanot and Mirutse

Giday, 2007). The medicinal plants of Wonch district in general and particular are facing the same problem.

The loss of medicinal plants associated with the missing advantages gained from medicinal plants and indigenous knowledge associated with plants (Sofowara, 1982). This is observed in wonch district as collection and search for some medicinal plants like *Cordia africana*, *Ekebergia capensis* and *Thalictrum rhynchocarpum* need longer time distance from their residence. Similar findings were also reported in Ethiopia (Endalew Amenu, 2007; Behailu Etana, 2010; Getnet Chekole *et al.*, 2015) that showed need for agricultural land and for other uses severely threatened plant species in general and medicinal plants in particular.

Merchants, health care workers and other members of society obtained charcoal and timber from *Acacia abyssinica* and *Cordia africana* mature plants were recorded in the area indicating over exploitation. Balick and Cox (1996) argue that quite simply, mature seed producing tree that are the backbone of the population will die and are not replaced and ultimately the resource base on which culturally values are built will disappear because of over harvesting.

Individual farmers in the area as observed during the study penetrated the forest with their axes daily. Here, the scenario is people need plants for their daily life activity i.e. as source of house hold tools, charcoal, furniture, agricultural implements. Thus, those multi-purpose species are on front line to be affected by these activities.

Variable	Factors	Frequency	Percentage (%)
Threats to conservation of medicinal plants	Agricultural land expansion	68	34.34
	Fire wood	23	11.61
	Charcoal	32	16.16
	Timber production	17	8.58
	Construction wood	21	10.60
	Medicinal plant trade	10	5.05
	Drought	10	5.05
	Over flooding	9	4.54
	Wild fire	8	4.04
Total		198	100

Table 6: Factors affecting Medicinal plants in the study area.

3.8. Conservation of medicinal plants and associated knowledge in the study area

Local people of the area know the importance of conserving the plants in both ex-situ and in-situ conservation methods. For instance, some people have started conserving the plants in fenced/protected pasture land (18.62%); in different worship areas (churches, mosques) (21.49%), in their farms (18.62%), field/farm margins and around their home gardens (18.58%) and live fences of the famers (20.20%) (Table 12). Nigussie Amsalu, (2010) and Getnet Chekole, (2015) have also reported that different worship areas are conservation sites for remnant vegetation in general and medicinal plants in particular. For instance, medicinal plants like *Juniperus procera*, *Olea europaea* subsp. *cuspidata* and *Euphorbia abyssinica* are found in church forest and also plants like *Hagenia abyssinica*, *Ocimum urticifolium* and *Ruta chalepensis* are found in the majority of home gardens in the study area, as they need these plants in their daily life as spices,

medicine or for other values. Plants such as *Acacia abyssinica* and *Cordia africana* are also left as remnants of forest in the agricultural field due to their uses as timber source, for construction and fuel wood. Many medicinal plant species were also reported to be rare. Some of these local names are BOODAA WALEENSSUU (meaning plain land of *Erythrina brucei*), BARAA CALALQAA (meaning valley of *Apodytes dimidiata*), KARREE BAROODDOO (meaning hilly slope of *Myrica salicifolia*), and GULLUUGURRAA (meaning mountainous slop of *Prunus africana*). What then ethno botanists have to learn from such evidences should be the point of focus. Such local clues could be good contributors for designing ecosystem/habitat conservation, rehabilitation and resilience of species in their wild state where they are best adapted. These need an urgent attention to conserve such resources in order to optimize their use in the primary health care system. Some studies have shown that most of the medicinal plants used in Ethiopia are harvested from the wild (Mirutse Gidey, 1999; and Zemed Asfaw, 1999).

Variables		Frequency	Percentage (%)
Knowledge on the importance of medicinal plant conservation	Good	101	51.01
	Not good	97	48.99
Total		198	100
Types of conservation	On worship areas	42	21.49
	On protected pasture	36	18.62
	In their farms	43	21.11
	In home gardens	37	18.58
	In live fences of the farmers	40	20.20
Total		198	100

Table 7: Indigenous knowledge of local community towards medicinal plants conservation

4. Conclusion and Recommendations

4.1. Conclusion

A study on medicinal plant indigenous knowledge, attitude and practice in the area revealed that the community use medicinal plants for maintaining their primary health care. From the study it can be said that the different segment of the community in the study area are in different level of knowledge with regard to traditional plant medicine use, i.e. difference in age, sex, work and education level has impact on the knowledge of the use of traditional plant medicine. In addition from the result of the study it can be concluded that there are considerable number of community members which do have negative attitude towards use of traditional plant medicines specially educated and youngsters are developing negative attitudes. Moreover, the result of the study revealed that, though negative attitude towards traditional plant medicine is believed to be increasing from time to time, still the community is extensively practicing the use of traditional plant medicines. The ethnobotanical study of medicinal plants in the study area showed that medicinal plants are used by a large member of the population and it is the most important means of treating some common human and livestock ailments.

Most medicinal plants collected and identified were herbs and all plant parts were used for preparation of remedies. However, the use of medicinal plants for multiple purposes is leading to depletion in an alarming rate. This is worthy because of some of the uses (Agricultural expansion, firewood, construction, forage, charcoal.) are the major destructive.

Threats that erode indigenous knowledge usually comes from secrecy, oral-based knowledge transfer, the unwillingness of young generation to gain the knowledge, unavailability of the species, the influence of modern education and awareness factors are the major ones.

The results of this study also showed that cultivation of plant species in and around home gardens for different purposes have great contribution to the conservation of medicinal plants and the associated knowledge.

4.2. Recommendations

Based on the results of the study, the following recommendations are forwarded.

- ❖ Integrated conservation and management program on medicinal plants focused on awareness development and active involvement of local community, governmental and non governmental bodies shall be practiced in the district.
- ❖ Young generation needs raising awareness to avoid negative impacts on the medicinal plants and associated knowledge in the area, hence, documentation of the medicinal plants of the area needs to be continued.
- ❖ Avoid uprooting of the plant species for medicinal purpose particularly before its flowering, fruiting and/seeding. If possible, it is better to use other parts of the medicinal plants such as leaves instead of root to protect them from the risk of extinction and endangering the species by collecting the roots or barks of the plants.
- ❖ Establishing traditional healers associations by providing supports like land, fund and assistances for cultivations of medicinal plants in the district would help to conserve medicinal plants.
- ❖ The societies have no good awareness with tradition plant medicine healers. So that all stakeholders should work together to change the situation and to benefit from traditional plant medicine.

- ❖ The government should create possible conditions and include to the teaching curricula about traditional plant medicine use
- ❖ To change the attitude of the society any concerned body should give trainings, seminars about traditional plant medicine use.
- ❖ The government and other officials should recognize the use of traditional plant medicine and also the healers of traditional plant medicine need any supports from concerned bodies.
- ❖ The insights of religious institution and health care institution should be positive and work together with traditional plant medicine.
- ❖ The user's negative attitude should be changed in to positive and the lack of knowledge about traditional plant medicine use also should be changed by giving training to them and through creating awareness. All stakeholders should develop positive attitude for traditional plant medicine healers. The healers of traditional plant medicine should use appropriate measurements to give the medicine for users.

Declarations

Ethical approval

Written ethical clearance was obtained from the research and ethical committee of the department of biology university of Gonder. A formal letter was written to wonchi district health and agricultural office and each kebele administration to conduct the study. Written informed consent was sought and obtained from every participant who decided to take part in the study. They were assured about the confidentiality of their responses.

Consent for publication

Not applicable

Availability of data and materials

The datasets used and /or analysed during the current study available from the author for reasonable request.

Completing interests

The author declares that they have no financial and non financial competing interests.

Author contributions

GM was involved in the conception, design, analysis, interpretation, report and manuscript writing.

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Appendix 1: Lists of plants collected from the study area (D=dry; F=fresh; DF= dry or fresh; Cl=climber; H=herb; Sh=shrub; T=tree)

No	Scientific name	Family	Local name (oromoo)	Condition of plant	Plant habitat	Habit
1.	<i>Acacia abyssinica</i> Hochst. ex Benth	Fabaceae	Girar	F	wild	T
2.	<i>Achyranthes aspera</i> L.	Amaranthaceae	Talenj	F	wild	H
3.	<i>Allium cepa</i> L.	Alliaceae	Shinkurt Dimma	F	cultivated	H
4.	<i>Allium sativum</i> L.	Alliaceae	Shinkurt Addii	F	cultivated	H
5.	<i>Aloe pubescens</i> Reynolds	Aloaceae	Eret	F	wild	H
6.	<i>Artemisia abyssinica</i> Sch. Bip. ex A. Ri	Asteraceae	Harit	F	wild	H
7.	<i>Asparagus africanus</i> Lam.	Asparagaceae	Yesetkest	F	wild	Cl
8.	<i>Brassica carinata</i> A.Br.	Brassicaceae	Gomenzer	D	cultivated	H
9.	<i>Brassica nigra</i> L.	Brassicaceae	Senafich	D	cultivated	H
10.	<i>Brucea antidysenterica</i> Fresen.	Simaroubaceae	Waginos	DF	wild	Sh
11.	<i>Buddleja polystachya</i> Fresen.	Loganiaceae	Anfar	F	Both	Sh
12.	<i>Calpurnia aurea</i> (Ait.) Benth.	Fabaceae	Digita	DF	wild	Sh
13.	<i>Capsicum annuum</i> L.	Solanaceae	Berbere	D	cultivated	H
14.	<i>Carica papaya</i> L.	Caricaceae	Papaya	F	cultivated	T
15.	<i>Carissa spinarum</i> L.	Apocynaceae	Agam	DF	wild	Sh
16.	<i>Citrus limon</i> (L.) Burm.f.	Rutaceae	Lomi	F	cultivated	Sh
17.	<i>Clematis simensis</i> Fresen.	Ranunculaceae	Azo hareg	DF	wild	Cl
18.	<i>Clerodendrum myricoides</i> (Hochst.) Vatke	Lamiaceae	Misirich	DF	wild	Sh
19.	<i>Clutia abyssinica</i> Jaub. & Spach	Euphorbiaceae	Fiyalefaj	F	wild	H
20.	<i>Coffea Arabica</i> L.	Rubiaceae	Buna	D	cultivated	Sh
21.	<i>Cordia africana</i> Lam.	Boraginaceae	Wanza	D	wild	T
22.	<i>Coriandrum sativum</i> L.	Apiaceae	Denbelal	D	cultivated	H
23.	<i>Croton macrostichus</i> Del.	Euphorbiaceae	Bisana	DF	wild	T

24.	<i>Cucumis ficifolius</i> A.Rich.	Cucurbitaceae	Ye medir enbuay	F	wild	Cl
25.	<i>Cucurbita pepo</i> L.	Cucurbitaceae	Duba	D	cultivated	Cl
26.	<i>Cupresses lusitanica</i> Mill.	Cupressaceae	Yeferenj tsid	F	Both	T
27.	<i>Cynoglossum coeruleum</i> (Hochst.ex.A.rich.)	Boraginaceae	Chigogit	F	wild	H
28.	<i>Cyphostemma adenocaula</i> (Steud. exA. Rich.)Des. ex Wild &Drum.	Vitaceae	Aserkush	F	wild	Cl
29.	<i>Datura stramonium</i> L.	Solanaceae	Astanagir	F	wild	H
30.	<i>Discopodium penninervum</i> Hochst.	Solanaceae	Almit	F	wild	Sh
31.	<i>Dodonaea angustifolia</i> L.	Sapindaceae	Kitkita	DF	wild	Sh
32.	<i>Dombeya torrida</i> (J. F. Gmel.) P. Bamps	Sterculiaceae	Wulkifa	DF	wild	T
33.	<i>Dovyalis abyssinica</i> (A.Rich.)Warb.	Flacourtiaceae	Koshim	F	Both	Sh
34.	<i>Echinops kebericho</i> Mesfin	Asteraceae	Kerebicho	D	wild	H
35.	<i>Embelia schimperi</i> Vatke	Myrsinaceae	Enkoko	DF	wild	Sh
36.	<i>Erica arborea</i> L.	Ericaceae	Asta	DF	wild	T
37.	<i>Eucalyptus globulus</i> Labill.	Myrtaceae	Bahirzaf Addi	DF	cultivated	T
38.	<i>Euphorbia abyssinica</i> . Gmel	Euphorbiaceae	Kulkual	DF	wild	T
39.	<i>Guizotia abyssinica</i> L.	Asteraceae	Nug	D	cultivated	H
40.	<i>Hagenia abyssinica</i> (Bruce) J. F. Gmel.	Rosaceae	Koso	DF	wild	T
41.	<i>Hypericum revolutum</i> Vahl	Hypericaceae	Amja	DF	wild	Sh
42.	<i>Jasminum abyssinicum</i> L.	Oleaceae	Tembelel	F	wild	Cl
43.	<i>Juniperus procera</i> Endl.	Cupressaceae	Ye abesha tsid	DF	wild	T
44.	<i>Justicia schimperiana</i> (Hochst. exNees) T. Anders	Acanthaceae	Simiza sensel	F	wild	Sh
45.	<i>Kalanchoe petitiata</i> A. Rich.	Euphorbiaceae	Endawula	F	wild	H
46.	<i>Kosteletzkya begonifolia</i> Ulbr.	Malvaceae	Yemegerem	F	wild	H
47.	<i>Linum usitatissimum</i> L.	Lineaceae	Telba	D	cultivated	H
48.	<i>Lobelia rhynchopetalum</i> Hemsl.	Lobeliaceae	Jibira	D	wild	Sh
49.	<i>Lepidium sativum</i> L.	Brassicaceae	Feto	D	cultivated	H
50.	<i>Maesa lanceolata</i> Forssk.	Myrsinaceae	Shwaria(kelawa)	DF	wild	Sh
51.	<i>Melia azedarach</i> Forssk.	Meliaceae	Nim	DF	cultivated	T
52.	<i>Myrtus communis</i> L.	Myrtaceae	Ades	D	wild	Sh
53.	<i>Nicotiana tabacum</i> L.	Solanaceae	Timbaho	DF	cultivated	H
54.	<i>Nigella sativa</i> L.	Ranunculaceae	Tikur azmud	D	cultivated	H
55.	<i>Ocimum basilicum</i> L.	Lamiaceae	Zikakibe	F	cultivate	H
56.	<i>Ocimum lamiifolium</i> Hochst. ex Benth.	Lamiaceae	Damakese	F	Both	sh
57.	<i>Olea europaea</i> L. subsp. <i>cuspidate</i> (Wall. ex G. Don) Cif.	Oleaceae	Weyra	DF	wild	T
58.	<i>Opuntia ficus-indica</i> (L.) Miller	Cactaceae	Balas(Ashewa kulkual)	F	wild	Sh
59.	<i>Otostegia integrifolia</i> Benth.	Lamiaceae	Tunjit	D	wild	Sh
60.	<i>Osyris quadripartita</i> Decn.	Santalaceae	Keret	F	wild	Sh
61.	<i>Phytolacca dodecandra</i> L' Herit.	Phytolaccaceae	Endod	F	wild	Sh
62.	<i>Pittosporum viridiflorum</i> Sims	Pittosporaceae	Tebera	F	wild	T
63.	<i>Plantago lanceolata</i> L.	Plantaginaceae	Gortab (Wenberet)	F	wild	H
64.	<i>Prunus persica</i> (L.) Batsch	Rosaceae	Kok	F	cultivated	T
65.	<i>Pterolobium stellatum</i> (Fors)Brenan	Fabaceae	Kentafa	DF	wild	Sh
66.	<i>Rhamnus prinoides</i> L. Herit.	Rhamnaceae	Gesho	F	cultivated	Sh
67.	<i>Ricinus communis</i> L.	Euphorbiaceae	Gulo	DF	cultivated	Sh
68.	<i>Rosa abyysinica</i> Lindley	Rosaceae	Kega	F	wild	Sh
69.	<i>Rumex abyssinicus</i> Jacq.	Polygonaceae	Makmako	DF	wild	H
70.	<i>Rumex nepalensis</i> Spreng.	Polygonaceae	Lut	F	wild	H
71.	<i>Rumex nervosus</i> Vahl	Polygonaceae	Embacho	DF	wild	Sh
72.	<i>Ruta chalepensis</i> L.	Rutaceae	Tenadam	DF	cultivated	H
73.	<i>Salix macronata</i> Thunb.	Salicaceae	Lahaya	F	wild	T

74.	<i>Schinus molle L.</i>	Anacardiaceae	Kundoberbere	DF	cultivated	T
75.	<i>Sesamum indicum L.</i>	Pedaliaceae	Selit	D	cultivated	H
76.	<i>Sida schimperiana</i> Hochst. Ex A. Rich.	Malvaceae	Cifrig	DF	wild	H
77.	<i>Solanum adoense</i> (Hochst) ex A. Rich.	Solanaceae	Zerch Enbuay	DF	wild	Sh
78.	<i>Solanum incanum L.</i>	Solanaceae	Enbuay	DF	wild	Sh
79.	<i>Solanecio gigas</i> (Vatke.)C. Jeffery	Asteraceae	Yeshikoko gomen (Mogne qitel)	F	wild	Sh
80.	<i>Stephania abyssinica</i> (Dillo&A.Rich.)Walp.	Menispermaceae	Ye ayit hareg (Chewchawit)	F	wild	Cl
81.	<i>Syngium aromaticum L.</i>	Myrtaceae	Kirunfu	D	cultivated	T
82.	<i>Tanacetum cinerariifolium</i> (Trev). Sch. Bip.	Asteraceae	Kaba	F	wild	H
83.	<i>Trigonella foenum-Graecum L.</i>	Fabaceae	Abish	D	cultivated	H
84.	<i>Thymus schimperii</i> Ronniger	Lamiaceae	Tosign	DF	wild	H
85.	<i>Urera hypselodendron</i> (A. Rich.) Wedd.	Urticaceae	Lankuso	F	wild	Cl
86.	<i>Urtica simensis</i> Steudel	Urticaceae	Sama	F	wild	H
87.	<i>Verbena officinalis L.</i>	Verbenaceae	Atuch	F	wild	H
88.	<i>Verbascum sinaiticum</i> Benth.	Scrophulariaceae	Kutina(ye Ahya joro)	DF	wild	H
89.	<i>Vernonia amygdalina</i> Del.	Asteraceae	Gerawa	F	Both	T
90.	<i>Vernonia hymenolepis</i> A.Rich.	Asteraceae	Weynagift	F		Sh
91.	<i>Zehneria scabra</i> (Linn.f.) Sond.	Cucurbitaceae	Haregres(Etse sabeq(NechHareg)	F	wild	Cl
92.	<i>Zingiber officinale</i> Roscoe	Zingiberaceae	Jinjible	F	cultivated	H
93.	<i>Ziziphus spina- christi</i> (L.) Desf.	Rhamnaceae	Gaba	F	Both	Sh

Appendix 2: List of medicinal plants used for both human (Hu) and livestock (Li) ailment treatment: scientific name; family; local name (A=Amharic; O=Afan Oromo) habit; parts used; disease treated; methods of preparation with dosage used and route of application.

Key:Habit (Ha.): Herb (H) ;Shrub (Sh) ; Tree(T); Climber (Cl.); Epiphyte (Ep.); Parts used (Bark, B; Latex, La; Root, R; Leaf, L; Fruit, Fu.; Flower, Fw.; Seed, Se.;Stem,St.;Sap,Sa; Bulb, Bu.; Root and leaf, LR.; Above ground , Ag; Leaf and seed, LSe; shoot, Sht.

Scientific name	Family	Local Name	Ha	Pu	Used for	Disease treated	Mode of preparation	Route
<i>Acacia abyssinica</i> Hochst. ex Benth.	Fabaceae	Girar (A) Laaftoo(O)	T	Sht	Hu	Tonsillitis	Fresh shoot is chewed and the juice is swallowed.	Oral
				Sht	Hu	Wound	Fresh shoot is pounded, squeezed and the sap is creamed on affected part	Dermal
<i>Achyranthes aspera</i> L.	Amaranthaceae	Talenj(A) Darguu(O)	H	L	Both	Pneumonia	Fresh leaf are pounded, mixed with water and drunk in the Morning.	Oral
				L	Hu	Body swelling	Leaf is squeezed and creamed on swollen body.	Dermal
				L	Hu	Wound	Leaves are pounded and tied on the wound.	Dermal
				L	Hu	Nasal bleeding	Fresh leaf of <i>Achyranthes aspera</i> is squeezed and its juice is dropped in to the nostrils to stop bleeding.	Dermal
				R	Hu	Stomach-ache	The root of <i>Achyranthes aspera</i> is chewed and swallowed during feeling of ache.	Oral
<i>Allium cepa</i> L.	Alliaceae	Qeyshenkurt(A) Qullubbii Diimaa(O)	H	Bu	Li	Leech	Fresh bulb is pounded, mixed with little water, decanted and poured through the nose.	Oral
					Hu	Asthma	Fresh bulb of <i>Allium cepa</i> is crushed with <i>Zingiber officinale</i> rhizome and boiled. Then drink the solution in the morning until recovery.	Oral
<i>Allium sativum</i> L.	Alliaceae	Neshinkurt(A) Qullubbii adii(O)	H	Bu	Hu	Malaria	Fresh bulb of <i>Allium sativum</i> and rhizome of <i>Zinger officinale</i> are pounded together, mixed with honey and eaten.	Oral
				Bu	Hu	Evil eye	Bulb of <i>Allium sativum</i> is crushed together with rhizome of <i>Zingiber officinale</i> and <i>Lepidium sativum</i> , pasted with honey and 2 tea spoons is taken.	Oral
				Bu	Hu	Colds	The Bulb is pounded, mixed with honey and 2-3 teaspoon is eaten every day for three days.	Oral
<i>Aloe pubescens</i> Reynolds	Aloaceae	Eret (A) Argiisa(O)	H	La	Hu	Fire burn	The latex is painted on the wound	Dermal
				La	Hu	Ringworm	The latex of the young leaves is creamed on the affected area and repeated every day until recovery.	Dermal
				La	Li	anthrax	Root of <i>Aloe pubescens</i> is crushed and mixed with cold water. Then two cup of tella is given to cattle.	Oral
<i>Artemisia abyssinica</i> Sch. Bip.ex A. Rich.	Asteraceae	Harit(A) Harrittaa(O)	H	L	Hu	Evil eye	Leaf concoction together with root of <i>Echinops kebericho</i> is added to a burning fire and smoked to the patient.	Nasal
				L	Hu	Malaria	Fresh leaf is crushed and pounded with water, filtered and drunk until recovery.	Oral
				L	Hu	Child Stomach-ache	Leaf is squeezed and ¼ of coffee cup juice is given to children	Oral

<i>Asparagus africanus</i> Lam.	Asparagaceae	Yesetkest(A) Sariitii(O)	Cl	R	Hu	Retained placenta	Fresh root is pounded; mixed with water and boiled, decanted, mixed with honey and drunk.	Oral
				R	Hu	Wound	Fresh root is pounded together with leaves of <i>Dodonea angustifolia</i> , mixed with butter and creamed on the wound.	Dermal
				L	Hu	Malaria	Leaf is smashed, mixed with water and decanted, then mixed with milk and one coffee cup is taken every morning.	Oral
				L	Li	Bloating	Leaves of <i>Asparagus africanus</i> & the root of <i>Verbasicum sinaiticum</i> are pounded and mixed with water, decanted and dropped in to left nostril.	Nasal
<i>Brassica carinata</i> A.Br.	Brassicaceae	Gomenzer (A) Ija raafuu(O)	H	Se	Hu	Stomach problem	Crushed and eaten with <i>Allium sativum</i> by adding salt.	Oral
				Se	Hu	Cancer	The seed of <i>Brassica carinata</i> together with seed of <i>Ricinus communis</i> is crushed, powdered and mixed with honey and then creamed on affected part.	Dermal
<i>Brassica nigra</i> L.	Brassicaceae	Senafich(A) Sanaafica(O)	H	Se	Hu	Malaria	Powdered seed of <i>Brassica nigra</i> , chopped <i>Allium sativum</i> and <i>Cicer arietinum</i> seed (Shimbura) are soaked with water and eaten after one day by enjera in the morning.	Oral
				Se	Hu	Intestinal parasites Amoeba	The semi-liquid condiment made of <i>Brassica nigra</i> called (awaze) is eaten with either injera or germinated bean seeds.	
<i>Brucea antidysenterica</i> Fresen.	Simaroubaceae	Waginos (Abalo(A) Qomanyoo (O)	Sh	L	Li	External parasites (lice)	Leaf of <i>Brucea antidysenterica</i> is pounded and mixed with water. The mixture is used to wash skin of cattle, donkey, mule and horse.	Dermal
				L	Hu	Wound and itches	Dried leaf of <i>Brucea antidysenterica</i> is pounded, mixed with butter and creamed the affected part until recovery.	Dermal
				R	Hu	Evil eye	Dried root of <i>Brucea antidysenterica</i> and <i>Carissa spinarum</i> are mixed together, smoked & inhaled.	Nasal
				Se	Hu	Back pain	Seed of <i>Brucea antidysenterica</i> is boiled with milk and drunk for 3-4 consecutive days.	Oral
<i>Buddleja polystachya</i> Fresen.	Loganiaceae	Anfar(A) Adaaddii(O) Hanfaaree(O)	Sh	L	Li	Eye disease	Fresh Leaf of <i>Buddleja polystachya</i> is chewed and spitted on cattle eye.	Eye
				L	Hu	Wound	Fresh leaf of <i>Buddleja Polystachya</i> is pounded, powdered and applied on wound	Dermal
<i>Calpurnia aurea</i> (Ait.) Benth.	Fabaceae	Digita(A) Ceekaa (O)	Sh	L	Hu	Wound	Dried leaf of <i>Calpurnia aurea</i> is pounded, mixed with butter or honey and creamed on the wounded part.	Dermal
				L	Li	Scabies and Lice	Leaf of <i>Calpurnia aurea</i> , <i>Croton macrostachyus</i> and <i>Justicia schimperiana</i> are pounded, mixed with water and wash the body of the cattle every morning until the Scabies (itches) and parasites are eradicated.	Dermal
				L	Both	Snake bite	Leaf of <i>Calpurnia aurea</i> is squeezed and drop of the sap is given orally to cattle and to Human.	Oral

				L	Hu	Diarrhea	Fresh leaf of <i>Calpurnia aurea</i> is squeezed and the juice is drunk before breakfast.	Oral
<i>Capsicum Annuum</i> L.	Solanaceae	Berbere (A) Qaaraa(O)	H	Fu/S e	Hu	Skin rash	Fruit and seed of <i>Capsicum annuum</i> is pounded, powdered, mixed with butter and creamed the infected parts	Dermal
					Hu	Tonsillitis	Fruit and seed of <i>Capsicum annuum</i> is pounded, powdered, mixed with oil, roasted and drunk	Oral
<i>Carica papaya</i> L.	Caricaceae	Papaya (A) Pappayya(O)	T	Fu	Hu	Heart problem	Fruit is eaten	Oral
				L	Hu	malaria	Leaf of <i>Carica papaya</i> and <i>Allium sativum</i> bulb are pounded together and made in the form of soup, boiled and mixed with honey and two cup are drunk.	Oral
				L	Hu	Intestinal parasites	Fresh leaves are boiled with water and cooled then drunk in the morning.	Oral
<i>Carissa spinarum</i> L.	Apocynaceae	Agam(A) Agamsa(O)	Sh	R	Hu	Evil eye	Root of <i>Asparagus africanus</i> , root, <i>Lobelia rhynchopetalum</i> bark, <i>Artemisia abyssinica</i> root and leaf, <i>Allium sativum</i> and <i>Ruta chalepensis</i> are crushed and smashed together and rolled by piece of cloth and tied on neck or arm.	Neck
				L	Hu	Head ache	Dried Leaf of <i>Carissa spinarum</i> is pounded and the smoke is used as treatment for head ache.	Nasal
				L	Hu	Stomach-ache	Leaf of <i>Carissa spinarum</i> is Pounded, mixed with honey. Two-three spoon is taken early in the morning before breakfast.	Oral
				L	Hu	Malaria	Fresh root is pounded, mixed with cold water, decanted and drunk after one day.	Oral
<i>Citrus limon</i> (L.) Burm.f.	Rutaceae	Lomi (A) Loomii (O)	Sh	L	Hu	Cough	The leaf of <i>Citrus limon</i> is pounded, powdered, mixed with milk, boiled and sugar is added. Then drink pure liquid during feeling of the pain.	Oral
				Fu	Hu	Athlete's foot	Fruit of <i>Citrus limon</i> is squeezed and creamed on affected part for continuous days.	Dermal
				Fu	Hu	Scabies(itches)	Fruit juice is squeezed and applied to the affected part.	Dermal
				Fu	Hu	Vomit	Fresh fruits are squeezed and the juice is drunk	Oral
<i>Clematis simensis</i> Fresen.	Ranunculaceae	Azo hareg(A) Hidda feetii(O)	Cl	L	Hu	Cancer	Fresh leaf is crushed, smashed, rolled by clean cloth and tied on hand.	Dermal
					Li	Horse itch	Leaf of <i>Clematis simensis</i> is squeezed and dropped on itched part.	Dermal
				R/L	Hu	Tonsillitis	Leaf of <i>Clematis simensis</i> is crushed, rolled in clean cloth and tied on neck.	Neck
				R/L	Hu	Wound	Dried root and leaf of <i>Clematis simensis</i> are pounded, powdered, mixed with butter and creamed on affected part.	Dermal
<i>Clerodendrum myricoides</i> (Hochst.) Vatke	Lamiaceae	Misirich(A) Maraasisaa(O)	Sh	R	Hu	Stomach-ache	Root of <i>Clerodendrum myricoides</i> , fruit of <i>Croton macrostychus</i> and root of <i>Solanum adoense</i> are crushed together and mixed with rotten butter and drunk.	Oral
				R	Hu	Headache	Root latex of <i>Clerodendrum myricoides</i> is dried, powdered, mixed with butter and creamed on head	Dermal
				R	Hu	Evil eye	Dried root is crushed and put on broken pot, and then fire is added to it and fumigated.	Nasal
				L	Hu	Eye problems	Leaves are pounded and powdered then sprayed to the eye.	Eye

<i>Clutia abyssinica</i> Jaub. & Spach	Euphorbiaceae	Fiyalefaj (A) Ulee loonii(O)	H	Se	Hu	Ring worm	Fresh seed is smashed, mixed with butter and creamed on affected part.	Dermal
				L	Hu	Ear disease	Leaf of <i>Clutia abyssinica</i> is pounded, squeezed and then its drop is added through the ear.	Ear
				R	Hu	Toothache	Fresh root is chewed and kept on teeth for some times.	Oral
<i>Coffea Arabica</i> L.	Rubiaceae	Buna(A) Buna(O)	Sh	Se	Hu	Diarrhea	Powder of roasted coffee bean is mixed with butter and eaten or drunk before breakfast for 3-4 days.	Oral
					Hu	Fire burn	Seed of <i>Coffea arabica</i> is roasted, pounded, powdered and applied on affected part.	Dermal
					Hu	Spider poison	Seed of <i>Coffea arabica</i> is Roasted, powdered, mixed with butter and painted.	Dermal
					Hu	Eye disease	Roasted seeds of <i>Coffea Arabica</i> is pounded together with Leaf of <i>Trigonella foenum-graecum</i> , mixed with butter and rubbed on the external eye.	Eye
<i>Cordia africana</i> Lam.	Boraginaceae	Wanza(A) Waddeessa(O)	T	B	Hu	Unstopped menstruation	Fresh bark is pounded, mixed with water, decanted and drunk with one coffee cup for three consecutive days	Oral
				L	Hu	Toothache	Fresh leaf is chopped, chewed with salt and the juice is swallowed.	Oral
				Fu	Hu	Intestinal parasites	The Fruit is eaten as food for the case of Intestinal parasites in the morning before food for 4-5 consecutive days.	Oral
<i>Coriandrum sativum</i> L.	Apiaceae	Denbelal(A) Dinbilaala(O)	H	Se	Hu	Cough	The seed together with butter and small quantity of water are boiled and drunk.	Oral
					Hu	Wound	Leaf of <i>Coriandrum sativum</i> is pounded with leaf of <i>Croton macrostachyus</i> and <i>Rumex nervosus</i> . Then creamed on wounded part for 2-3 days.	Dermal
<i>Croton macrostachyus</i> Del.	Euphorbiaceae	Bisana (A) Bakkannisa (O)	T	Sht	Hu	Gonorrhea	Seven, nine or eleven shoot tips is cut, cooked together with <i>Ruta chalepensis</i> and one spoonful of the solution is drunk per a day for seven consecutive days.	Oral
				B	Li	Bloating	The bark of root is ground, mixed with water and given to the animal.	Oral
				L	Li	Scabies(itches)	Leaf of <i>Croton macrostachyus</i> with leaf of <i>Brucea antidysenterica</i> are crushed together and used as skin wash for calf.	Dermal
<i>Cucumis ficifolius</i> A.Rich.	Cucurbitaceae	Midir enbuay(A) Coolotoo(Hiddii hooloo(O)	Cl	R	Hu	Gonorrhea	Root of <i>Cucumis ficifolius</i> and root of <i>Cyphostemma adenocaula</i> are crushed and pounded together, mixed with water and decanted, then mixed with honey and drunk.	Oral
				R	Li	Cattle infection	Root of <i>Cucumis ficifolius</i> with leaf of <i>Vernonia amygdalina</i> are pounded together and mixed with cold water. Then given to cattle by tella material (meriti).	Oral
				Fu	Hu	Stomach-ache	The root of <i>Cucumis ficifolius</i> is chewed and swallowed during the feeling of ach	Oral
				Sa	Hu	Ear pain	Sap of fruit is added to ear canal.	Ear
<i>Cucurbita pepo</i> L.	Cucurbitaceae	Duba (A) Dabaaqula (O)	Cl	Se	Hu	Tape worm	Seed of <i>Cucurbita pepo</i> is roasted and eaten before breakfast.	Oral

<i>Cupresses lusitanica</i> Mill.	Cupressaceae	YeFerenjtsid(A)Gaattiraa faranjii(O)	T	La	Hu	Ringworm	Latex of <i>Cupresses lusitanica</i> is creamed on affected part of body.	Dermal	
<i>Cynoglossum coeruleum</i> (Hochst.ex.A.rich.)	Boraginaceae	Chigogit(A)Maxxannee(O)	H	L	Hu	Headache	Fresh leaf of <i>Cynoglossum coeruleum</i> is massaged and sniffed.	Nasal	
				R		Body swelling	Fresh root of <i>Cynoglossum coeruleum</i> is chewed and sprayed on swollen part	Dermal	
				L		Scabies(Itches)	Juice of fresh leaves is applied on the skin.	Dermal	
<i>Cyphostemma adeno caule</i> (Steud. ex A. Rich.) Des. ex Wild & Drum.	Vitaceae	Aserkush(A)Hidda Bofaa(O)	Cl	Tu	Hu	starvation	Tuber is cooked and eaten during famine	Oral	
				Ag		Li	Infection on Neck(livestock)	Tied on the livestock's neck.	Neck
<i>Datura stramonium</i> L.	Solanaceae	Astanagir(A)Manjii (O)	H	L	Hu	Dandruff	Leaf is crushed with leaf of <i>Myrtus communis</i> & the powder is rubbed over the head after having cut the hair.	Dermal	
				R		Hu	Headache	Roots of <i>Datura stramonium</i> is pounded with leaf of <i>Ocimum gratissimum</i> and sniffed Nasally.	Nasal
				Fu		Hu	Scabies(itches)	About 2-3 spoons of Powdered fruit of <i>Datura stramonium</i> is mixed with butter and creamed.	Dermal
				L		Hu	Wound	Fresh leaf of <i>Datura stramonium</i> is squeezed and creamed the affected (wounded) part of the body.	Dermal
<i>Discopodium penninervum</i> Hochst.	Solanaceae	Almit(a)	Sh	L	Li	Leech	The leaf of <i>Discopodium penninervum</i> is pounded, mixed with little water and the decanted is given to cattle.	Oral	
					Li	Bloating	The fresh leaf of <i>Discopodium penninervum</i> is pounded, squeezed, mixed with water, decanted and given to cattle.	Oral	
<i>Dodonaea angustifolia</i> L.	Sapindaceae	Kitkita(A)Ittacha(O)	Sh	L	Hu	Diarrhea	Fresh leaves are pounded, mixed with water, decanted and drunk.	Oral	
					Hu	Skin rash	Fresh leaves are crushed, mixed with water and painted the skin.	Dermal	
					Li	Wound	Dried leaves of <i>Dodonaea angustifolia</i> are powdered and sprayed on the wound of pack (domesticated) animals.	Dermal	
						Ecto-parasities	Fresh leaves are crushed and pounded with water, then leaf extract is given Orally and pounded leaves are painted on the cattle body.	Dermal	
<i>Dombeya torrida</i> (J. F. Gmel.) P. Bamps	Sterculiaceae	Wulkifa (A)Daannisa(O)	T	L	Hu	Fire burn	Fresh leaf of <i>Dombeya torrida</i> is squeezed and creamed on affected part.	Dermal	
						Abdominal pain	Dried leaf powder is mixed with honey and given Orally.	Oral	
<i>Dovyalis abyssinica</i> (A.Rich.)Warb.	Flacourtiaceae	Koshim(A)Koshommii (O)	Sh	Fu	Hu	Intestinal Parasites	Its fruit is eaten as food for the case of intestinal parasite before breakfast every morning	Oral	
<i>Echinops kebericho</i> Mesfin	Asteraceae	Kerebicho (A)Qarabichoo(O)	H	R	Hu	Evil eye	Root concoction together with Leaf of <i>Artemisia abyssinica</i> is added to a burning fire and smoked to the patient.	Nasal	
				R		Hu	Rabies	Root concoction together with root of <i>Ricinus communis</i> is boiled and decoction is drunk.	Oral
				R		Hu	Evil Spirit	Root is Crushed, heated on fire and its smoke is inhaled.	Nasal
				R		Hu	Tetanus	Root of <i>E. kebericho</i> with bark of <i>Croton macrostachys</i> is pounded, powdered together, mixed with honey and then one cup of the mixture is taken for 3 days.	Oral

<i>Embelia schimperi</i> Vatke	Myrsinaceae	Enkoko (A) Haanquu (O)	Sh	Se	Hu	Tape worm	Seed of <i>Embelia schimperi</i> is dried and powdered, mixed with water, two glasses are taken in the morning before food and stay for 6-7 hours.	Oral
				Fu	Hu	Epilepsy	Fruit of <i>Embelia schimperi</i> with seed of <i>Guizotia abyssinica</i> is crushed, powdered, mixed with local alcohol "tej" and drunk	Oral
<i>Erica arborea</i> L.	Ericaceae	Asta(A) Maxaxee (O)	T	Sht	Hu	Giardiasis	Shoot is boiled and the decoction is drunk for 3-4 days consecutively.	Oral
				L	Hu	Wound	The powder of dried leaves is mixed with butter & rubbed on the affected part.	Dermal
<i>Eucalyptus globulus</i> Labill.	Myrtaceae	Nech bahirzaf(A) Bargamoo adii(O)	T	L	Hu	Influenza	The Leaf of <i>Eucalyptus globulus</i> is chopped and Boiled with water and inhale the vapor repeatedly.	Oral/Nasal
				St	Hu	Fibril illness	The young leaves and immature stem tip are boiled in water and the steam is inhaled by the patient during the sleep time until recovery.	Nasal
				L	Hu	Malaria	Dried leaf is put on fire and smoked	Nasal
				L	Hu	Cough	Leaf is boiled with sugar and one tea cup of syrup is drunk.	Oral
<i>Euphorbia abyssinica</i> . Gmel	Euphorbiaceae	Kulkual (A) Adaammii (A)	T	Fw	Hu	Wound	Fresh flower of <i>Euphorbia abyssinica</i> is squeezed and creamed on affected part	Dermal
				B	Hu	Ascariasis	Fine powder of pounded bark of <i>Euphorbia abyssinica</i> and <i>Croton macrostachyus</i> is mixed with water, decanted and taken at meal time.	Oral
				La	Hu	Gonerrhea	Very small amount of the milky latex is mixed with red teff flour, baked and eaten for three consecutive days.	Oral
<i>Guizotia abyssinica</i> L.	Asteraceae	Nug(A) Nuugii(O)	H	Se	Hu	Kidney Problem	Seed of <i>Guizotia abyssinica</i> is roasted, pounded and mixed with powdered leaves of <i>Thymus schimperi</i> and boiled. Then one coffee cup is drunk for 3-5 days.	Oral
				Se	Hu	Swelling	Seed is roasted, pounded and powdered, then boiled with salt and the syrup is drunk.	Oral
				Se	Li	Leech	More than one litter powdered seed mixed with water is given to cattles for three days continuously.	Oral
<i>Hagenia abyssinica</i> (Bruce) J. F. Gmel.	Rosaceae	Koso (A) Heexoo(O)	T	Fu	Hu	stomach-ache	Fresh fruit is crushed, squeezed and the juice is mixed with tella and drunk.	Oral
				Se	Hu	Venereal disease (abalazar)	Dried Seed is powdered, mixed with tela and drunk.	Oral
				Se	Hu	Eczema	Calf horn and roasted <i>Hagenia abyssinica</i> seed are pounded together, mixed with butter and creamed on affected body part.	Dermal
				Se	Hu	Tape worm	The seed of <i>Hagenia abyssinica</i> is crushed, powdered, mixed with milk, boiled and drunk for five days before breakfast.	Oral
<i>Hypericum revolutum</i> Vahl	Hypericaceae	Amja (A) Muka Foonii(O)	Sh	L	Hu	Erythroblasts	Leaf is boiled with water and the decoction is drunk.	Oral
				Sht	Hu	Dandruff	Shoot is crushed, squeezed and the sap is creamed after having cut hair.	Dermal
				L/ R	Li	Rabies	The root and leaf of <i>Hypericum revolutum</i> together with roots of <i>Rumex nervosus</i> , <i>Phytolacca dodecandra</i> , <i>Brucea</i>	Oral

							<i>antidysenterica</i> , leaf and bark of <i>Croton macrostachyus</i> are pounded together, mixed with water and given to cattle.	
<i>Jasminum abyssinicum</i> L.	Oleaceae	Tembelel Biluu(O)	Cl	L	Hu	Eye disease	The leaves of <i>Jasminum abyssinicum</i> and seven pieces of immature stems of <i>Olea europaea</i> are ground and powdered together, mixed with water and drop of mixture is applied on infected part for 3 days.	Eye
<i>Juniperus procera</i> Endl.	Cupressaceae	Ye abesha tsid(A) Gaattiraa(O)	T	B	Hu	Tonsillitis	Fresh stem bark is chewed and the juice is swallowed.	Oral
				B	Hu	Malaria	Dried bark is boiled with water and the decoction is drunk.	Oral
				L	Hu	Pneumonia	Fresh leaf is Crushed and steeped in cold water and the infusion is drunk.	Oral
<i>Justicia schimperiana</i> (Hochst. exNees) T. Anders	Acanthaceae	Simiza(sensel)(A) DHummuuga a(O)	Sh	L	Li	Hen disease (Cocoidiosi)	The leaf (shoot) is crushed, mixed with water and decanted; 'Enjera' (bread) is soaked with the solution and given to the hen.	Oral
				L/R	Li	Blackleg	Leaf and root of <i>Justicia schimperiana</i> is pounded with dried fruit of <i>Ricinus communis</i> and the solution is given to cattle.	Oral
				L	Hu	Leg swelling	Fresh Leaf is heated on fire; salt is added to it and tied on the swollen part.	Dermal
				L	Li	Lice	Leaf of <i>Justicia schimperiana</i> with leaf of <i>Calpurina aurea</i> are used to wash the body of cattle to remove the lice.	Dermal
<i>Kalanchoe petitiata</i> A. Rich.	Euphorbiaceae	Endawula (A) Bosoqqee (O)	H	R	Hu	Bone fracture	Fresh leaf is squeezed; the juice is mixed with butter and applied topically on fractured part.	Dermal
				L	Hu	Wound	Fresh leaf is heated with fire, squeezed and the juice is dropped on wounded part	Dermal
				R	Hu	Ear disease	Fresh root of <i>Kalanchoe petitiata</i> is squeezed and few drops are added through ear canal.	Ear
<i>Kosteletzkya begonifolia</i> Ulbr.	Malvaceae	Yemegerem (A)	H	R	Li	For anthrax	Fresh leaf of <i>Kosteletzka begonifolia</i> is pounded squeezed mixed with "tella" and drunk.	Oral
				R	Hu	For swelling body	Fresh leaf of <i>Kosteletzka begonifolia</i> is pounded squeezed mixed with "tella" and drunk.	
<i>Linum usitatissimum</i> L.	Lineaceae	Telba(A) Talbaa(O)	H	Se	Hu	Wound	Seed of <i>Linum usitatissimum</i> is pounded, mixed with honey and creamed on wounded part	Dermal
				Se	Li	Retained placenta	Seed of <i>Linum usitatissimum</i> is powdered and half of a glass of the powder is dissolved in water and given to cattle.	Oral
				Se	Hu	Amoeba	The pounded seed is mixed with water and drunk before breakfast.	Oral
				Se	Hu	Gastritis	The seed of <i>Linum usitatissimum</i> is pounded, mixed water and sugar and then drunk during feeling the pain.	Oral
<i>Lobelia rhynchopetalum</i> Hemsl.	Lobeliaceae	Jibira(A)	Sh	B and R	Hu	Evil eye	The bark and root of <i>Lobelia rhynchopetalum</i> is crushed , mixed with little water and sniffed at the sickness time or the dried root is tied with piece of cloth around the neck or put it in the pocket.	Nasal and Dermal
				R	Hu	Scabies(itches)	Root of <i>Lobelia rhynchopetalum</i> is dried, powdered, mixed with butter, rub the body for some days and finally taking a shower at the end of the day.	Dermal
<i>Lepidium sativum</i> L.	Brassicaceae	Feto(A) Feecoo(O)	H	Se	Hu	Bloating	Seed of <i>Lepidium sativum</i> and bulb of <i>Allium sativum</i> are pounded together, mixed with water and given to cattle.	Oral

				Se	Hu	Dysentery	The seed of <i>Lepidium sativum</i> is ground, mixed with milk, then filtrate and the solution is drunk.	Oral
				Se	Hu	Malaria	Seed of <i>Lepidium sativum</i> , bulb of <i>Allium sativum</i> and rhizome of <i>Zingiber officinale</i> are pounded together and given to Human with honey.	Oral
				Se	Hu	Tonsillitis	Seed of <i>Lepidium sativum</i> and bulb of <i>Allium sativum</i> are pounded together and given to Human with honey.	Oral
				Se	Hu	Fibril illness	Dried seeds are powdered and added in to fire and smoked to the patient.	Nasal /Oral
				St	Hu	Hemorrhoids	Stem is heated on fire and used to burn the affected part	Dermal
<i>Maesa lanceolata</i> Forssk.	Myrsinaceae	Shwaria(kelawa) (A) Abbayyii (O)	Sh	L and Se	Li	For leeches	Dried leaf and fruit of <i>Maesa lanceolata</i> are crushed, pounded and the powder is added to water to kill leeches	Oral
				R	Li	Retention of placenta	Root of <i>Maesa lanceolata</i> is boiled with seed of <i>Linum usitatissimum</i> and given to cattle.	Oral
				L	Hu	Eczema(chife)	Dried leaf powder together with the powder of leaf of <i>Croton macrosrachyus</i> are pasted with butter and applied for seven days consecutively.	Dermal
<i>Melia azedarach</i> Forssk.	Meliaceae	Nim(A) Niimii(O)	T	L	Hu	Malaria	Chewing and swallowing the juice of fresh leaf.	Oral
				B	Li	Anthrax	The fine powder of dried bark is added to a glass of water and applied through the mouth.	Oral
				Sht	Hu	Tooth ache	Young shoot tip is chewed and kept on the teeth.	Oral
<i>Myrtus communis</i> L.	Myrtaceae	Ades(A) Adasii(O)	Sh	L	Both	Intestinal parasites	Dried leaf of <i>Myrtus communis</i> is pounded, added to tella and drunk to expel intestinal parasites.	Oral
				L	Hu	Dandruff	The leaf of <i>Myrtus communis</i> is powdered, mixed with butter and creamed on head after is cut.	Dermal
				L	Hu	Scabies(itches)	Dried powder is mixed with butter & applied on the affected part	Dermal
<i>Nicotiana tabacum</i> L.	Solanaceae.	Timbaho(A) Tamboo(O)	H	L	Hu	Snake bite	Leaf of <i>Nicotiana tabacum</i> is crushed and squeezed, mixed with water and the Juice is drunk to expel the poison by vomiting.	Oral
				L	Li	Bloating	Leaf and root of <i>Nicotiana tabacum</i> is dried, powdered, mixed with salt, water and made as bread. Slice is given to cattle before they drink water for three days.	Oral
				St/ L	Li	Leech	The young stems and or leaf is ground, add salt, and then one glass of the mixture is given every morning for three days orally or through the nose.	Oral
				L	Li	Internal parasites	Leaf of <i>Nicotiana tabacum</i> is pounded with root of <i>Carissa spinarum</i> and mixed with water. One merit solution is given to calf.	Oral
<i>Nigella sativa</i> L.	Ranunculaceae	Tikur azmud(A) Abasuuda gurraacha (O)	H	Se	Hu	Depression	Seed is added to tea and drunk to stimulate mental.	Oral
				Se	Hu	Tonsillitis	Seed of <i>Nigella sativa</i> is pounded, powdered and added to coffee. Then drunk for 3-4 consecutive days.	Oral
				Se	Hu	Stomach-ache	Seed is crushed and pounded with <i>Ruta chalepensis</i> , <i>Lepidium sativum</i> and <i>Allium sativum</i> then mixed with honey and a spoonful of the mixture is taken before breakfast.	Oral

<i>Ocimum basilicum</i> L.	Lamiaceae	Zikakibe(A) Gosobila(O)	H	L	Hu	Headache	Leaf of <i>Ocimum basilicum</i> is crushed and sniffed.	Nasal
				L	Hu	Malaria	Leaf of <i>Ocimum basilicum</i> and bulb of <i>Allium sativum</i> are pounded together and eaten with honey in the morning.	Oral
				L	Li	Bloating	Its fresh leaves with the bulb of <i>Allium sativum</i> and salt are ground together and then one litter of the solution is given to cattle.	Oral
<i>Ocimum lamiifolium</i> Hochst. ex Benth.	Lamiaceae	Damakese(A) Damakasee(O)	Sh	L	Hu	Febrile illness	Fresh leaf of <i>Ocimum lamiifolium</i> together with leaf of <i>Eucalyptus globulus</i> , is pounded, mixed with water and drunk or the patient can inhale the vapor of the boiled mixture.	Oral
				L	Hu	Headache	Leaf of <i>Ocimum lamiifolium</i> is massaged and sniffed.	Oral
<i>Olea europaea</i> L. subsp. <i>cuspidata</i> (Wall. ex G. Don) Cif.	Oleaceae	Weyra(A) Ejersa(O)	T	L	Both	Eye disease	Leaf is Crushed and squeezed. Then the sap is dropped by piece of clean cloth on eye.	Eye
				St	Hu	Wound	Fresh stem is heated on fire and the oily liquid produced from the stem is applied on the wound.	Dermal
				St	Hu	Gastiritis	Oily liquid produced from the stem is drunk after meal for three consecutive days.	Oral
				B	Hu	Haemorrhoid	The bark is heated on fire and held on the pain area.	Dermal
<i>Opuntia ficus-indica</i> (L.) Miller	Cactaceae	Balas (Ashewa kulkual(A) Adaammii(O)	Sh	L	Hu	Ear disease	Leaf of <i>Opuntia ficus-indica</i> is squeezed and the sap is dropped through ear canal safely.	Ear
				Fu	Hu	Stomach-ache	Ripened fruit is eaten	Oral
<i>Otostegia integrifolia</i> Benth.	Lamiaceae	Tunjit(A) Xunjiti(O)	Sh	L	Hu	Stomach-ache	Leaf of <i>Otostegia integrifolia</i> and leaf of <i>Solanum adoense</i> are crushed, squeezed together and the juice or sap is drunk.	Oral
					Hu	Fibril illness	Dried leaf is added to fire and fumigated	Oral and Nasal
					Hu	Tonsillitis	Fresh leaf of <i>Otostegia integrifolia</i> is squeezed and half of coffee cup is drunk	Oral
<i>Osyris quadripartita</i> Decn	Santalaceae	Keret (A) Waatoo (O)	Sh	St	Hu	Stomach-ache	Fresh stem bark of is chewed & the solution is swallowed.	Oral
				L	Hu	Wound	Dried or fresh leaf of is crushed, powdered and then applied on the wound part	Dermal
<i>Phytolacca dodecandra</i> L' Herit.	Phytolaccaceae	Endod(A) Handoodee(O)	Sh	Se	Hu	To stop pregnancy	Seed of <i>Phytolacca dodecandra</i> are crushed, smashed, squeezed and the juice is drunk.	Oral
						Malaria	Fresh root is smashed, mixed with water, decanted and drunk in the morning.	Oral
				R	Li	Bilharziha	Fresh root is chewed and swallowed.	Oral
						Stomach-ache	Fresh root is crushed and pounded with water, then filtered and drunk for four days	Oral
<i>Pittosporum viridiflorum</i> Sims	Pittosporaceae	Tebera(A) Dambii(O)	T	L	Hu	Dandruff	Leaf is crushed, smashed and mixed with butter and creamed after having cut hair.	Dermal
<i>Plantago lanceolata</i> L.	Plantaginaceae	Gortab Yewusha milas	H	L	Hu	Wound	Fresh leaf of <i>Plantago lanceolata</i> and bulb of <i>Allium sativum</i> are crushed, smashed together and rubbed on wounded part.	Dermal
						Fibril illness	Rub the body with the squeezed leaves	Dermal

		Wenberet(A) Qorxobbii (O)				Skin cut	Fresh leaf of <i>Plantago lanceolata</i> is smashed, squeezed and three to four drops of the exudate is added to skin cut.	Dermal
<i>Prunus persica</i> (L.) Batsch	Rosaceae	Kok(A) Kookii (O)	T	L	Hu	Constipation	Fresh leaf of <i>Prunus persica</i> is crushed and mixed with water and given orally for continuous days until it gets relieve.	Oral
				L	Hu	Diarrhea	Leaf is pounded, mixed with water and decanted, and then one cup of local tella is given to Human.	Oral
				Ep	Hu	For delayed pregnancyWoman(Infertile)	Leaf of epiphyte is cut by her Husband. Then crushed, mixed with water, decanted, drunk at bed time and continuing sexual intercourse.	Oral
<i>Pterolobium stellatum</i> (Forsk)Brenan	Fabaceae	Kentafa(A) Harangamaa(O)	Sh	L	Hu	Goiter	Crush the leaves and mix with butter. Then apply the paste and tie it on the neck.	Dermal
				L	Hu	Evil eye	Leaf of <i>Pterolobium stellatem</i> and <i>Ruta chalepensis</i> are pounded, mixed with water and one coffee cup is drunk.	Oral
				R	Hu	Sudden sickness	Root of <i>Pterolobium stellatem</i> is dried, powdered and preserved. One spoon of the powder is mixed with alcohol and given to human.	Oral
<i>Rhamnus prinoides</i> L. Herit.	Rhamnaceae	Gesho(A) Geeshoo(O)	Sh	L	Hu	Teeth-ache	Leaf is chewed and kept on the teeth.	Oral
				L	Li	Leech	Leaf is crushed, dried and soaked with the leaves of a <i>Solanumtuberosum</i> at least for 2 days & then given small droplets through left nostril & then much more through their mouth.	Oral and Nasal
				L	Hu	Tonsillitis	Young leaves are chewed and the juice is swallowed.	Oral
<i>Ricinus communis</i> L.	Euphorbiaceae	Gulo(A) Qobboo(O)	Sh	Se	Hu	Headache	Seed is pounded, mixed with butter, and tied on head.	Dermal
				Se	Li	Anthrax	Fresh Fruit is pounded, mixed with water and given for cattle to drink.	Oral
				Se	Hu	Impotency	Seeds are pounded, mixed with small quantity of Aloe spp. latex and drink one coffee cup before bed time for 3-4 days.	Oral
				L	Li	Bloating	Fresh leaf is pounded, mixed with water; salt is added and given to cattle Orally.	Oral
<i>Rosa abyssinica</i> Lindley	Rosaceae	Kega(A) Goraa(O)	Sh	L	Hu	Ascariasis	Fresh leaf is pounded, mixed with water and a cup of the mixture is drunk.	Oral
				Fu		Hypertension	Fresh fruit with the leaves of <i>Otostegia integrifolia</i> are ground, powdered, mixed with water and one coffee cup is drunk during the sick time.	Oral
				Fw/ L		Erythroblasts	The flower and leaf of <i>Rosa abyssinica</i> is eaten for some days.	Oral
<i>Rumex abyssinicus</i> Jacq.	Polygonaceae	Makmako(A) Dhangaggoo Fardaa(O)	H	R	Hu	“Ayne tila”	Root of <i>Rumex abyssinicus</i> and root of <i>Verbascum sinaiticum</i> are crushed together and mixed with honey. Then drunk before breakfast for three consecutive days.	Oral
				R	Hu	Hypertension	Dried root of <i>Rumex abyssinicus</i> is pounded , added to tea and drunk	Oral

				R	Hu	Ring worm	The root of <i>Rumex abyssinicus</i> with root of <i>Rumex nepalensis</i> is pounded, powdered, mixed with solution of <i>Citrus limon</i> and creamed on affected part.	Dermal
<i>Rumex nepalensis</i> Spreng.	Polygonaceae	Lut (A) Tultii(O)	H	R	Li	Retained placenta	Latex of <i>Rumex nepalensis</i> root is washed out by water and given to animal (e.g. sheep, cow)	Oral
				R	Hu	Stomach-ache	Root is Chewed and the sap is swallowed.	Oral
				R	Hu	Wound	Root is chopped, dried, powdered and applied on wounded part.	Dermal
				L	Hu	Spider poison	Leaf of <i>Rumex nepalensis</i> is directly rubbed on affected skin.	Dermal
				R	Hu	Internal Parasite	The root is Chewed and swallowed or boiled in the water and one glass of the solution is drunk.	Oral
R	Hu	Body swelling	Dry/fresh root is chewed and put on the swollen part.	Oral				
<i>Rumex nervosus</i> Vahl	Polygonaceae	Embacho (A) Dhangaggoo	Sh	L	Hu	Wound	Dried root bark is crushed, pounded, mixed with butter and placed on the wound.	Dermal
				R		Skin rash	Root of <i>Rumex nervosus</i> is dried and powdered. One coffee cup of powder is mixed with butter and creamed on affected skin	Dermal
				L	Hu	Snake bite	The leaf of <i>Rumex nervosus</i> is chewed and the solution is swallowed during bite time.	Oral
				L/ St	Li	Lice	<i>Rumex nervosus</i> together with <i>Sida schimperiana</i> is used to wash the calf to remove external parasites and Scabies (itches).	Dermal
<i>Ruta chalepensis</i> L.	Rutaceae	Tenadam(A) Cilaattama(O)	H	L	Hu	Stomach-ache	Fresh leaf of <i>Ruta chalepensis</i> mixed with sugar & powder of <i>Vicia faba</i> , then boiled and drunk (or chewing and taking the sap).	Oral
				B/L	Li	Cocoidiosis (Bilii)	Bark and leaf of <i>Ruta chalepensis</i> and root of <i>Justica schimperiana</i> are pounded together and given to hen with injera.	Oral
				Se	Hu	Evil eye	The seed of <i>Ruta chalepensis</i> with <i>Allium sativum</i> are finely crushed together and sniffed at the sickness time	Nasal
<i>Salix macronata</i> THunb.	Salicaceae	Lahaya(A) Alaltuu(O)	T	Sht	Hu	Hemorrhage	Fresh shoot is crushed, squeezed and the juice is rubbed on the affected part.	Oral
				L	Hu	Wound	Fresh leaf of <i>Salix macronata</i> is pounded and placed on wounded part	Dermal
				L	Li	Joint dislocation	The leaf is ground along with young stem, mixed with bread and given to the cattle in problem	Oral
<i>Schinus molle</i> L.	Anacardiaceae	Kundoberbere (A) Qundobarbare (O)	T	L/Fu	Li	Eye disease	Fesh Leaf and fruit of <i>Schinusmolle</i> are chewed and spitted on cattle, equines, goat and sheep eye.	Eye
				Se	Hu	Tonsillitis	Dried seed of <i>Schinusmolle</i> is pounded, powdered, mixed with honey and then drunk	Oral
<i>Sesamum indicum</i> L.	Pedaliaceae	Selit(A) Saliixa(O)	H	Se	Hu	Ear defect	Extract oil from the seed and drop the extract in canal the ear.	Ear
<i>Sidas chimperiana</i> Hochst. Ex A. Rich.	Malavaceae	Cifrig(A) Harmellaa(O)	H	R	Hu	Syphilis (ketegn)	Fresh Root of <i>Sidaschimperiana</i> and root of <i>Solanumadoense</i> are crushed together and mixed with water and decanted. Then mixed with honey and drunk.	Oral
				R	Li	Horse disease	Ground, mixed with water and drunk or applied through the nostrils.	Nasal
				R	Hu	Evil eye	Root is fumigated every evening to patient until recovery.	Nasal

<i>Solanum adoense</i> (Hochst) ex A. Rich.	Solanaceae	Zerch Enbuay(A) Hiddii baddaa(O)	Sh	Fu	Hu	Wound	Adding the drop of <i>Solanum adoense</i> fruit juice on wounded part	Dermal
				Fu	Li	Bloat	Fruits of <i>Solanumadoense</i> are Squeezed on cattle feed.	Oral
				L	Li	Anthrax	Dried leaf of <i>Solanum adoense</i> is crushed, pounded, mixed with tella and given to cattle.	Oral
<i>Solanum incanum</i> L.	Solanaceae	Enbuay(A) Hiddii loonii(O)	Sh	R	Hu	Snake bite	Dried root powder is drunk with coffee.	Oral
				Sa	Hu	Infection caused by spine in leg	The sap of fresh fruit is squeezed & dropped on affected part.	Dermal
				L	Hu	Nasal bleeding	The leaf of <i>Solanum incanum</i> is ground, powdered and sniffed several times until recovery.	Nasal
				L	Li	Urination problem	The leaf of <i>Solanum incanum</i> and that of <i>Cuminum cyminum</i> are smashed together, mixed with water and given for horse, donkey, and mules to drink	Oral
<i>Solanecio gigas</i> (Vatke.)C. Jeffery	Astraceae	Yeshikoko gomen(Mogne qitel(A) Jirma Jaldeessaa(O)	Sh	L	Li	Bloating	The leaf of <i>Solanecio gigas</i> is pounded, squeezed and the juice is added through the nose	Nasal
				L	Li	Lice	Leaf of <i>Solanecio gigas</i> is used to wash hair of calf as lice killer.	Dermal
<i>Stephania abyssinica</i> (Dillo&A.Rich.)Walp.	Menispermaceae	Ye ayit hareg(Chewchawit(Etse Iyeesus(A) Hidda kalaalaa(O)	Cl	L	Hu	Wound	Leaf of <i>Stephania abyssinica</i> is pounded and a small amount is added to wound.	Dermal
				R	Li	Rabies	Dry root of <i>Stephaniaabyssinica</i> is powdered and baked with teff flour and given to cattle.	Oral
				L	Li	Pasturolosis	Dried root and leaf of <i>Stephaniaabyssinica</i> is powdered together, mixed with water and given to the animal (cattle, goat or sheep).	Oral
<i>Syzgium aromaticum</i> L.	myrtaceae	Kirunfud(A) Qurunfudii(O)	T	Fu	Hu	Impotency	Dried <i>Syzgium aromaticum</i> is crushed, mixed with goat milk and boiled. Then the decoction is drunk.	Oral
				Fu	Hu	Vomit	Fruit of <i>Syzgiumaromaticum</i> with rhizome of <i>Zingiberofficinale</i> is boiled and drunk.	Oral
<i>Tanacetum cinerariifolium</i> (Trev). Sch. Bip.	Asteraceae	Kaba(A)	H	L	Hu	Fibril illness	The leaf of <i>Tanacetum cineratiifolium</i> is squeezed and drunk	Oral
<i>Trigonellafoenum-Graecum</i> L.	Fabaceae	Abish(A) Sunqoo(O)	H	Se	Hu	Leg wound	Seed of <i>TrigonellafoenumGraecum</i> , seed of <i>Faciafaba</i> and seed of <i>Linumusatissimum</i> are finely ground together, rolled in piece of cloth and tied on leg	Dermal
				Se	Hu	Body swelling	The seed of <i>Trigonellafoenum-graecum</i> is crushed, powdered, mixed with honey and little water, then boiled like "porage" and eaten	Oral
				Se	Hu	Bone fracture	Seed is powdered; water is added to flour to make the paste, and then applied to the broken bone.	Oral
<i>Thymus schimperi</i> Ronniger	Lamiaceae	Tosign(A) Xassee(O)	H	Ag	Hu	Cough	Its leaves, root and bark are ground together, powdered and mixed with water, one coffee cup (sini) is drunk during pain time.	Oral
				L	Hu	Stomach-ache	Leaf is boiled with leaves of <i>Foeniculumvulgare</i> and one tea cup is taken.	Ora
				L	Hu	Hypertension	Leaf is boiled with sugar and drunk.	Oral

<i>Urera hypselodendron</i> (A. Rich.) Wedd.	Urticaceae	Lankuso(A) Laanqisaa dhoqonu (O)	Cl	B	Li	Anthrax	Bark/shoot of <i>Urera hypselodendron</i> is crushed, smashed, mixed with powder of <i>Trigonella foenum-graecum</i> or with egg and given to cattle.	Oral
<i>Urtica simensis</i> Steudel	Urticaceae	Sama(A) Doobbii (O)	H	L	Hu	Gastritis, Heart Disease	Eat in the form of stew ('wot') against gastritis & heart disease.	Oral
				R/L	Hu	Gonorrhea	The root and leaves of <i>Urticasimensis</i> with the bark of <i>Crotonmacrostachyus</i> are pounded, powdered, mixed with little water, filtered, then a cup of filtrate is drunk for 5 days in the morning	Oral
<i>Verbena officinalis</i> L.	Verbenaceae	Atuch(A) Derguu(O)	H	L	Hu	For tonsillitis	Leaf of <i>Verbenaofficinalis</i> is Crushed, smashed, mixed with butter and creamed around neck.	Dermal
				R	Hu	Fibril illness	Root of <i>Verbenaofficinalis</i> , together with the root of <i>Carissaspinarum</i> and root of <i>Rutachalepensis</i> , are fumigated to the patient.	Nasal
				R	Hu	Diarrhea	Root of <i>V. officinalis</i> and root of <i>Phytolaccadodecandra</i> , bark of <i>Crotonmacrostachyus</i> are pounded, mixed with water, decanted and drunk after a day.	Dermal
<i>Verbascum sinaiticum</i> Benth.	Scrophulariac eae	Kutina(Ye Ahya joro(A) Gurra Harree (O)	H	R	Li	Horse disease	Fresh Root of <i>Verbascumsinaiticum</i> is collected from three places, smashed, mixed with water, decanted and given to horse	Oral
				L	Hu	Impotency	Chopped Leaf of <i>Verbascum sinaiticum</i> is rolled by clean piece of cloth and tied around male sex organ to erect it.	Dermal
				R	Hu	Wound	The root of <i>Verbascum sinaiticum</i> is crushed, powdered, mixed with butter and creamed on affected part.	Dermal
<i>Vernonia amygdalina</i> Del.	Asteraceae	Gerawa(A) Eebicha (O)	T	L	Hu	Malaria	Crushed leaves of <i>Vernonia amygdalina</i> concocted with leaves of <i>Ruta chalepensis</i> . One cup is served as a drink for 3-5 days with cold water in the morning.	Oral
				L	Hu	Skin infection	The leaf of <i>Vernonia amygdalina</i> is pounded and the patient body is washed by the plant or the leaf of is used as a soap to wash the infected body.	Dermal
				L	Li	Bloating Urine retention	Fresh leaves is squeezed, mixed with water, and then given to cattle in morning and at night until recovery.	Oral
<i>Vernonia hymenolepis</i> A.Rich.	Asteraceae	Weynagift (A) Sooyyama(O)	Sh	L	Hu	Gonorrhea	Leaf twig of <i>Vernonia hymenolepis</i> and bark of <i>Croton macrostachyus</i> are pounded together, mixed with honey and 1-3 spoons is taken in the morning before breakfast.	Oral
				L	Hu	Wound	Leaf of <i>Vernonia hymenolepis</i> is squeezed and the sap is dropped on the wound.	Dermal
<i>Zehneria scabra</i> (Linn.f.) Sond.	Cucurbitaceae	Haregres(Etse sabeq(Nech Hareg(A) Qorii Sinbiraa(O)	Cl	L	Hu	Swelling	Leaf and bark of <i>Zehneria scabra</i> and leaf of <i>Rumex nervosues</i> are pounded together, rolled in clean cloth, and tied on swelling.	Dermal
				L	Hu	Fibril illness	The leaf of <i>Zehneria scabra</i> is pounded, squeezed and mixed with sugar and drunk one cup /or the stem is boiled and inhaled	Oral
				R	Hu	Sudden sicknes	Fresh root is pounded, mixed with water and drunk.	Oral
				L	Hu	Dandruff	Fresh leaf is squeezed to make juice and creamed after hair is cut.	Dermal

<i>Ziziphus spina-christi</i> (L.) Desf.	Rhamnaceae	Gaba(A)	Sh	L	Hu	Dandruff	The leaf of <i>Ziziphus spina-christi</i> is pounded, powdered, mixed with butter and then creamed.	Dermal
<i>Zingiber officinale</i> Roscoe	Zingiberaceae	Jinjible(A) Zinjibila(O)	H	Rh	Hu	Malaria	Rhizome of <i>Zingiber officinale</i> and bulb of <i>Allium sativum</i> are pounded together and eaten with honey.	Oral
					Hu	Stomach ache	Rhizome of <i>Zingiber officinale</i> together with Leaf of <i>Vernonia amygdalina</i> and bulb of <i>Allium sativum</i> are pounded and eaten with honey.	Oral

Appendix 3: List of the medicinal plant families and corresponding number of genera and species in the study area

No.	Family	No. of genera	No. of plant species	No	Family	No. of genera	No. of plant species
1.	Acanthaceae	1	1	27	Menispermaceae	1	1
2.	Alliaceae	1	2	28	Myrsinaceae	2	2
3.	Aloaceae	1	1	29	Myrtaceae	3	3
4.	Amaranthaceae	1	1	30	Oleaceae	2	2
5.	Anacardiaceae	1	1	31	Pedaliaceae	1	1
6.	Apiaceae	1	1	32	Phytolaccaceae	1	1
7.	Apocynaceae	1	1	33	Pittosporaceae	1	1
8.	Asparagaceae	1	1	34	Plantaginaceae	1	1
9.	Asteraceae	6	7	35	Polygonaceae	1	3
10.	Boraginaceae	2	2	36	Ranunculaceae	2	2
11.	Brassicaceae	2	3	37	Rhamnaceae	2	2
12.	Cactaceae	1	1	38	Rosaceae	3	3
13.	Caricaceae	1	1	39	Rubiaceae	1	1
14.	Cucurbitaceae	3	3	40	Rutaceae	2	2
15.	Cupressaceae	2	2	41	Salicaceae	1	1
16.	Ericaceae	1	1	42	Santalaceae	1	1
17.	Euphorbiaceae	5	5	43	Sapindaceae	1	1
18.	Fabaceae	4	4	44	Scrophulariaceae	1	1
19.	Flacourtiaceae	1	1	45	Simaroubaceae	1	1
20.	Hypericaceae	1	1	46	Solanaceae	5	6
21.	Lamiaceae	4	5	47	Sterculiaceae	1	1
22.	Lineaceae	1	1	48	Urticaceae	2	2
23.	Lobeliaceae	1	1	49	Verbenaceae	1	1
24.	Loganiaceae	1	1	50	Vitaceae	1	1
25.	Malvaceae	2	2	51	Zingiberaceae	1	1
26.	Meliaceae	1	1				

Appendix 4: List of human diseases in the study area

No	Disease treated	Total of plant species used	Total percentage (%)
1.	Wound	25	26.88
2.	Malaria	14	15.05
3.	Stomach-ache	13	13.97
4.	Body swelling and Evil eye	10	10.75
5.	Tonsillitis	9	9.68
6.	Fibril illness, Scabies(itches) and Skin rash	7	7.52
7.	Cough,dandruff, diarrhea and headache	6	6.45
8.	Eye disease ,gonorrhea ,intestinal parasites and tape worm	5	5.38
9.	Snake bite	4	4.30
10.	Amoeba,bone fracture, fire burn, hypertension, impotency, rabies,skin cut, sudden sickness and toothache	3	3.22
11.	Asthma, cancer ,heart disease, hemorrhoids ,nasal bleeding, pneumonia, ring worms ,urination problem and vomit	2	2.15
12.	Abortion(To stop pregnancy),back pain, bilharzia, ear defect, goiter,infertility, retained placenta and syphilis	1	1.07

Appendix 5: List of livestock diseases in the study area

No.	Disease treated	Local name(Afaan oromoo)	No. of plant species used	Percent (%)
1	Bloating	Dhitahuu garraa	10	10.75
2	Anthrax and Leech	Abasanga Alekit	6	6.45
4	Ectoparasite (lice)	Ye wech tegegna	5	5.38
5	Rabies	Dhukkubaa sarre	3	3.22
6	Erythroblasts, horse disease, retained placenta , cocoidiosis	Machangaf ,Dhukkuba fardaa,yengdelej sizegey and Dhukubaa indaqoo	2	2.15
7	Blackleg ,horse itch,pasturolosis and eye disease	Abagorba, Epizootic lymphagities,Gororsa, Aynebesheta	1	1.07

Appendix 6: Some of the cultivated and wild grown medicinal plants widely traded in the market for different uses in addition to medicinal values in Wonch district.

No	Scientific Name of the medicinal plant	Local name(Afan oromo)	Used for
1.	<i>Allium cepa</i>	Shinkurt dimma	Spice, food
2.	<i>Allium sativum</i>	Nech shinkurt	Spice,food
3.	<i>Artemisia abyssinica</i>	Harit	spice
4.	<i>Brassica carinata</i>	Gomenzer	food
5.	<i>Brassica nigra</i>	Senafich	food
6.	<i>Capsicum annum</i>	Berbere	food
7.	<i>Carica papaya</i>	Papaya	food
8.	<i>Citrus limon</i>	Lomi	Food,
9.	<i>Coffea Arabica</i>	Buna	stimulant
10.	<i>Cordia africana</i>	Wanza	Timber, live fence, fire wood
11.	<i>Coriandrum sativum</i>	Denbelal	Food
12.	<i>Croton macrostchyus</i>	Bakanisaa(bisana)	Fire wood,
13.	<i>Cucurbita pepo</i>	Duba	Food
14.	<i>Echinops kebericho</i>	Kerebicho	Smell
15.	<i>Eucalyptus globulus</i>	Bahirzaf Addii.	Construction, fire wood, live fence
16.	<i>Guizotia abyssinica</i>	Nug	Food
17.	<i>Linum usitatissimum</i>	Telba	Food
18.	<i>Lepidium sativum</i>	Feto	Food
19.	<i>Nigella sativa</i>	Tikur azmud	Food
20.	<i>Ocimum basilicum</i>	Zikakibe	Spice
21.	<i>Olea europaea L. subsp. cuspidata</i>	Weyra	Fire wood, consruction, farming tool
22.	<i>Ostostegia integrifolia</i>	Tunjit	Fumigate
23.	<i>Prunus persica</i>	Kok	Food
24.	<i>Rhamnus prinoides</i>	Gesho	Bevarage
25.	<i>Ruta chalepensis</i>	Tenadam	Spice
26.	<i>Schinus molle</i>	Kundo berbere	Spice
27.	<i>Sesamum indicum</i>	Seli	Food
28.	<i>Trigonella foenum-Graecum</i>	(Sungoo)Abish	Food
29.	<i>Thymus schimperi</i>	Tosign	Stimulant
30.	<i>Zingiber officinale</i>	Jinjiblaa	Spice