DEPARTMENT OF BIOLOGY, SCHOOL OF GRADUATE STUDIES

JIMMA UNIVERSITY COLLEGE OF NATURAL SCIENCES,

ETHNOBOTANICAL STUDY OF TRADITIONAL MEDICINAL PLANTS USED TO TREAT HUMAN AILMENTS BY INDIGENOUS PEOPLE OF YAYO ILU ABBA BOR ZONE of OROMIA REGIONAL STATE, SOUTHWEST ETHIOPIA

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Abstract

This study was conducted in Yayo districts, Oromia Region, South west Ethiopia during 2021,with the aim of investigating ethnomedicinal plants. .Indigenous knowledge includes time-tested practices that developed in the processes of interaction of humans with their environment .Medicinal plants are one part of the plant resources that have a potential capacity for treating of various diseases. The purpose of the study was to organize and document information on use, managementand conservation of medicinal plants.The study involved in three kebeles of yayo district durin stady time. For ethnobotanical data collections, 90 informants were interviewed. 27 key informants were purposively selected. Various ethnobotanical techniques were used to collect and analyze the data such as semi-structureinterview,guided field walk and observation, group discussion,preference ranking and paired comparison, direct matrix that werethetop two species recorded for the highest number of usesand fidelity levelindex, descriptive statistical analysis.One hundred seventeen informants from 3 kebeles were included in the study.A total of 70 plant species58 fromwild, and 12 from ``homegarden, distributed in 28 families,66 genera were collected and identified. Asteraceae was the most Species rich family represented by 27 followed by Fabaceae that contributed 24 species. All 70 species (100%) are used for treatment of 46 .Trees species constitute the largest number with (34 %) species followed by herbs (30 %), shrubs (29%), and climbers (7 %) species. In addition tothese medicinal plants in the area are utilized for forage, fencing, fire wood, construction and spiritual and cultural needs. The highest informant consensus was documented for the plants Artemisa abyssinica 11% cited by all informants for its medicinal value treating fibrililness. Burecea antidystrical and Bidens piloca9.4% and 8% are citedcited 2nd and 3rd Ocimum urticifolium (7.7%) ranking4th respectively. Oral administration is the dominant route (53 %) ,followed by dermal route (28%) in which pounding 23% , powdering 19%, crushing 14%, squeezing 10%, smashing 10%, chewing, burning, steam bath, dry bath and rubbing are recorded methods of preparation techniques.Modernization and acculturation have contributed in making the younger generation un willing to practice and retain traditional knowledge.

Keywords:- phrases *Ailments, Ethnobotany, indigenous knowledge, and informantconsensus*

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LIST OF ABBREVIATIONS

CAM=Complementary and Alternative Medicine

CBD= Conventional on Biological Diversity

Ha = Hectare

I/A/B/Z = Iluu Abbaa Boor Zone

IBC= Institute of Biodiversity Conservation

IK=Indigenous Knowledge

KTH=Key Traditional Healers

MP=Medicinal Plants

NGO=Non-Governmental Organization

OCTB =Oromia Cultural and Tourism Bureau

SNNPRS = Southern Nations Nationalities and Peoples Regional State

TMP=Traditional Medicinal Plants

UK=United Kingdom

UNESCO =United Nations Education, Science and Cultural Organization

WDLMO=Yayo District Land Management Office

Y/E/S =Yayo Eco-System

YNFPA =Yayo National Forest Priority Area

1. INTRODUCTION

Ethnobotany is abroad term referring to study of direct interrelations between humans and plants (Martin,1995; Balick and Cox,1996).The indispensable dependency of human up on plants for their livelihood was primarily stepped by domestication and dates back 10,000 years (Martin,1995). From plants humans can obtained food, pesticides, medicines, fuel, fodders, construction materials, tools, and also derive aesthetic and spiritual fulfillments. (Posey, 1999).

Medicinal plants are one part of the plant resources that have a potential capacity for treating of various diseases. Plants are a great source of medicines, especially in traditional medicine, which are useful in the treatment of various diseases (Bako et al., 2005).

Traditional medicine has not only played a vital role in providing healing but has also contributed to the discovery of most pharmaceutically active substances in plants (Sakkiret et al., 2012). With the emergence of new diseases and drug resistance to in fections such as HIV/AIDS, malaria, tuberculosis,diarrhea diseases and skin problem is;traditional medicines hould be given more at tention in modern research and development (Mariita,2006) .Because of the un matched availability of chemical diversity,natural products,either as pure compounds or as standardized plant extracts,provide unlimited opportunities for new drug leads.

Now with 78% of the new chemical entities being natural or natural product-derived molecules, there has been a promising alternative treatment of infectious disease using medicinal plants(Mariita,2006).When the human being got sickIn our country, Ethiopia, around 90% of the utilization uses traditional medicine due to cultural acceptability of healers and local pharmacopeias, the relatively low cost of traditional medicine and difficult to access the modern health facilities (WHO, 2002; Bekele, 2007). It is endowed with diverse biological resources due to significant geographical diversity, which favored the formation of different habitat and vegetation zones (Balcha Assefa et al., 2010).

Ethiopia is also home to a diverse mix of ethnic, cultural and linguistic groups (Bekele .E, 2007; Balcha Assefa et al., 2010). According to the same reports, diverse combination of social and cultural backgrounds contributed much to the existence of rich indigenous knowledge, including managing and using medicinal plants against human and livestock ailments.

As the usage of herbal medicine gained popularity over the past decades, reports of suspected toxicity and adverse events were also described. A meta-analysis of 69 prospective and retro spective studies from different parts of the world involving around 419,000 patients found that nearly 6.7% of all hospitalizations resulted from adverse drug reaction (GromekK, et al., 2015.)

Environmental degradation, agricultural expansion, loss of forests and woodlands, over-harvesting, fire, cultivation of marginal lands, overgrazing and urbanization appear to be the major threats to medicinal plants of Ethiopia. Such a threat poses a significant risk to the future wellbeing of the human and animal populations that have for generations, relied on these resources to combat various ailments (Bekele.E, 2007).

The activity of conservation, documentation of indigenous and related knowledge on the utilization and conservation of MPTs is required from each part of the region to know the major threats towards MPTs and to share the general knowledge on conservation measures that have been taken by the local people (WHO,2002).

However, itsl studies on medicinal plants in the country are limited as compared to the multiethnic and cultural diversity of the people, the diverse flora of the country and vital role played by traditional medicinal plants for the primary healthcare (Debela Hunde et al, 2006). Similarly, in the study area there is no enough study or documentation with the same issue before (Debela Hunde, 2001).

However, the people use traditional medicines continuously to combat human ailments. Therefore, like any other areas of Ethiopia, the study area (Yayo Disrict) needs documentation of ethnobotanical knowledge to know the status of medicinal plants and to share the knowledge of the local people about the use and conservation measure that the people use.

This study is initiated to fill existing do not documented tradional knowledge gap in documenting and analyzing the indigenous knowledge on the use of traditional medicinal plants and their associated knowledge used by the local people in Yayo district, Ilubabor zone. It is believed to add to the country's database of plants and in documenting indigenous ethno botanical knowledge of the people.

1.2 Statement of the Problem

The People in developing countries like Africa, highly dependent on traditional medicine for primary health care for both humans and livestock. In particular, for Ethiopia, about 90% of the populations using traditional medicine for primary health care (WHO, 2002). However, the indigenous knowledge about traditional medicinal plants is transferred secretly from generation to generation through oral.

Since, there is a gap in the document and usage of medicinal plants as remedies are getting lost owing to migration from rural to urban areas, industrialization, expansion of modern education and specialized healers do not convey their knowledge to next generation.

And also in most parts of the country, the wild plants and forests are almost totally lost by human impact like deforestation, agricultural expansion, over exploitation and population growth and hence there is evident loss of biodiversity (Abebe, 2011). Likewise, a similar problem is observed in one part of Ethiopia, Oromia Regional State, particularly in Yayo district.

However, until this time, only two research conducted on ethno botanical study of medicinal plants and associated knowledge in the study area. Therefore, the finding of this study will help people of the study area to be aware of problems associated with medicinal plants and related knowledge and give attention for the threatened medicinal plants.

In addition, the documentation of the indigenous knowledge of medicinal plants in the study site may be used as a reference material for those who want to conduct research in further ethno botanical study and development of modern drug, hence, this study initiate to fill the gaps in the documentation of ethnobotanical knowledge in the study area.

1.3. Objectives of the Study

1.3.1 General Objective

To understand how indigenous people use plants for medicinal purposes in Yayo District.

1.3.2 Specific Objectives

1. To identify medicinal plant specimens used as treatment for human health problem in the study area;
2. To record methods of preparation, route of administration, plant parts commonly used and dosage commonly used by the local people;
3. To identify the major threats on medicinal plants and related aspects in the study area;
4. To examinethe conservation measures used by the local people in the studyarea

1.4 Research questions

1. 1.Which medicinal plant species that are used for the treatment human disease found inthe study area?

2. How to record methods of preparation, route of administration, plant parts commonly used by the local people?

3. What are the major threats on medicinal plants of the area?

4. What are the conservation methods used by the local people of the study area?

1.5. Significance of the Study

Until this time, not more than two research on ethnobotany was done in the area. Therefore, the finding of this study was to develop awareness of society in use and conserve medicinal plants. Used as input by other researchers who wants to carry out the study on traditional medicinal; plants and can be part of the information source for those who want to conduct further research in the same issue and the development of modern drugs.

1.6. The scope of the study

Speciallythis study was conducted in Yayo district, Ilu Abba Bor Zone, Oromia Regional State, specifically on the three kebeles because of financial and time constraint. The study was conducted to assess ethnobotanical study on medicinal plants and related knowledge in the local people of Yayo district. The Sample sizes for this study were 90 respondents randomly selected and 27 key informants purposly selected by the researcher.

2. LITERATURE REVIEW

2.1. History and Development of Ethnobotany

There has been an ever-increasing interest by anthropologists, botanists and explorers of the world to document the potential use or economic potential of plants used by indigenous people (Cotton, 1996). Christopher Columbus initiated this in 1442 when he discovered the use of tobacco plant (Nicotiana spp.) by local people of Cuba. Around 1858, British explorer, R. Spuce noted for the first time the psychoactive properties of the vine plant (Cotton, 1996). Such works gradually yielded a firm base for the study of direct interactions between human and other organisms through documenting, analysis and use of indigenous knowledge of biological entity. Eventually, the work on ethnobotany promoted this subject to be an independent field of study in biological sciences. Since then, different authors used various ways of defining ethnobotany.

John Hersh berger proposed the term ethnobotany for the first time in 1895 (Balick, 1996). However,this term has been given different interpretations and definitions depending on the interest of workers involved in the study Hersh berger(1896)cited in Cotton,1996),defined Ethnobotany as the study of the use of plants by a original peoples. Martin (1995)definedethno botanyasastudyofpeople's classification, management and use of plants. In 1941, Shultes redefined ethnobotany as the study of the relation ship,which exits between humans and their ambient vegetation (Castetter, 1944 cited in Cotton, 1996, Bye (1985) Ethnobotany as a science investigates the biological (including the ecological) basis of interaction and relationship between plants and people over evolutionary time and geological space.

Even today, no definitive agreement in its interpretation has been reached. This stemmed from the fact that the term has been given different interpretation and definition depending on the interest of the workers involved in the study (Cotton, 1996). Another author, Martin (1995) broadly defined the term of ethno botany as the subject dealing with the study of direct interactions between humans and plants. However, Balick and Cox (1996) expanded this field of study by including the use of plants for food, medicinal, forage and for any other economic purpose within field of ethnobotany. According to Cotton (1996), ethnobotany encompasses all studies that concern the mutual relationships between plants and traditional people.

According to Balick and Cox (1996), research concerned with ethno botany involves recording the knowledge on the cultural interaction of people with plants, finding out how local people have traditionally used plants for various purposes, and how they incorporate plants into their cultural tradition and religion. However, to get more detailed and reliable information in this concern, ethnobotanical investigation needs to involve scholars from different field of studies such as plant taxonomy, plant ecology, anthropology, linguistic, economic botany, pharmacology and the like (Martin, 1995).

There are various techniques of inquiry tools based on the aims and objectives of the ethno botanical study at hand (Martin, 1995; Alexiades, 1996). These inquiry techniques include participant observation, simulation, field interviews, and group discussion, checklist interview and market survey.

2.2 Indigenous knowledge and medicinal plants

Indigenous knowledge refers to the accumulation of knowledge, rule, standards, skills, and mental sets,which are possessed by local people in a particular area (Quanash, 1998). The immediate and intimate dependency of local people on natural resources resulted in the accumulation of indigenous knowledge that helped people of adapt to and survive in the environmentsin which they live.It is local knowledge that is unique to a given culture or society and the base for agriculture,health care, food preparation, education, environmental conservation and a host of other activities (Thomas, 1995).

Indigenous knowledge is abody of knowledge built up by a group of people through generations of living in close contact with nature and it is cumulative and dynamic. It builds upon the historic experiences of people and adapts to social, economic, environmental, spiritual and political change.

The quantity and quality of traditional knowledge differs among community members according to their gender, age, social standing, profession and intellectual capabilities. Forinstance, societies concerned with biological diversity will be most interested in knowledge about the

environment; this information must be understood in a manner, which encompasses knowledge about the cultural, economic, political and spiritual relation ships with the land.

In all countries of the world there exists traditional knowledge related to the health of humans and animals. It is usually unwritten and preserved in the culture through oral tradition. It refers to the knowledge system of indigenous people and minority cultures (UNESCO, 1994). In the scientific viewpoint, traditional knowledge is first and foremost a resource which is considered as a body of information and set of skills developed traditional ways as related to their daily lives (Abebe, 2001).

The majority of people in developing countries particularly Africa will continue to rely on modern medicine for much of their primary healthcare. Side by side however, there will be continuing declines in traditional knowledge about medical plants and in traditional medical systems due to both natural and anthropogenic activities. As each generation matures, skills perceived as immediately useful are gained while others with a lesser perception of immediate value may be lost (Hamilton, 2003).

Plants always used as central significance to human welfare. They provide food, fuel and medicine as well as materials for construction and the manufacture of crafts and many other products for indigenous people. All cultures from ancient times to the present day have used plants as sources of medicines. A medicinal plant is any plant, which in one or more of its organs contains active ingredients which can be used for therapeutic purposes or contain foundation compounds that can be used for the synthesis of useful drugs (Sofowora,1982).

Thus, plants have formed the basis of traditional medicine system that existed for thousands of years and continue to provide sources of remedies (Balick and Cox, 1996). Modern medicine has its roots in ancient medicine and it is likely that many important new remedies will be discovered and commercialized in the future as it has been now by following the leads provided by traditional knowledge and experience.

2.3 Traditional medicinal plants

The world health organization WHO (2001) defined traditional medicine as the total combination of knowledge and practices that can be formally explained or used in prevention and elimination of physical, mental or social imbalance and relying exclusively on practical experience and observation handed down from generation to generation, whether verbally or in writing (Yilma Desta et al, 1996; cited in Fassil Kibebew, 2001).

According to Fassil Kibebew (2001), about 75-90 % of the rural population in the world (excluding western countries) relies on traditional medicines as their only health care system. This is not only because of poverty where people can not afford to buy expensive modern drugs, but traditional systems are also more culturally acceptable and meet the psychological needs in a way modern medicine does not.

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 foklore (Asfaw Debela et al., 1999). The secrete of information retained by traditional healers is relatively less susceptible to distortion but less accessible to the public (Dawit Abebe, 1986).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; Abbink, 1993).

2.3.1 Use of Traditional Medicinal Plants in the Developed World

Infact majority of the developing country is relied on TMPs for the primary healthcare. This is not only because of poverty, shortage of allopathic doctors, and less access of hospitals but also due to the fact that it is more culturally accepted and does not produce complications for harming the physiology and anatomy of a patient as modern medicine may does (WHO, 2002; Hamilton et al., 2003). While showing how far these TMs goes in line with our physiological needs, Hippocrates who mainly remembered as a father of medicine said that herbal remedies contain synergistic and/ or side effects neutralizing combinations (Gilani and Rahman, 2005).

The interest for MPs and TMs is not only for developing countries but also it is true for developed worlds. For example, India, Korea, Japan, China, and Malaysia are frequently cited countries in using traditional medicine (WHO, 2002). According to the same report, countries like Australia, Europe and North America increasingly used "complementary and alternative medicine" (CAM) in parallel to allopathic (orthodox) medicine, particularly for treating and managing chronic disease. The same report showed that 31% of the population in Belgium, 49% of the population in France and 70% of the population in Canada uses CAM at least once.

The other report of the United Nations Conference on Trade and Development (UNCTAD) revealed that in United states of America (USA) medicinal plants have been used as one alternative therapies and its application increased from 34% in 1990 to 42% in 1997 (UNCTAD, 2000). In Latin America 71% of the population in Chile and 40% of population in Columbia has been reported to use TMs (WHO, 1999). In many Asian countries TMs are widely used even though western medicines are often readily available (Velasquez, 2008).

Not only the indigenous people but also allopathic doctors are well aware of the use of TMs. For example 40% of all general allopathic practitioners of United Kingdom (UK) offer some form of TM referral. In Germany 80% of the physicians prescribe herbals. In Japan about 70-85% of physicians prescribe herbal medicine to their patients (WHO, 1999; Elujoba et al., 2005).

2.3.2. Uses of Traditional Medicinal Plants in Africa

As elsewhere in other continents, Africans have been supposed to use TMs to safe guard against disease since time immemorial (Lewu and Afolayan, 2009; Izugbara and Duru, 2008). According to WHO (2002), about 80% of the populations in Africa primarily rely on traditional medicinal. As a matter of testimonial there has been found documentary evidences like that of medicinal plants of East Africa (Kokwaro, 1976), Medicinal plants of North Africa (Boulos, 1983) . Ayensu (1979 cited in Boulos 1983) have documented medicinal plants of West Africa. Hutching and Terblanche (1989) also emphasized the use of herbal remedies for the physical and physiological health care in South Africa.

WHO (2002) reported the degree of some specific African countries towards the use of TMs; and accordingly 70% of the Benin people use TMs. Similarly 70% of Rwandans, 60% of Tanzanians, 60% of Uganda peoples are reported to rely on TMs. The same organization in 2003 reported the use of TMs in treating and/ or proactive prevention for some chronic disease. For example in Ghana, Mali, Nigeria and Zambia, the first line treatment for 60% of children with malaria is the use of herbal medicine, and in South Africa, 70% of people living with HIV/AIDS use traditional medicine (WHO, 2003).

2.3.3 Overview of Medicinal plants in Ethiopia

Ethiopia is believed to be home for about 6,500 species of higher plants with approximately 12% endemism, and hence one of the six plant biodiversity rich countries of Africa (Endashew Bekele, 2007).The diversity is also considerable in the lower plants but exact estimate of these have to be made. The genetic diversity contained in the various biotic make up is also high thus making the country a critical diversity hot spot for plants (UNEP, 1995).

Ethiopia has a significant portion of two of the world's 25 biodiversity rich areas hot spot i.e. the eastern Afro montane Biodiversity Hotspot and the Horn of Africa-Biodiversity Hot Spot. These hotspots house a lot of useful wild biodiversity, particularly that of medicinal plants. The biodiversity richness of Ethiopia was known since 5000 years ago when ancient Egyptians Greeks and Romans used it as a source of unique commodities like Frankincense, Myrrh and other plant products, which are also used for medicine preparation (Thulin, 2004).

Most Ethiopian traditional medicinal knowledge is kept in strict secrecy; however, it is dynamic in that the practitioners make every effort to widen their scope by reciprocal exchange of limited information with each other or through reading the traditional pharmacopeias (Abebe, 1986). According to the same report, there are three treatment features of Ethiopian traditional medicines i.e. curative, prophylactic and preventive. Sometimes, the treatment could have a curative as well as a prophylactic effect and it is occasionally claimed that the prophylaxis could even be genetically fixed and can protect the offspring. Preventive remedies are usually prepared as ornamental, to be borne by the patients against evil spirits or psychosomatic disorders. Other therapies of preventive nature are employed against snake bites, intestinal worms, and

miscarriages. Regulatory drugs are also commonly used to correct the time and the amount of flow of the menstruation cycle of women. Rejuvinative and restorative remedies are also employed to counter the effect of aging, and to overcome importence, malnutrition, infertility etc. Traditional medicine is an integral part of the local culture and is a major public health system; what we call modern medicine is an offshoot of traditional medicine.

2.3.4. Utilization Status of Traditional Medicines in Ethiopia

As known, Ethiopia is a land of mosaic topographies which is responsible to have diverse floras and faunas, a land of multiple ethnic groups, and a land of Lucy, Selam and Ardi which signifies to be the origin of mankind is not that much surprise to have diverse indigenous culture (Abebe and Ayehu, 1993). These traditional practices associated with plant base health care systems are in use since time immemorial (Abebe, 1986) and was supposed to be the only system available for health care before the introduction of allopathic medicine to get cured from disease arising from worms, fungi, virus and protozoa (Abebe, 2001).

2.3.5.. Ethno Medicine Research in Ethiopia

About eighty percent of Ethiopia depends on medicinal plants for primary health care. Although the contribution of medicinal plant species to modern health system and the poor society who live mainly in the rural area is very high, lack of detailed descriptions of the medicinal plants has made it difficult for the researchers to decide the identity of these plants universally with the only reference being the local names of the plants and there is very little attention in modern research and development and the effort made to upgrade is not satisfactory. One of the reasons is that the traditional medicinal plant species are not well described (Tadesse and Demissew, 1992).

According to Demissie and Dagne (2001), when research is conducted on the medicinal plant species, it must target on the fact that the providers of the indigenous knowledge should get a fair share on the benefits of the development of medicines. According to Awas (2007), detailed information on medicinal plants of Ethiopia could only be obtained when studies are under taken in various parts of the country where little or no botanical and ethnobotanical studies have been conducted.

Scientific research on medicinal plants provides additional evidence to the present knowledge of medicinal plants which has been handed down from generation to generation (WHO, 1998). As it has already been stated by Cunningham (1993) and Alexiades (1996), it is better to involve traditionally medical practitioners in pharmaceutical companies. The modern health professionals and some of the consumers ask for scientific based evidence. This encourages for better and more research work. According to Kannon (2004), research on medicinal plants should direct for quality control and the research should examine active herbal constitute for efficacy and toxicity of the herbs.

To preserve indigenous knowledge of plants use in general and of traditional medicine in particular, an ethnobotanical survey of lesser-studied socio-cultural groups is very crucial. However, in Ethiopia research and documentation on medicinal plants have been started only very recently (Tadesse and Demissew, 1992). Limited number of these papers dealt with specific socio- cultural groups in specific areas. When compared to the country's varied flora and the socio-cultural diversity, these studies are incomplete as medicinal plant healing systems differed from culture to culture. Due to this, attention should be given to the field of ethnomedicine of the country with all necessary endeavors to have a full picture of the country's medicinal plants potentials.

2.4. The Role of Ethno Botanical Study and Traditional Medicinal Plant in Ethiopia

2. 4.1 Medicinal Plants for Human Healthcare System

As in any African countries, the use of plants in religious ceremonies as well as for magic and medicinal purposes is common in Ethiopia. This knowledge of traditional medicine has been passed on by word of mouth from one generation to the next by herbalists and knowledgeable elders. About 80% of the Ethiopian population depends on traditional medicine for their health care practices. However, as time goes on, the traditional knowledge is gradually worn away for reasons mainly attributed to environmental degradation and deforestation, which in turn brought about the loss of some species including medicinal plants **(**Desissa, 2000**)**.

Plant diversity remains crucial for human well-being and still provides a significant number of remedies required in healthcare. Medicinal plants played a pivotal role in the treatment of various afflictions in Ethiopia (Fullas, 2007). For the role-played by plant derived products in human and livestock health, systematic scientific investigations are vital (WHO, 1998). Plants play a major role in providing prototype molecules for possible development into conventional drugs by the pharmaceutical industry (Fullas, 2007). However, only small fractions of the world's plants have been investigated scientifically so far, but, human kind has already reaped enormous benefits from it (Farns worth,1985).

2. 4.2 Role of Ethno botanical studies for Conservation of Biodiversity in Ethiopia

The term Ethno botany is a broad term. It is derived from the term ethno and botany. Ethno- refers to race, people, cultural group, nation where as botany is the science of plants. Hence it is the science of people's interactions with plants (Albuquerque et al., 2008). This discipline is found to be a novel form of science to create a partnership between indigenous peoples and researchers aiming for the conservation of biodiversity (Laird, 2002).

Ethno medicine, that encompasses indigenous knowledge, besides studying the actual medicinal values of plants, it plays a great role for the conservation of biodiversities. Studies conducted in Ethiopia have found out some cultural believes and traditional practices which are so vital in contributing to the conservation of medicinal plants in particular and biodiversity as a whole. For example, Tolosa (2007) listed out various local beliefs and cultural traditions used for the conservation of medicinal plants in Gimbi woreda (Western Wellega). The other study by Mesfin (2007) also documented and suggested on cultural and spiritual beliefs used for the conservation of MPs in Wonago woreda (SNNPR). Other cultural practices for example the Geda culture (Abba Geda) in Oromo also do have an important contribution in BD conservation. Wassie (2008) also noted the role of Ethiopian Orthodox Church (EOC) in northern part of Ethiopia for the conservation of biological diversity (CBD).

Thus, Ethno botany if strengthen and work together with its stakeholders like the local communities, governments, educators, NGOs, and others can address future environmental degradations and accelerating loss of cultural knowledge and language (Hamilton, et al., 2003).

This can be if we keep for example chapter 26 of Agenda 21, "Recognizing & Strengthening the Role of Indigenous People and Their Communities," and article 8(j) of the CBD that legally obliges governments to protect and promote indigenous knowledge systems for the conservation and sustainable use of BD so that indigenous people involve in preserving their knowledge and practices relating to conservation (Davidson-Hunt, 2000; Smallacombe, 2010).

2.5 Threats to and conservation of traditional medicinal plants in Ethiopia

2.5.1 Threats to medicinal plants

Many of the threats to medicinal plant species are similar to those causing endangerment to plant diversity generally. The most serious proximate threats generally are habitat loss, habitat degradation and over-harvesting (Hamilton, 1997; Maunduet al., 2006). Medicinal plants can have other uses besides as sources of medicines, and the threats from over-harvesting may be due to effects of collection for purposes other than medicinal. The majority of species of plants in traditional or herbal medical treatments are harvested in the wild rather than cultivated. As a result, many plant species have become extinct and some are endangered. It is therefore necessary that systematic cultivation of medicinal plants be introduced in order to protect threatened species.

As population grows, demand for traditional medicines will increase, and pressure on medicinal plant resources will become greater than ever (Hamilton, 2003). Like other developing countries, the loss of valuable medicinal plants in Ethiopia due to population pressure, loss of habitat, agricultural expansion and deforestation is widely reported by different workers in Ethiopia (Asfaw, 2001; Zewudu, 2002; Balemieet al., 2004). Thus, documentation of medicinal use of plants is becoming increasingly urgent because of the rapid loss of the natural habitat for some of these plants due to anthropogenic activities.

2.5.2 Conservation of traditional medicinal plants

Laterally the term Conservation is defined as the sustainable use of biological resources. The concept of sustainability is now seen as the guiding principle for economic and social

development, particularly with reference to biological resources. According to Asfaw (2001), medicinal plants are considered to be at conservation risk due to over use and destructive harvesting (roots and barks collection).

Abebe and Ayehu (1993) found that many medicinal preparations use roots, stem and bark by effectively killing the plant in harvest. Plant parts used to prepare remedies are different; however, root is the most widely used part. Such wide utilization of root part for human and livestock aliments with no replacement has severe effect on the future availability of the plant. Recent work of Yineger (2005) confirms the fact that of the total plant parts to prepare remedies root is widely used with 64 species (35.5%) followed by leaf 47 species (25.97%) which hence affects sustainable utilization. This implies that the major factor for the loss of medicinal plants in Ethiopia.

In a broad sense, conservation is achieved using in-situ and ex-situ means. In-situ conservation is conservation of species in their natural habitat. Some traditional medicinal plants have to be conserved in-situ due to difficulty for domestication and management (Asfaw, 2001). Moreover, some plants fail to produce the desired amount and quantity of the active principles under cultivation out of their natural habitats. Medicinal plants can also be conserved by ensuring and encouraging their growth in special places, as they have been traditionally (Asfaw, 2001), this can be possible in places of worship (churches, mosques, grave yards, so on), scared grooves, farm margins, river banks, road sides, live fences of gardens and fields.

Medicinal plants also can be conserved using appropriate conservational methods in gene banks and botanical gardens. This type of conservation of medicinal plants can also be possible in home gardens, as the home garden is strategic and ideal farming system for the conservation, production and enhancement of medicinal plants (Asfaw 2001)

3. MATERIALS AND METHODS

3.1. Description of the Study area

3.1.1 Geographical location

The study was conducted at Yayo District, Ilu Abba Bor zoneOromia Regional State,. It is 565 kms from Addis Ababa in western direction, and at a distance of 36 kms in eastern direction from Mettu the capital city of the zone. Yayo district is bounded by Chora district in the east, Hurumu district in the west, Doreni district in the north, Jimma zone and Southern Nations, Nationalities and People Regional State (SNNPRS) in the southern direction.Yayo district has seventeen rural kebeles and one town administration and its altitude ranges from 1600m—2400m above sea level. The location coordinates are 8°32'N latitude, 35°30'E-36°3' longitude (Fig 1 below) .It is located in yayo Biosphere reserver.(YDANRDO,2008)

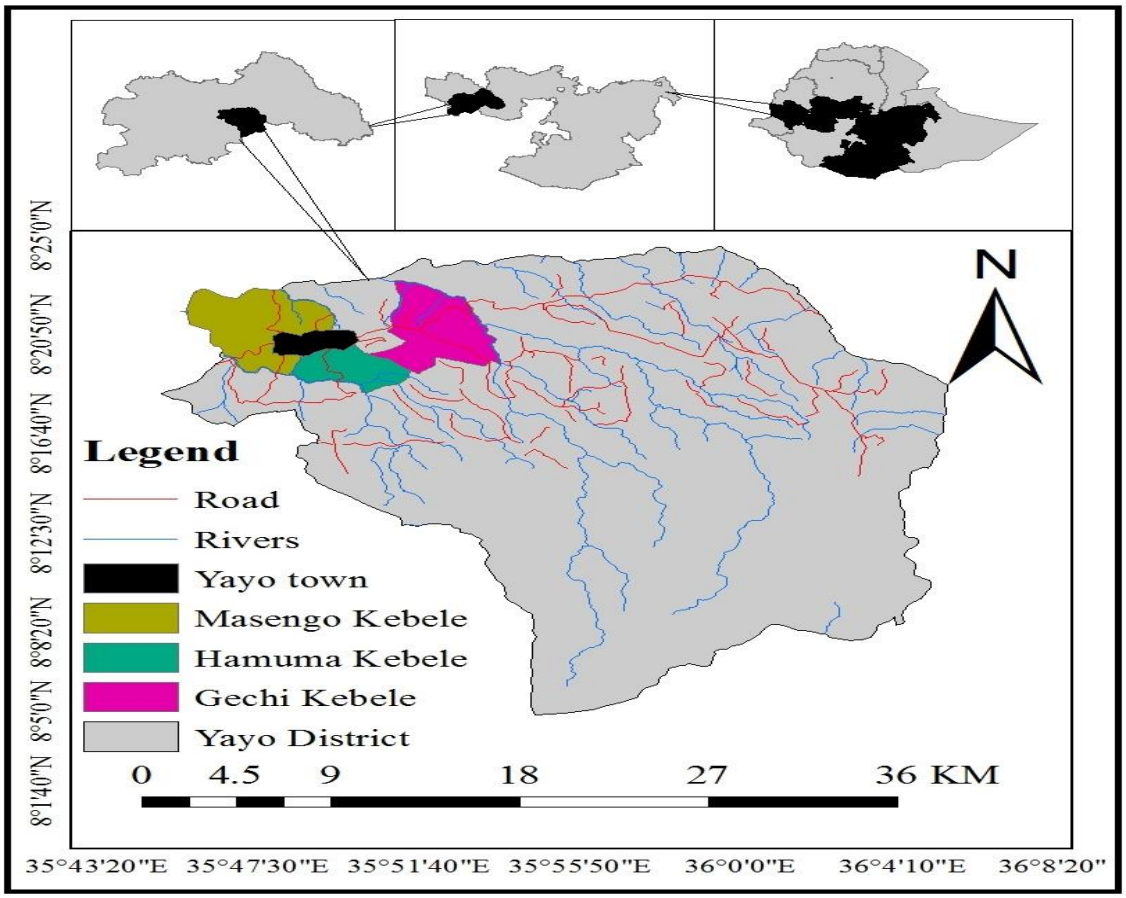

Fig.1 Map of Ethiopia showing the study area and sample sites

3.1.2. Population

Yayo district had a total population of 76, 962. From these 34,884 are Male and 42,078 are Female individuals.Yayo District Agricultural Office (2021)

3 .1.3 Climate

Yayo District has three Agro-climatic zones: highland, Middle land, and lowland. Highland area accounted for 43.62%, Middle land accounted 46.76%, and lowland area is about 9.62% out of the total area of the District. It has an average annual temperature of 23^0c ranging between18.59^0c mean minimum and 27.88^0c mean maximum temperature. The annual rainfall ranges from 1800 mm up to 2500 mm (YDLMO, 2011). Annually the district gets more than six to seven months of rain which is lasted from March to September. Most of the population of the district settled in the Highland climatic zone.

3.1.4 Land use

Yayo area is the most favorable for agricultural activities and human life.In Yayo District there are four seasons, winter, summer, spring and autumn seasons. The main economy of the District was based on agriculture and most of the people are farmers. The main food crops cultivated in the district are teff, maize, sorghum, barley, wheat and others. Coffee is the major source of income or cash crop for the majority of the population in the district. Yayo district is well known in the production of coffee particularly the forest coffee (Coffea Arabica). The production of honey is also conducted through traditional and modern way in the district.(YDAO ,2011))

3.1.5 Vegetation

Yayo district is well known for its natural vegetation covered with a variety species of trees including few species found only in Ethiopia, good soil types and different species of wild animals. It is well known for its vast natural forest area that forms the major part of "Yayo Biospher Reserver (YBR) This forest has wild coffee (*Coffeaarabica*) grown under it. It covers about 90,890.7 hacters constituting 58.8 percent of the total area of the District. This forest ecosystem is endowed with a variety of species of trees. The most common are *Albizia gummifera, Cordia africana, Aningeria adolf- friederci, Ficus vasta, Acacia lahai, and Albiizia grandibracteat* and other big species of trees are found in this forest. This is due to a dense forest found in the district, which is absorbing carbon dioxide from atmospheric air and emitting oxygen which is very important for human breathing for thousands of years. Yayo forest is also very important for the genetic preservation of biodiversity and also conducting different researches for the production of medicines.

3.2. Reconnaissance survey and study site selection

Prior to ethno-botanical data collection, reconnaissance survey was conducted to understand the availability or distribution of medicinal plants and related knowledge and to select study sites which was performed by the following criteria; (i) availability of traditional practitioners (both women and men) (ii) occurrence of elderly peopleused to trtansifer knowledgeto youngers (iii) occurrence of natural vegetation or forest used and and management of medicinal plants. Moreover, direct field observation was done. It was conducted in two monthsJulay and June 2020 and determined to include three study sites. The study areas are found within the range of 1600-2400 masl.This variation in altitude resulted in variability in climate, vegetation types, life system and life constraints.

3.2.1 Population of the study

The total population of Yayo distrit, 76,992, comprising 34,962 males and 420789. The Oromo are the major ethnic group followed by the Amhara . Tigrayan and others .

3.2.2 Sampling and samplesize Determination

The sample size determination was done following Bart lett *et al*. (2001). The below formula was used to determine sample size as it was considered a better representative informant for collecting quantitative data for medicinal plants of Yayo districts. Thus, considerable numbers of general informants which randomly selected and key informants purposefully selected were used from three (3) *Kebeles* from Yayo district (Table 1).

The *Kebeles* selections were based on the above mentioned criteria such as *Kebeles* elders and adminstretors recommendation and personal observation.

$$n = \frac{N}{1+N(e)^2}$$ Where

n = sample size; N= the population size, in this case total number of households in the particular selected *Kebeles*.

e = maximum variability or margin of error 5% (0.05);

1 = the probability of the event occurring

3.3.3. Informant selecting Techniques

Table 1. Sample size for general and key informants for the ethnobotanical data collection in the study area

No	Yayo District kebeles	Numbers of house holds	General informants			Key informants		
	Three kebele		Male	Female	total	Male	Female	Total
1	Gchi	207 0	25	5	30	6	3	9
2	Hamuma	2000	27	3	30	8	1	9
3	Mesengo	2098	26	4	30	8	1	9
	Total	6168	78	12	90	22	5	27

Sample size

Totally, 27 key informants 9 persons from each study site with the assistance of district and kebele authorities were selected. In addition 30 participants from each three kebeles were included which made the general informants.

From these 117informants100 are malesand17 are females. From ninety of general informants78 males and 12 are females.From 27 key informants 22 male and 5 female were selected purposefully based on recommendations from , local kebele authorities and development agents at each study sites.And number of house holds selected randomly.

3.3 Data Collection

Ethnobotanical data was collected using semi structured interviews and group discussion during field visits which was done based on procedures recommended by Martin (1995) and Alexiades (1996). Data collection was made on the basis of checklist (questionnaires) items prepared. The items include all information on informant's personal background, traditional knowledge of the local community such as use, local names of medicinal plants used, distribution, and methods of preparation, diseases treated, dosage, and routes of administration, conservation status, sources and management of medicinal plants. Moreover, direct field observation was also made when necessary.

3 3.1 Semi-Structured Interviews

Semi-structured interviews was employed to collect ethnobotanical data on ways of preparation, it was carried based on the interview questions, prepared beforehand in English and translated to *Afaan Oromoo* language for local informants to help communication and ethnobotanical data collection easy. Interviews questions included the medicinal plants found in the area, parts used, preparation method, ingredients added, condition of the plant used, method of administration, conservation strategies, local name of the plants and plant type. All the resulting data was recorded and filled in the data collection format for further analysis as recommended by Martin, (1995.)

3.3.2 Field Observations

During this study, a field observation was performed with the help of key informants (guides selected from among the local people) who was also interviewed. Full notes on the prevailing facts and information about the history of medicinal plants, and plants used and treated ailmentswere recorded on site.Totally 70 plant specimen collected and identified by the guide of key informants.

3.3.3 Data Analysis

Techniques like Informant consensus to check the reliability of the information given by the informants; preference ranking and paired comparison to rank the most important medicinal plants for a particular aliment; and direct matrix ranking method was used to know the multipurpose use of the given medicinal plants. The detail of each method is indicated as follows:

3.3.3.1 Descriptive statistics

Adescriptive statistical method such as percentage and frequency were employed to analyze and summarize the data on medicinal plants and associated knowledge use and conservation.The most useful information gathered on medicinal plants reported by local people such as medicinal value, application, methods of preparation, route of application, disease treated,dosage,part and habit used were analyzed through descriptive statistical analysis.In addition**,**three categories of plant use-reports and relative frequency of, plant species were tabulated and analyzed statistically.

3.3.3.2 Informant consensus factor

Inorder to evaluate the reliability of information recorded during the interview,informants were contacted atleast two times for the same ideas and the validity of the information was proved and recorded. Consequently,the idea of the original information was rejected since it was considered irrelevant information. Only the relevant oneswere taken into account and statistically analyzed.This method was adopted from Alexiades (1996). The Informant Census Factors (ICF)

is calculated for each category to identify the agreements of the informants on the reported cures for the group of ailments. The ICF was calculated as follows: number of use citations in each category (nur) minus the number of species used (ni) divided by the number of the use citation in each category minus one (Heinerich et al.1998).The factor provided a range of 0 to 1,where a high values act as good indicator for a high rate of informant consensus.

ICF=nur-nt/ nur-1

Where: ICF IS informant consensus factor

nur=number of use citations in each category

nt= is number of use citation.

1 is number of species used

3.3.3.4 Preference ranking

Preference ranking was conducted following Martin (1995) for four most important medicinal plants used in treating disease as traditional healers treat it usually. Thirteen informants were selected toidentify the best-preferred medicinal plant species for treatment of disease. Each informant provided with most medicinal plants reported to curethisdiseasewitheach leaf of medicinal plant used being paper tagged name, and asked to assign the highest value for plant species most preferred,against fibril illness and the lowest value for the least preferred plant and in accordance of their order for the remaining ones. These values summed up and ranks given to each plant species.

3.3.3.5 Paired comparison

Paired comparison can be used for evaluating the degree of preferences or levels of importance of certain selected plants/parts of plants (NemarundweandRichards,2002).A listof the pairs of selected items with all possible combinations is made and sequence of the pairs and the order with in each pair is randomized before every pair is presented to select informants and their responses recorded and total value was summarized. In this study, ten informants to indicate the efficacy and popularity of six medicinal plants species used to treate vileye and ranking was

made based on the report of the informants.As traditional healers treat evil eye and no treatment is provided by modern clinics, the local informants are endowed with the knowledge of evil eye treatment.

3.3.3.6 Direct matrix ranking

Direct matrix ranking exercise was done following Martin (1995) in order to compare multipurpose use ofa given species and to relate this to the extent ofits utilization versus its dominance.Based on information gathered, five multpurpose tree species selected out of the total medicinal plants and five used diversities of these plants were listed for thirteen selected key informants to assign use diversity to each species. The use-values include medicinal, fodder,food,firewood,construction,charcoal,fencing, and furniture making.

To conduct this activity each key informants asked to assign use values (5=best,4=very good,3=good,2=less used,1=leastused and0=not used). Accordingly, each key informants use values for the multipurpose medicinal plant species, average value of each use-diversity for a species taken and then ranked.

3.3.3.7 Fidelity level Index

Fidelity level indexquantify the importance of agiven species for aparticula rpurposeinagiven cultural group (Friedman et al., 1986; cited in Cotton, 1996). Confirmation or consensus could not be taken as a single measure of the potential efficacy of any medicinal plant. Thus, efficacy is not the only factor thatinfluencestheinformantchoicebutprevalence of a given plant and disease in the area can affect informants' choices.

3.3.3.8 Ethical Considerations

Primarily, the researcher has a responsibility to respect the rights, needs, values, and desires of the informants (Creswell, 2009). Taking this in to consideration, the researcher will get the permission of the household heads questionnaire survey respondents and key informant interviewees before going into gathering data. In addition, participants were fully informed that their personal information is kept confidentially and that the researcher never exposes

them in any way and never mention their name in the paper. Beyond the ethics on human matters, acknowledgement of data generated by others and appropriate citations of scholarly research outputs, books, websites, and the researcher try to cite and acknowledge all the information taken from scholarly literatures.

4. RESULTSANDDISCUSSION

4.1 OPINION OF INDIGENOUS PEOPLE ON HEALTH

People of the study area confer value for their health, as their health is their life part and security. The local people call health“fayya"which is taken as a special wealth provided by God"Waaqayyo".They believe or understand as ailments are the cause for health up set caused either with organisms or can be sent from God as punishment for wrong doings.They can also classify health problems, as those that can be treated and that can not.Forinstance,the informants pointed that AIDs and spiritual diseases are non-curable either traditionally or by modern treatment.

4.2 Demographic characteristicsof respondents

Table 2 Demographic characteristic of respondants

Age			**Occupation**		**Marriage**		**Religion**		**Ethnic group**	
standard	Male	Female	Type	No	Type	No	Type	No	Type	No
20-35	15	3	Farmer	93	Single	-	Orthodox	33	Oromo	104
36-50	38	7	Merchant	-	Married	114	Muslim	29	Amhara	13
>50	47	7	Government Employer	24	Divorced	3	Protestant	55		
Total	100	17		117		117		117		117

Atotal of 117 general informants and key informants (100 males and 17 females) from the age of 20 and above years were used. The respondents were with an average age of 55 years.Males were dominant representing (85.3%) of the respondents. Generally, 46.15% of the respondents were above 50 years.

4.3. Taxonomic diversity of medicinal plant species used in the study area

A total of 70 medicinal plants were collected and identified. Of these, 58 species are obtained from forest (Appendix3)12 species are from homegarden(Appendix3).

These plants are categorized under 28 families and 70 species. Family*Asteraceae* was represented by 13 speciesfollowed by *Fabaceae 8 species; Rutaceae 3 species; verbenaceae 3; Moraceae 6 species; Solanaceae 2 species; Euphobiaceae and Lamiaceae* 4 species each. Family *Poaceae and Cucurbitaceae* 3 species each. The remaining families had 1 species each.

This finding is agood indicator for the presence of a considerable diversity of plant species in the area. Thus, the majority of medicinal plants are from wild vegetation and there was a relaxed practice to cultivation in the area. Mirutse Giday (1999) presented similar findings in his work on medicinal plants of the Zay people out of 70 medicinal plant species in this study, 13 species were in common with Mirutse Giday (1999),24with Debela Hunde (2001), 22with Ermias Lulekal (2005) and 18 species with HaileYinger (2005).Three species that are common with Kok waro(1976) are known to be used in the medicinal flora of other countries. These observations acknowledge the local people over a wide area in Ethiopia show the tendency to use same medicinal plants, which indicates the genuine therapeutic value of these medicinal plants as well as indigenous knowledge of them. Everine vegetation type contains better distribution of medicinal plants, although plants in it are in accessible for collection due to gorges.

4.3 Major plant use categories by people of the study area

A total of 1800 use-reports (UR) from 300 frequency of occurrence among 70 species of plants were recorded. These species were assigned to nine categories of plant uses (Table 3).Analysis of homogeneity of the ethnobotanical information following the factor of informant consensus (FIC) revealed that there is high consistency of plant use among informants,all value stending to1.Quantitative variation in use reports reflected relative frequency and/or preference of uses. Both frequency and preference of use depends on personal choice, availability and abundance of the relevant plant and popularity among informants.

The consistency of use in descending order was miscellaneous (0.97), fire wood (0.93),edebile

and fodder (0.88) Other use categories were below average in dicating heterogeneity of uses among informants (Table: 2). fencing (0.85), furniture (0.82) medicinal (0.82) and charcoal (0.82) use categories.

Table 3.Use categories of collected plants species

Use Category	Species	%of species	Use-reports	%ofuse reports	Factor of Informant Consensus
Edible	51	17	213	11.8	0.88
Fencing	58	19.3	264	14.7	0.85
Fire wood	33	11	112	6.3	0.93
Fodder	41	13.7	213	11.8	0.88
Furniture	13	4.00	312	17.3	0.82
Medicinal	71	23.7	312	17.3	0.82
Miscellaneous	12	4	62	3.5	0.97

Average FIC= nur-nt/nur-1 = 0.87

The low FIC for medicinal use category (table.3) may be due to a complex preparation of plants requirement to treat ailments, which results in high number of species and high number of uses recorded for these 70 medicinal plants. All collected plants (100 %) species have pairs medicinal values and anumber of uses, which result in greater heterogeneity of use reports.

4.4. Growth forms, methods of preparation, and modes of administration

Analysis of habit these medicinal plants (Fig.2) reveals that trees constitute the largest category (34 %) followed by herbaceous species (29%). Shrubs make up the third growth form (30 %) followed by tree climbers (7%). The current findings show that the most of widely used medicinal plants habit in the study area are trees followed byherbs.This may be due to these species exhibit high level of a bundance and easy to obtain them.Differently high number of herbs and shrubs for medicinal purpose were also previously reported in Ethiopia (BayafersTamene,2000; DebelaHundie,2001;andErmiasLuelkal,2005).Njau(2001)in Tanzania also similar finding was reported.

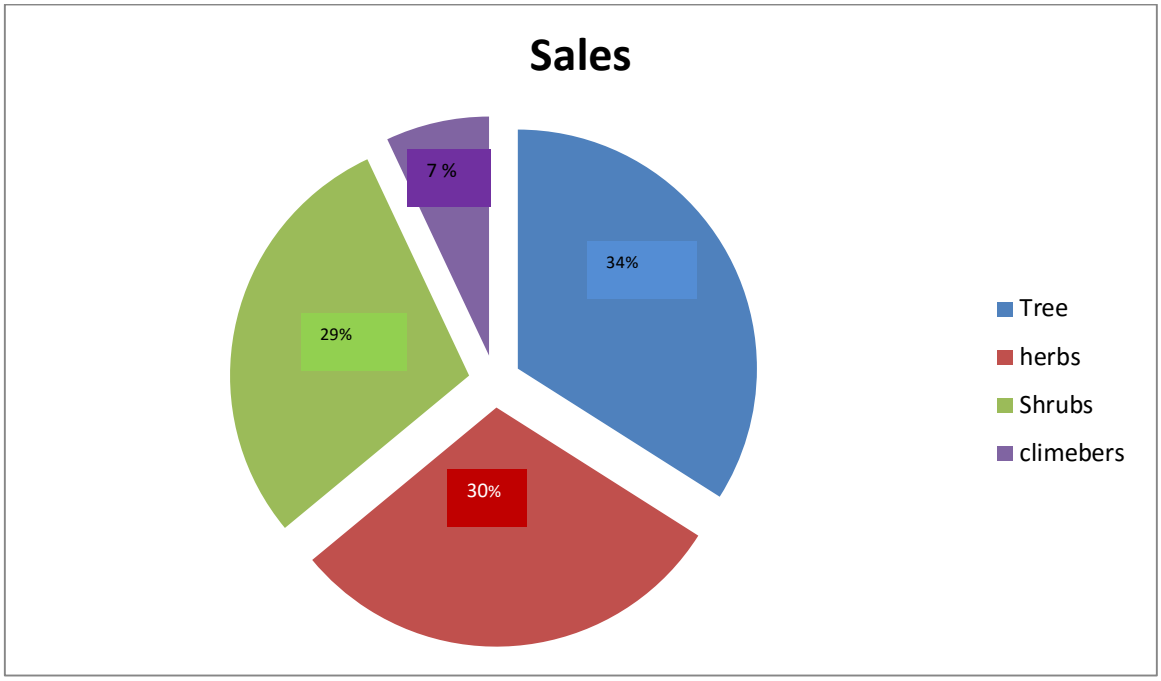

Figure 2. Habits of plants used for medicinal purposes for human ailments

4.5 Methods of preparation of Medicinal plants in the study area

The local people use several methods of preparation of traditional medicines from plants. Pounding and powdering are the most frequently used methods of preparation in the study area. According to the informants, both pounding and powdering are used as a strategy to preserve plant materials that are not available both in dry and rainy seasons. It was also found that, these are effective for complete extraction of the potential content of the plant and increase the curative power of the medicine or its efficacy,as both increases the healing power of the remedy through faster physiological reaction, as respondents reported.After preparation, the remedies are either used soon or preserved for later use. A few of Traditional practitioners often use any dry clean containers to preserve traditional medicines. Almost greater proportions of informants do not have the habit of keeping traditional medicines prepared foral on time.Some of them hang dried medicines on roofs and walls,while others use sheet of clothes and seal in bottle

The majority (47.67%) of these preparations are made from mixtures of different plant species with different additive substances like honey, sugar, barely powder, butter, salt, honey, soil and charcoal ash for the treatment of single ailment. These additive substances have double function that is to improve flavor and reduce adverse effects such as vomiting and diarrhea, and enhance the efficacy and healing conditions. Similar result was also reported by Mirutsen Giday, (1999) and Bayafers Tamene, (2000). Dawit Abebe (1986) has also identified the additive substances in herbal remedy preparations with their possible benefits.

The current finding and to the records else where, which revealed the interrelation ships of the use of medicinal plans in combination and high level of cure efficacy is not concordant to the findings of Dawit Abebe (1986), Debela Hundie (2001) and EtanaTolessa(2007). These authors have reported that the use of medicinal plants in a unit has high traditional medicinal efficacy.

It was also reported that some medicinal herbs are mixed with food and drinks in such manner that, they give special flavor and taste to it. Forinstance, *Allium sativum* and *Ruta chalepensis* are added to Coffee and cheese to improve the flavor and taste, and to avoid abdominal discomfort. Mixing and using some medicinal plants with common foods and drinks might be an easy way for effective treatment (Abdu and Hamed, 1982; cited in Etana Tolessa, 2007).

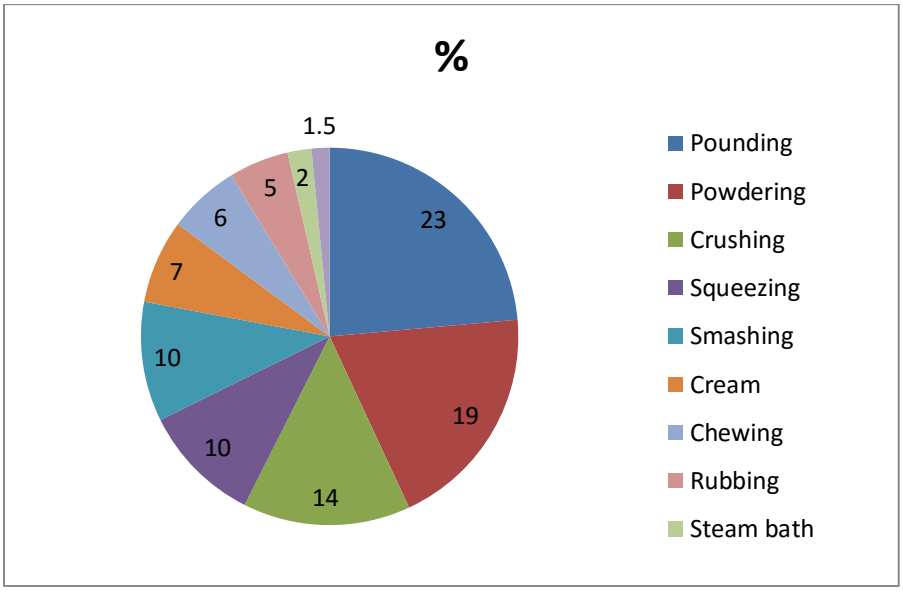

Figure 3 Number ofdistribution of routs of adminsration of plan remedies

There are various routes of administration of traditional medicinal plants prepared by the local community. The major routes of administration in the study area are oral, dermal, nasal, anal, auricular and optical. Oral administration is the dominant route (63%), followed by dermal application (29.05%), nasal (4.27%), auricular (1.7%), adding on teeth and others (1.7%)

Table.4. Route of administration of medicine

Number	**Administration**	**No**	**%**
1	Oral	74	63
2	Dermal	34	29.05
3	Nasal	5	4.27
5	Optical	2	1.7
7	Total	117	100

Both oral and dermal routes permit rapid physiological reaction of the prepared medicines with pathogens and increase curative power.Previous reports such as Dawit Abebe (1986), Bayafers Tamene (2000) and Kebu Balemieet.al.,(2004) agree with this current finding. In addition, informants reported that there are related restrictions to enhance rapid physiological reaction and to increase its curative power of remedies. For example, a patient who takes remedy against tape worm should not take any food six hours before and after administration of the medicine.

Local people depend on both dry and fresh remedies.The dependency of local people on fresh materials put the plants under serious threat than the dried form, as fresh materials are harvested directly and used soon with its extra deterioration with no chance of preservation that is not stored for later use. However, local people argue that fresh materials are effective in treatment as the contents are not lost before use compared to the dried forms. The lively hood of most traditional healers relies on fresh materials that have aggravated the decline of rare medicinal plants from the study area according to the informants.Traditional practitioners are collecting medicinal plants with less attention than would be preferred from view poin to conservation of plant resource. Debela Hunde (2001) and Kebu Balemie et .al.,(2004) have reported that the use of fresh medicinal plants are more threatened than dry forms

4.6 Parts of Medicinal plant species used to treat human diseases

As described earlier, the local people utilize 70 medicinal plant species (100 %) totreat 46 human ailments. According to the informants, they are facing the scarcity of land practice of home gardening of medicinal plant about (17.14%) in the area.This practice has botanical, ecological and economical meanings for reduction of pressure on wild plants. Mirutse Giday (1999) and Bayafers Tamene (2000) have also reported the dominance of wild collection in their work on medicinal plant study.

With regard to the plant parts used for medicinal purposes, the practitioners mostly harvest leaves (53%) and roots(16%)of the plants.The other parts include fruits (6%),bark(10 %),stem,seed(4 %) flower (8%) and sap(3 %).Theinvestigation showed that leaves are most harvested resulting in little threat to rare plants in the area. However, the second most collected plant part is root, which negatively affects the growth and physiology of the plant results in death of mother plant at the end (Odera, 1997).

Table 5 Parts of medicinal plants used for human ailment treatments

No	**Species**	**No**	**%**
1	Leaves	37	53
2	Roots	11	16
3	Bark	7	10
4	Flowers	6	8
5	Fruit	4	6
6	Seeds	3	4
7	Sap	2	3
	Total	70	100

4.7 Major human diseases and plant species used by indigenous people

In the area a total 46 diseases of humans **(**Appendix 2),recorded are treated with a total of 70 plant species and 150 preparations, where one species can treat a single disease or a number of diseases. Similarly, one ailment canbe treated with combination ofplant species or single plant .For example, Stomach problem can be treated with 11 species, Gonorrhea with 7 species, Evileye 8 species,Fibrilillness 7 speciesand Malaria with 5species each.The fact that the above mentioned diseases being treated by a number of species is, coupled with the frequent occurrence of the diseases and ease of accessibility of plant species for treatment.In turn,these factors widen the popularity of these species among the informants and indigenous peoples for treating these diseases.categories.categories.

4.9. Informant consensus

Table 6Informant Consensus

Scientificname	**Total**	**%total**
Artemisia abyssinca	13	11.10
Burcea antidysentrical	11	9.40
Bidens pilosa	9	7.69
Ocimum urticifolium	9	7.69
Vernoniaamygdalina	8	6.83
Calpurinaaurea	8	6.83
Justica schimerina	7	5.98
Discopodium penninumium	7	5.98
Bidensbiternata	5	4.27
Acmella caulirhiza	5	4.27
Cynoglossum coerulum	5	4.27
Rumex nervosum	5	4.27
Indigofera hochstetteri	4	3.41
Zinger officinale	4	3.41
Moringa stenacetaia	4	3.41
Fresenbercca abyssinica	4	3.41

Catha edulis	2	1.70
Asparaggus africanus	2	1.70
Albeza gummifera	2	1.70
Corono pusdidymus	1	1.28
Withania somenter	1	1.28
Crota laria	1	1.28

The results of the study showed that some medicinal plants are popular than the others, in viewofthat *Artemisia abyssinca*took the lead where it was cited by 13 (11%) informants for its medicinal value for treating fibril illness. *Artemisa abyssinica* and *Burcea antidysentrical*by11 (9.4%),and *Bidens pilosa* 9 (7.7%) informants ranking2nd, 3rdrespectively and *Ocimum urticifolium 4th*.The later speciesare used for treating a series of different the health problems. The action of plant extracts on different health problems may explain the broad-spectrum nature of plants,while their action on aparticular problem explains their narrow spectrum nature.Popularity of these medicinal plantsaccording to key informants is due to their wide range of diseases they treat.Thecase of *Artemisia abyssinca and Burcea antidysentrical*can be cited for their abundant distribution in thearea. With this,of the medicinal plants mentioned by four or more, scoring percentage greater than and those frequently used ones for treatement of more than two ailments are described .

4.10. Preference ranking, paired comparisonandDirect matrix ranking

4.10.1 Preference ranking

When there are different species prescribed for the same health problem, people show preference of one over the other. They also show preference in searching for treatement either fromclinics or fromlocal healers. Some informants reported that searching treatment fromclinics for Fibril and some other diseases are. Thus, the rural communities prefer traditional healers. However, the case is reversed taken as taboo among the informants fromYayo, as the dwellers are better experienced in using modern drugs for ailment treatment.

Preference ranking for six medicinal plants used to treat Fibrils (Table 7) shown that*Withania somenifera*. ranked first and hence is the most effective medicinal plant to cure Fibril. The

second*Croton macrostachyus*, third,*Pycnostachyus abyssinica* fourth and fifth most preferred medicinal plants against this disease are *Burcea antidysetrica and Echinops kerebicho*.while,the least preferred species compared to the other six species are *Ocimum gratissumum.*

Table 7 Preferance ranking of six selected medicnal plants based on their degree of treat Fibril as perceived by informants

Preferance ranking For Fibril

Informants	***Pycnostchyus abyssinnica***	***Withania somenifera***	***Echinops kerebicho***	***Burcea antidysetrica***	***Ocimum gratissumum***	***Croton macrostachyus***
R1	3	6	2	4	1	5
R2	4	5	1	3	2	6
R3	4	5	3	2	1	6
R4	3	6	1	2	5	4
R5	6	5	2	3	1	4
R6	5	6	1	3	2	4
R7	5	6	2	3	1	4
R8	2	5	3	1	2	6
R9	6	4	2	3	1	5
R10	5	6	3	2	1	4
R11	4	5	1	2	3	6
R12	4	6	3	2	1	5
R13	6	5	4	3	2	1
Total	57	70	28	33	23	60

4.10.2. Paired comparison

In this study, ten informants to indicate the efficacy and prefere of these species to treat evil eye paired comparison was made with six medicinal plants (Table 8). Ruta *chalepensis*,*Burcea antidysetrica*,*Clerodendrem myricoides*,and *Artemisia abyssinicawere* ranked 1^{st},2^{nd},$3^{rd}$and 4^{th}respectivily. *Allium sativum* and *Croton macrostachyus*are less preferred and less efficacious compared to the other four species.

Table 8 .The most Paired comparisons of six medicinal plants used to treat evil eye

Informant	*Clerodendrem myricoides*	*Allium sativam*	*Burcea antidysentrica*	*Croton macrotachys*	*Artemisia abyssinica*	*Ruta chalepensis*
R1	3	4	1	0	4	2
R2	4	2	0	3	2	4
R3	2	0	3	1	2	5
R4	0	3	2	2	3	3
R5	3	2	3	0	3	5
R6	2	0	5	2	1	2
R7	2	1	2	2	1	4
R8	2	5	5	2	2	5
R9	2	2	4	3	2	3
R10	2	3	3	0	1	3
Total	22	20	28	15	21	36
Rank	3rd	5th	2nd	6th	4th	1st

Some studies made in Ethiopia (BayafersTamene, 2000; Gebremedhin Hadera, 2000; Debela Hundei, 2001;AbiyotBerhanu,2002) have used the method of pair wise ranking where informants made their choice on individual basis.

For example, Abiyot Berhanu (2002), employed pair wise ranking to reveal the most preferred traditional medicinal plants used by the local people to treat malaria in Jabitehnan Woreda, West Gojjam; quantitatively showing that *Allium sativum* was the most preferred antimalarial plant.

4.10. 3Direct matrix ranking

In this study, a number of medicinal plants were found to be multipurpose species being utilized for a variety of uses.The common uses include medicinal, fodder, food, firewood, construction, charcoal, fencing and furniture making. Six commonly reported multipurpose species and eight use-categories were involved in direct matrix ranking exercise in order to evaluate their relative importance to the local people and the extent ofthe existing threats related to their use values.

Table .9 .Direct matrix ranking for multipurpose species

Trees and usage	*Croton Macrostachyus*	*Cordia africana*	*Vernonia amygdalina*	*Prunus Africana*	*Millettiaferr uginia*	*Trichilia dregeanasond*
Fire wood	3	4	4	4	4	2
Forage	0	5	2	5	0	4
Construction	4	5	2	5	2	1
Furniture	4	5	0	3	1	2
Food	0	2	2	0	0	0
arcoal	3	4	2	4	4	5
Fencing	2	3	3	4	4	4
Medicine	5	4	5	4	3	4
Total	21	32	20	30	18	22
Rank	4^{th}	1^{st}	5^{th}	2^{nd}	6^{th}	3^{rd}

As show in Table 9, *Cordia African* and *prunus Africana* were ranked 1 st and 2 nd and hence are the most preferred medicinal plants by local people for various uses and most theratened species as the informants reported which is evidently shown by their distribution scarcity and required for collection of these speciec. Eventhough *trichilia dregeana* sond is required for. Various use values and ranking 3^{rd}it is abundantly recorded in the area as farmer's plants it. *Croton Macrostachyus , vernorin amygdalina* and are *Milletti aferruginia* the othe rmultipuropose medicinal species ranking 4^{th},5^{th}and6^{th} respectively.the least ranked species in multipupose a spectare vernonia amygdalina and croton macrostachyus thus,the least ranked species are the less threatened and widely distributed species in the area croton macrostschyus with the least rank is a highly regarded and abundant medicinal plant in the area.

Similsrly,the values for use reports across the selected species were summed up and ranked the results show that the local people report.Informants also reported that the healers know time and processes of gathering, and storing medicinal plants. It is once a year that some medicinal plants are collected and preserved.*Lepidium sativum, Sorghum bicolor, Cucumis ficifolius,Datura stramoniu Embeliaschimperi, Ricinuscom munisand Thalictrum rhynchocarpum* seed,leaf,fruit harvested,dried and preserved in roof corners or out side house, and dried parts are powd ered and stored in different containers like pots, bottles or tied with clothes and used when needed.

Indigenous people are havestrongand genuine belief on healing power of plants andtheyknowtheirhabitat,distribution, harvesting technique, time of harvest and the status of a

plant in the area. For instance, medicinal plants like*Ocimum urticifolium,Ruta chalepensis* and *Nicotiana tabacum* are found in majority of family gardens and farm borders in the study area, as they need these plants in their daily lifes astimulant, medicine or for other values. Other medicinal plants are also maintained or protected near vicinity due to their fragrance, as live fences to avoid enemies, as spices and for food.

Plants are also left as remnants of forest in agricultural field due to their uses as timber source, for construction, fuel wood, spiritual and ritual values. Thus, plants are managed andconserved because of their spiritual, ritual land material values, which open the way for the possibilities in conservation of vegetation of the locality in general and medicinal plants in particular.Here, the inter mixing of multi-purpose tree species by farmers on their farm land is evidence to management practices in the area. This type of management farmers practice should not be dis regarded as it benefits the indigenous people and encourages them to conserve plants of medicinal value with indigenous practices. In the area, about 11% of medicinal plants collected were reported as cultivated in home garden and 5% under cultivation in crop field.

The ritual and spiritual protected areas for celebration of "Gada" and "Jaarii", "Errecha" and"Qe'eeAyyantuu"preferably contain more plant diversity because, cultural rule of harvest forbid of plant resources from these areas, possibly preserving indigenous ethnobotanical information and cultural components. Culturally, trees with synonymous to an individual are not harvested by an individual, which has contribution to conservation activities in the area. Collection and application of medicinal plants requires strict cleanses of spiritual body, such as special prey to God to attain full power of healing.The informants further revealed that, the healer or collector should not sleep with his or her partner and sexual activity is not allowed for 24 hours before collection (laguu). In connection, experienced healers follow the lunar calendar"lakkofsa ji'aa"ortime of"cagginoo"to collect medicinal plants, as this time retards the rate of healing of plants from which medicinal part has been collected.

The healers also know the direction, site and angle from which the plant should be harvested. Shoots, main root, regenerating parts and insect or human and animal injured plants are not harvested. During root harvest,the healer buries the pit from which the harvest has taken place. This is either to increase the healing power of the medicine or to increase the regenerating capacity of the plant. Besides,collection of immature plant resourses,shoot harvest,from spring

source“Burrqaa bishanii”,under ritual trees “muka irrecha,dhibayyu,jaarii”are believed as it results in attack of “Dhayicha” and the healer faces mis fortunes in his life time.Thus, as reported by informants’ taboos, social restrictions and seasons of collection all limit over exploitation of medicinal plants by healers in the area.

Traditional beliefs have an indirect contribution to the conservation of plants of medicinal importance, since they limit excessive harvesting of these plants in one way or another. Thus, these beliefs could be considered as the major parts of traditional medicinal plant conservation activities of the local people.(Debela Hunde(2001) and Kebu Balemie et al., (2004) from other parts of Ethiopia, based on their studies in Rift valley have reported parallel beliefs, attitudes and practices

4.13. Risks to medicinal plants and indigenous knowledge in the area

Given the highest frequency of leaves used for medicinal purposes in the study area, threat to the destruction of medicinal plants was found to be minimal, as high threat to them other plant comes with root, bark and stem harvest.

According to Dawit Abebe and Ahadu Ayehu (1993) medicinal plant harvest that involves roots, rhizomes, bulbs, barks and stems have serious effect on the survival of mother plants.

Nowdays, the world is losing plants every minute due to deforestation, for agriculture, firewood, timber, constructionmaterials, overbrowsing andovergrazing (Seyaniand Chikuni, 1997). These common anthropogenic factors beside some natural factors resulted in loss of plant genetic diversity and threatening the very survival of human kind with erosion of some life saving medicinal plants of wild genes (Odera,1997). The loss of medicinal plants associates with the missing advantages gained from medicinal plants and indigenous knowledge associated with plants (Sofowara, 1982). This is observed in YayoWoreda as collection and search for some medicinal plants like *Cordia africana, Thalictrumrhyncho carpum* and *Ekebergia capensis* need longer time and distance from their residence.

The surgeing lobaldem and for herbal medicines has been followed by abelated growth in international awareness about the dwindling supply of the world's medicinal plants. In the area, medicinal plant harvesting for local use doese not result in their threat.Instead, mosten dangered medicinal plants of the area threatened due to other use modes. Over-harvesting for commercial purposes, destructive harvesting practices, habitat loss resulting from forest degradation and agricultural encroachment have all been recognized as contributing factors to the loss of plant taxa with indigenous knowledge. Thus,the need for a gricultural land and population pressure severely threatened plant species in general and medicinal plants inparticular.The effect of deforestation on medicinal plants was reported in Mirutse Giday (1999). Harvest of medicinal plants put them also under threat, even though it is not severe as the other factors.

Business obtained from charcoal making and timber production severely accelerated the high rate exploitation of *Acacia abyssinica* and *Cordia africana*.

A significant number of *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 trees that are the backbone of the population will die and are not replaced and ultimately the resource base on which cultural values are built will disappear because of over harvesting. This case is justified for areas near Yayo town. Significant numbers of animals graze and browse on vegetations in this locality. They put an actual effect on vegetations there during dry season, as the availability of browseable and grazeable vegetation is limited. These in turn affect the survival of medicinal plants and associated knowledge.

Individual farmers in the area as observed during the study penetrate the forest with their axesdaily.Here,the scenario is people need plants for their daily life activity i.e. as source of household tools, furniture, ornaments, utensil making and agricultural implements such as coffee plantation.Thus,these multi-purpose species are on the front line to be affected by these activities.Threat to indigenous-knowledge on medicinal plants in the area is manifested not only due to loss of taxa.However,secrecy during collection, oral based knowledge transfer, impact of modernization, refusal from the younger generation to inherit the knowledge and un availability of the species all resulted in acceleratedrate of indigenous knowledge loss in the area.

Religious concerns also disregard traditional medicinal plants in the area, as if it is wrong

fortune the healers portray to gain business benefit. Thus, a number of combined conditions stated above resulted in over all loss of taxa and indigenous knowledge in the area. Evidently, more medicinal plants were used in the past than today.

5. CONCLUSION AND RECOMMENDATION

5.1 Conclusion

The present study revealed people of the area have different depth and width of knowledge of natural resources in general particular in theirlocality.These resources are with wide and varied use values i.e. forage, fodder, charcoal, timber, tools, spiritual and cultural values. Thus, local peoples know when, where and how to use these plant resources around their locality.

The locality is rich in plant diversity. Seventy plant species were recorded having potential healing power of 47 human ailments.

Peoples of the study area partly depend on this resource for their day-to-day health care. Environmental degradation, intense deforestation, increased need for farm lands, fuel woods, and construction materials in the area are the main causes for reduction in quantity of medicinal plants and associated knowledge. In addition, browsing and grazing by livestock and celebration of ceremonies resulted in threat ofmedicinal plants.

However,threat due to utilization for medicinal purpose is low compared to the other factors. Indigenous people of the study area have their own ways of managing resources as they are endowed with specific culture, tradition and ethical norms.

Teaching generations about plants and environmentand cultural related practiceshas played a significant role in conservation of resources and medicinal plants in the area.

5.2. Recommendations

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

- Traditional medicinal plants are central to the indigenous cultures and material needs.Therefore, formal and non-formal education systems should be designed to create positive attitude among the young by integrating in to the curricula about the traditional use of medicinal plants.
- As the local people harvest plants for business or for house hold use with little awareness of its risk or future sustenance, awareness should be created either, by development agents or agricultural workers through which sustainable harvesting be practiced.
- Training the local people,on resourceuse value, management and conservation at kebele or District level by agricultural experts or development agents, as it facilitates an integration ofresource conservation with sustainable use.
- Resources, especially plant resources are integral to the life of all biota, as they are the primary food producers. Life of world biota is directly or indirectly dependent on plant resources. Thus, indigenous people of the study area should be involved in conservation and management plans of plant resources or their indigenous knowledge in their locality.
- An already started plantation of indigenous and for age trees in the District by Yayo Agricultural Department (YAD) should include medicinal plants from wild as it can be used as a site for training, conservation and demonstration.
- Recognitions and intellectual property rights should be given to traditional healers, either through certifycation or through organizing them at community or District level, which popularizes their indigenous knowledge and medicinal plants value.

REFERENCES

Abbink,J.(1993).Me'enritual, medicinal and other plants: Acontribution to south west Ethiopia Ethnobotany .*Journal of Ethiopian Studies,* **26** (2):1-21.

Abbink,J.(1995).Medicinal and ritual plants of Ethiopian South west. Anaccoun to frecent research.Indigenous Knowledge and Development Monitor **3(2**): 6-8.

Abbiw,D.K.(1996).Misusesandabuses of self-medication with medicinal plants: The case of Erythropbleumin Ghana. **In**: (Vander Mesen and Vander Burget (eds.). The Biodiversity of Africanplants: Proceeding of the 14thAETFAT Congress. 27,August 1994.Pp.700-718. Wageningen, the Nether lands.

Abebe Demissie (2001). Bio diversity conservation of medicinal plants: problems and prospects. **In**: (Medhin Zewdu and Abebe Demissieeds.).Conservation and sustainable use of medicinal plantsin Ethiopia.Proceeding of the National Works hopon Biodiversity Conservation and Sustainable use of medicinal plants in Ethiopia, 28 April-01 May 1998,pp.56-64. IBCR, Addis Ababa.

Abiyot Birhanu (2002).Useand Conservation of Traditional Medicinal plants by Indigenous people in JabitehnanWoreda,West Gojjam.M.Sc.Thesis. AddisAbaba, Ethiopia.

April-01May1998,pp.76-91.IBCR,AddisAbaba.

Bako, S. P., Bakfur, M. J., John, I. and Bala, E. I. (2005).Ethno-medicinal and phytochemical profile of some savanna plant species in Nigeria.*Int. J. Bot*., 1(2): 147-150.

Balcha Assefa, .,Glatzel, G. and Buchmann, C. (2010).Ethnomedicinal uses of Hageniaabyssini(Bruce) JF.Gmel. among rural communities of Ethiopia.*Journal of Ethnobiology and Ethnomedicine,*6:20

Balick, M.J.and Cox,P.A. (1996). Plants, people and Culture: Science of Ethnobotany.New York,USA.

Balick,M.J.(1996). Transformin gethnobotany for the new millennium.Ann. Missouri Bot. Gard.**83**:58-66.

BayafersTamene(2000).Afloristicanalysis and ethnobotanical study of the semi-wetl and of

Bekele, E. (2007). *Study on actual situation of medicinal plants in Ethiopia*. Prepared for JAICAF (Japan Association for International Collaboration of Agriculture bid Posey,D.(1999). Ethnobotany:Itsimplicationandapplication.In:Posey,D.A.andOverol, W.L.(eds.),Proceedingof theFirstInternationalCongressofEthnobiology,Vol.1, Pp.1-7.

Bye,R.A.(1985).Botanical perspectives of ethnobotany of the Greater SouthWest. Econ.Bota.**39 (4):**375-386.

Cheffaarea, South Welo, Ethiopia. M.Sc. Thesis. Addis Ababa University.

Cotton,C.M.(1996).Ethnobotany:PrinciplesandApplications.JohnWileyandSons,NewYork,412pp.

Dawit Abebe (1986). Traditional medicine in Ethiopia: The Attempts being made to promote it for effective and better Utilization. SINET: Ethiop. J.Sci. (Supp.):62-69.

Dawit Abebe and Ahadu Ayehu (1993) .Medicinal plants and Enigmatic Health practices of Northern Ethiopia.B.S.P.E. August 1993.

DawitAbebe(2001).Therole of medicinal plants in Health care Coverage of Ethiopia, the possible benefits of integration. **In**: (Medhin Zewdu and Abebe Demissie (eds.)). Coservation and Sustainable Use of Medicinal plants in Ethiopia. Proceeding of the National works hopon Biodiversity Conservation and Sustainable use of medicinal plants in Ethiopia, 28 April-01 May 1998, pp.107-118.IBCR, AddisAbaba.

Debela Hunde (2001). Use and Management of Traditional Medicinal Plants by In digenous People of Bosat Woreda, Wolenchitiarea: An ethnobotanical approach. M. Sc. Thesis, Addis Ababa, Ethiopia.

Debela, Dawit Abebe and Kelbessa Urga(1999). Anoverview of traditional medicine in Ethiopia:Prospective and Development Efforts. In: (TamiratEjigu,ed.) .Ethiopian Pharmaceutical Association. Silver Jubilee Anniversary, Special Issue.pp.45- 53.Ethiopian Pharmaceutical Association. Addis Ababa, Ethiopia.

Demel Teketay (1999). Pastand presentactivities, achievements and constraints in forest genetic resources conservation in Ethiopia.**In**: (Edwards, S.,Abebe Demissie,

Demel Teketay (2000). Ranunculaceae.**In**: Edwards, S., Mesfin Tadesse and Sebsebe Demissew and

Hedberg,I.(eds.).Flora of Ethiopia and Eritre,Vol.2,part1.Magnoliaceae to Flacourtiaceae.TheN ational Herbarium, Addis Ababa University, Addis Ababa, Ethiopiaand Uppsala, Sweden.

Ermias Lulekal (2005).EthnobotanicalStudy of Medicinal Plantsand Floristic Composition of the Manna Angatu MoistM ontane Forest, Bale.M.Sc.Thesis.Addis Ababa, Ethiopia.

Etana Tolasa (2007).UseandConservationofTraditionalMedicinalPlantsby Indigenous

Fichtl,R. and Admasu Adi(1994).Honeybee Flora of Ethiopia. Margraf Verlag,Wikersheim, Germany.Pp.510.

Gebremedhin Hadera (2000). A study on the Ecology and Management of Dess'a Forestin the Northe as tern Escarpment of Ethiopia. M. Sc. Thesis. Addis Ababa, Ethiopia. Getachew Addis, Dawit Abebe and Kelbessa Urga (2001).Asurvey of traditional medicinal plants In Shirka District, Arsi Zone, Ethiopia.Ethiopian Pharmaceutical Journal, **19**:30-47.

Haile Yineger (2005). A study of Ethnobotany of Medicinal plants and Floristic Composition of the Dry A from ontane Forestat Bale Mountains National Park.M.Sc.Thesis. Addis Ababa, Ethiopia.

Harbone,J.B .& Baxter, M. (1993). Phytochemical dictionery: A Hand book of bioactive compounds from plants.Taylor and Francis; London, Washing to Dc.

Healthcarein Ethiopia.**In**:(Medhin Zewduand Abebe Demissieeds.).Coservation and Sustainable Use of Medicinal plants in Ethiopia. Proceeding of the National work shop on Biodiversity Conservation and Sustainab leuse of medicinal plantsin Ethiopia, 28April-01May1998,pp.107-119.IBCR,AddisAbaba

Hedberg,I.(1993).Botanical methods in ethno pharma cology and the need forconservation of medicinal plants. Journal of Ethno pharmacology.**38**:121-128.

Jeffery,C.(1995).Cucurbitaceae.**In**:(Edwards,S.,MesfinTadesseandHedberg,I.eds.).Flora ofEthiopia andEritrea.V-2part2:CanaellaceaetoEuphorbiaceae,Pp.27,34-36. AddisAbaba,Ethiopia;Uppsala,Sweden.

KebuBalemie,Ensermu Kelbessa, and Zemede Asfaw (2004).Indigenousmedicinalplant utilization, management and threatsin Fentalle area,Eastern Shewa, Ethiopia. Ethiop.J.Biol.Sci.**3**(1):37-58.

Kent,M.and Coker,P.(1992).Vegetation Descriptionand Analysis. Belhavenpress,London=336pp

Kokwaro,J,O.(1976).MedicinalplantsofEastAfrica.GeneralPrintersLtd.Nairobi,Kenya. 384pp.

Langenheim,J.h.and Thiemann, K.U.(1982).Plant Biology and its Relationto Human Affairs. University of California, Santa Cruz, NewYork.Pp.Pp.12-45

Leeuwenberg,A.J.M.(2003).Apocynaceae. In: Flora of Ethiopiaand Eritrea.Vol.4.Apiaceae to Dipsacaceae.Pp.49-54.TheNational Herbarium,Addis Ababa University.Addis Ababa, Ethiopiaand Uppsala,Sweden.

Martin,G.J.(1995).Ethnobotany:A method Manual.Chapman and Hall,London.Pp.265-270. MaCorkel,C.M.(1995).Back to the future lessons from ethno veterinary research,development extention for studying and applying knowledge.Journal of the Agricultural,Food and Human Values Society. **22(2)**:52-80.

McCorkle,C.M. and Mathias,E.(1996).Animal Health Biotechnology:Buildingon Farmers Knowledge. Bunders,J,Haverkort,B. and Heiemstra ,W,(eds.).Pp.22-55.\ MacmillanEducationLtd.,London.

Menassie Gashew(1991).The useand value of wild plants to the people of Bale. Walia **13**:21-

Mesfin Tadesse and Sebsebe Demissew (1992). Medicinal Ethiopian plants.Inventory, Identification and Classification .**In**:Edwards,S. and Zemede Asfaw (eds.).Pp.1-19. NAPRECA, Botany 2000:MonographSeriesNo5.

MesfinTadesse(1986).Some medicinal plants of central Shewa and South western Ethiopia. SINET.Ethiop.J.Sci.9 (Suppl.)1986.

Mirgissa Kaba(1998).Utilization of plant medicine for the treatment of health problems.The case of Oromo of Chora District Illu ba bor Zone, Western Ethiopia.The Ethiopian Journal of Health Development,**10**(3):161-166.

Mirutse Giday (1999).An Ethnobotanical study of medicinal plants used by the Zay Peoplein Ethiopia.M.Sc.Thesis.Uppsala,Sweden.

Namaqual and (South Africa). In: (Peters, C.R., and Jejoly.J.,eds.).Proceeding of the 12th Plenarymeeting of AETFAT. Pp.959-972. Mitt.Institute, Allg.Bot. Hamburg. Asfaw

Nemarundwe, N.and Richards,M .(2002). Participatory methods for exploring livelihood values derived from forest: potential and limitations. **In**:B.M. Campbelland M.K.Luckert

(eds.),Uncoveringthe Hidden Forest: Valuation Methods for Wood land and Forest Resource.Earth scan Publications Ltd,London.Pp.168-198.

Odera,J.A.(1997).Traditional beliefs, Sacred groves and Home Garden Technologies: Adapting old practices for conservation of medicinal plants.**In**: Conservationand Utilization of Indigenous medicinal plants and wild relatives of food crops.Pp.19-28. UNESCO, Nairobi, Kenya.

Organization.Technical Report Series622,WHO,Geneva.

PeopleinGimbiWoreda,Western Wellega. M.Sc. Thesis. Addis Ababa, Ethiopia. Fassil Kibebew (2001).The statusanda vailability of or aland written knowledge ontraditional

Polhill,R.M.(2000).Phytolacaceae.In:(Edwards,S.,Mesfin Tadesse, Sebsebe Demissewand Hedberg,I.eds.). Flora of Ethiopia and Eritrea.Vol.2Part1.Magnoliaceae to Flacortiaceae.Pp.274-276.The National Herbarium,Addis Ababa University.Addis Ababa, Ethiopiaand Uppsala, Sweden.

Progres Reportto Research and Publication Office,Addis Ababa University, Addis Ababa.

Quanash,N.(1998).Bicultural diversity and integrated health care in Madagascar.Natureand

Resource.**30**:18-22.

Sebsebe Demissew (1998).Astudy of the vegetation and floristic composition of SouthernWallo, Ethiopia. Journal of Ethiopian studies (JES)**31**(1):159-192.

Sebsebe Demissew (2003).Myrsinaceae. **In**: (Hedberg,I.,Edwards, S. and Silesh Nemomissa Flora of Ethiopa and Eritrea.Vol.4.Apiaceaeto Dipsacaceae. Pp.6469.Addis Ababa University.

AddA baba, Ethiopiaand Uppsala, Sweden.

Sofowara,A.(1982).Medicinal plants and Traditional medicinein Africa. John Wileyand

Sons.NewYork.Pp255-256.

Tafesse Mesfin and Mekonen Lemma (2001).Therole of traditional veterinary herbalmed icineandits constrain tsinanimal hea lt caresy stemin Ethiopia.

In :(Medhin Zewduand Abebe Demissieeds.).Proceeding of the National work shop on Biodiversity Conservation and Sustainab leuse of medicinal plants in Ethiopia,28April-01May1998,pp.23-33.IBCR,Addis Ababa.

Taye Bekele & Haase, G., eds.). Forest genetic resource conservation: principles, strategies and actions, Pp.49-72 Proceedings. The National Forest Genetic Resources Conservation Strategy Development Workshop, June 21-22, 1999; IBCR&GTZ. Ababa, Ethiopia.

Tesfaye Awasand Zemede Asfaw(1999).Reporton EthnobotanicalS tudy Nations, of Nationalities and People in Gambel land Benishangul Gumuz Reginal States.

Tewolde Berhan Gebre Egzibher& Edwards,S. (1997).Alliaceae.**In**: (Edwards,S.,Sebsebe Demissew& Hedberg,I.eds.).Flora of Ethiopiaand Eritrea.Vol.6: Hydrocharitaceaeto Arecaceae,pp.148.Addis Ababa, Ethiopia; Uppsala,Sweden.

Thomas,H.(1995).Indigenous Knowledge, Emanicipation and Alination. Journal of knowledge transfer and utilization**. 8(1**):63-73.University of Washington.

Walter,H.(1985).Vegetation of hearth and ecological system of the geobiosphere. Thirded. Berlin,Heideber g, NewYork.318pp.

WHO(1979).Thepromotionand development oftraditional Medicine.WorldHealth

WHO(1998).Regulatorysituation of herbalmedicines: AWorld wide Review.Pp.1-9.

WHO(2001).Planning forcost effective traditional health services in the new century a discussion paper.http://www.who.or.jp/tm/research/bkg/index.html.

WHO(2002).Traditional Medicines Strategy 2002-2005.World Health Organization,Geneva:WHO.

WHO/TRM/98.1,Geneva.

YDANRMO (Yayo District‟s Agricultural and Natural Resources Management Office) (2009).

Zemede Asfaw (2001).TheRole of Home Gardenin Productionand Conservation of Medicinal plants.In:(Medhin Zewduand Abebe Demissieeds.).Coservation and Sustainable Use of Medicinal plants in Ethiopia. Proceeding of the National works hopon Biodiversity Conservation and Sustainab leuse of medicinal plantsin Ethiopia,28

APPENDICES

APPENDIX 1.Prepared Checklist and questionnairs for respondents

1 Name of the respondent_____

sex_____Kebele_____occupation_____age_____marital status _____

2 What are the main human health problems in your locality or Keble?

3 Do you use plants? For what purposes? Would you list their importance? To treat disease?For charcoal production?For firewood?For construction?For food?For fodder?

A/ Name the plant_____B/ Habitat of the plant_____

C/ Habit of the plant_____D/ Part of the plant used_____

E/ Preparation methods_____F/ Amount used (dose_____

G/ Application method_____H/ Treats to the above plant_____

I/ Method of conservation of the plant_____J/Other uses of the plant_____

4 How do you prevent /control those diseases?

5 How do you treat human health problems?

6. Which plants do you use for treating those particular diseases?

7. Local name(s) of the plants?_____

10 Habit of the plant -tree/shrub/herb/climbers?

11. Habitat of the plant-forest/reverie/homegarden/road side//rocky area/agricultural field/grazing land?

12. How widespread is the medicinal plants fromyour residence?

13. Plant parts used: Root/stem/root bark/leaves/small twigs with Leaves/flowers/fruit/seed/whole plant. Others_____

Used alone mixed with other materials, concoction/decoction, others_____

14. Preparation for medicinal use: crushed/crushed and powdered/ crushed pounded/extract with cold water /boiled/juice/ latex/: other_____

15. Dose/amount?

16. Does the dose differ among males, females, children, elders?

17. Any noticeable side effects

19. How do you preserve traditional medicines?

20. Are there restrictions /taboos in collecting medicinal plants?

21. Are medicinal plants marketable?

22. Are there threats to those medicinal plants?

23. How do you conserve traditional medicinal plants?

24. How is the knowledge of traditional medicine passed to a family member/younger? Generation?

25. How dose modernizations interfere with traditional medicine application and use?

26. Preference ranking_____

27. Paired comparison_____

28. Direct matrix ranking_____

29. Fidelity level index_____

Identification

Survey Area/woreda – Yayo Disrict.

PeasantAssociation_____

Community/village_____

Interviewer/facilitator_____

Date/Month/Year_____/_____/_____

Time: From_____

APPENDIX2 List of human disease in the study area

No	Local name (Afaan Oromoo)	English name
1	Mitmitii	Amoeba case
2	Budaa	Evil eye
3	Busaa	Malaria
4	Cittoo	Scabies
5	Cophxoo	Gonorrhea
6	Dhiitoo harmaa	Breast ulcerate
7	Dhitoo	Swelling
8	Dhodhotoo	*Taniaversicolaries*
9	Dhukkkubailkaanii	Teethinfection
10	Dhukkubaijaa	Eyeinfection
11	Dhukkubakale	Kidney problem
12	Dhukkubasaree maraatuu	Rabies
13	Dhukkubasinbiraa	Hepatitis
14	Dhullaa	Swelling
15	Dingetegnaa	Suddensickness
16	Foroforii	Taniapaddies
17	Foroforii	Dandruff
18	Funuuna	Nasal bleeding
19	Gaggabdoo	Epilepsy
20	Garaacininna	Stomachproblem
21	Garaakaasaa	Diarrhoea
22	Gonaadee	Taniapaddies
23	Gonnaadee	-
24	Gubaaabidda	Fireburn
25	Gurrawaransa	Earpain
26	Hadhaa	Tetanus
27	Hadhooftuu	Liverproblem
28	Harsasee	Tonsillitis
29	Hir'inadhiigaa	Anemia
30	Iddabofaa	Snakepoison
31	Inniqii	Goiter
32	Irrraaba'uudubartiif	Erythroblasts
33	Kintaarota	Homeoroide
34	Koosoo	Tapeworm
35	Madaa	Wound
36	Mata bowoo	Headache
37	Michii	Fibril illness
38	Mitimitii	Ascaris
39	Qakee	Cough
40	Qufaa	Influenza
41	Qurxumatii	Rheumatism
42	Raamoogaraa	Internal parasites
43	Roobbii	Ring worm
44	Seexana(Jinnii)	Evil sprit
45	Shiffee	Skin rash
46	Sibijjii	Spiderpoison

APPENDIX3 List ofplantscollectedinthestudyarea

S/N	Scientific name	Family	**Local name**	**Ha.**	**Coll. No**
1.	*Acacia abyssinica* Hochstex.Benth.	*Fabaceae*	Laaftoo	T	YA01
2.	*Acanthu seminens* C.B.Clarke	*Acanthaceae*	Kosorruadii	Sh	YA02
3.	*Achyranthe saspera* L.	*Amaranthaceae*	Darguu	H	YA03
4.	*Pycnostchyus abyssinnica*	*Labiatae*	Yeroo	Sh	YA04
5.	*Allium sepa* L.	*Alliaceae*	Qullubbi adii	H	YA05
6.	*Beciumfil amentosum* (Forssk.)Cliob.	*Lamiaceae*	Kooddoo	T	YA06
7.	*Bidens pilosa* L	*Asteraceae*	Maxxanne	H	YA07
8.	*Bidens biternata* (lour.)Merr.&Shrff.	*Asteraceae*	Maxxanne	H	YA08
9.	*Bridelia micrantha* Hochst.)Baill.	*Phyllanthaceae*	Rigraabaa	T	YA09
10.	*Calpurnia aurea*(Ait.)Benth.	*Fabaceae*	Ceekaa	Sh	YA10
11.	*Capparis tomentosa* Lam.	*Capparaceae*	Harangamaa	Sh	YA11
12.	*Carica papaya* L.	*Caricaceae*	Paapayya	Sh	YA12
13.	*Catha edulis* (Vahl)Forssk.exEndl.	*Celastraceae*	Caatii	Cl	YA13
14.	*Centhrus setigerus* Vahl.	*Poaceae*	Sardoo	H	YA14
15.	*Chionanth Mildbreadii* (Gilg & schellearn)	*Oleaceae*	Gagamaa	T	YA 15
16.	*Citrus limon* (L.)Burm.f	*Rutaceae*	Lomii	T	YA16
17.	*Clausena anisata* (Willd.)Benth.	*Rutaceae*	Ulumaayyii	Sh	YA17
18.	*Clematis simensis* Fresen.	*Ranununculaceae*	Hidda feetii	Cl	YA18
19.	*Clero dendrum myricoides* (Hochst.)Vattke	*Lamiaceae*	Maraasisaa	Sh	YA19
20.	*Cordia africana* L	*Boraginaceae*	Waddeessa	T	YA20
21.	*Crateva adansonii* Dc.subsp.adonsonii	*Capparidaceae*	Harangamaa	Sh	YA21
22.	*Crotalaria incana* L.	*Fabaceae*	Atariikuruphee	Sh	YA22
23.	*Croton macrostchyus* Del.	*Euphorbiaceae*	Bakkannisa	T	YA23
24.	*Cucumis ficifolius* A. Rich	*Cucurbitaceae*	Hiddihooloo	Cl.	YA24
25.	*Cucur bitape* poL.	*Cucurbitacea*	Buqqee	H	YA25
26.	*Cyno dondactylon* (L.)Prers	*Poaceae*	Coqorsa	H	YA26
27.	*Cynoglossum coerulem* Hochst.Dc.	*Boraginaceae*	Mataree	H	YA27
28.	*Datura stramonium* L.	*Solanaceae*	Manjii	H	YA28
29.	*Echinops kerebicho* Mesfin	*Asteraceae*	Qarabicho	H	YA29
30.	*Echino psmacro chaetus* Fresen	*Asteraceae*	Kossorru	Sh	YA30
31.	*Ekrbergia capensis* Sparm.	*Meliaceae*	Somboo	T	YA31
32.	*Embelia schimperi*Vatke.	*Myrsinaceae*	Haanquu	Sh	YA32
33.	*Erythrina brucei* Schweinf.	*Fabaceae*	Waleensuu	T	YA33

S/N	Scientific name	Family	**Local name**	**Ha.**	**Coll. No**
34.	*Ficus sur* Forssk.	*Moraceae*	Harbuu	T	YA34
35.	*Ficus vasta* Forssk.	*Moraceae*	Qilxuu	T	YA35
36.	*Indigo ferahochstetteri* Bak.	*Fabaceae*	Qorichahadha'a	H	YA36
37.	*Justica schimperiana* (Hochst.ex.Nees)T.Andre	*Acanthaceae*	Dhumuugaa	Sh.	YA37
38.	*Lagenaria siceraria* (Molina)Standl.	*Cucurbitaceae*	Buqqe hadhaa	Sh	YA38
39.	*Lippia adoensis* Hocht.Ex.Walp.var. adoensis	*Verbenaceae*	Kusaayee	Sh	YA39
40.	*Melina azedrach*	*Meliaceae*	Baybay	Sh	YA40
41.	*Millettia ferruginea* (Hochst.)Baker	*Fabaceae*	Sootallo	T	YA41
42.	*Moringa stenopetla*	*Moringacae*	Moringa	Sh	YA42
43.	*Nicotia natabacum* L.	*Solanaceae*	Tamboo nyaata	Cl.	YA43
44.	*Ocimum gratissimum* L.	*Lamiaceae*	Daamakasee	Sh	YA44
45.	*Ocimum lamifolium* Hochst.ex.Benth.	*Lamiaceae*	Hancabbii diimaa	Sh	YA45
46.	*Oleaca pensis* L.Subsp.	*Oleaceae*	Gagamaa	T	YA 46
47.	*Pavoni aurens* Cav.	*Malvaceae*	Maxxannee	Sh	YA47
48.	*Pentas lanceolata* (Forssk.)Defl.	*Rubiaceae*	Dhumuga	Sh	YA48
49.	*Phytolacca dodecandra* L'Herit	*Phytolaccacea*	Handoodedhalaa	Sh	YA49
50.	*Piper capense* L.f.	*Piperaceae*	Mimmixa	Sh	YA 50
51.	*Premna resinosa* (Hochst.)Schauer	*Verbenaceae*	Urggeesaa	T	YA51
52.	*Prunus africana* (Hook.f.)Kalkm.	*Rosaceae*	Hoomii	T	YA52
53.	*Psycho triaorophila* Petit	*Rubiaceae*	Ulaagaa	Sh	YA53
54.	*Pterrollobium stellatum* (Forssk.)Brenan	*Fabaceae*	Harangamaa	Sh	YA54
55.	*Ricinus communis* L.	*Euphorbiacea e*	Qoobbo	Sh	YA55
56.	*Rumex nervosus* Vahl.	*Polygonaceae*	Dhangaggoo	H	YA56
57.	*Ruta chalepensis* L.	*Rutaceae*	Cillaattama	Cl	YA57
58.	*Sapium ellipticum* (Krauss)Pax.	*Euphorbiaceae*	Bosoqa	T	YA58
59.	*Senna occidentalis* (L.) Link	*Fabaceae*	A/Qamale	Sh	YA59
60.	*Sidas chimperiana* Hochst.ExA.Rich.	*Malvaceae*	Uleharree	Sh	YA60
61.	*Stephania abyssinica* (Dillo&A.Rich.)Walp.	*Menispermacae*	Hidda kalaala	Cl	YA61
62.	*Tecleano bilis* Del.	*Rutaceae*	Hadheesa	T	YA62
63.	*Thalictrumrhynchocarpum* Dill.&A.Rich.	*Ranunuclaceae*	Siraabuzuu	H	YA63
64.	*Vernonia amygdalina* Del.	*Asteraceae*	Eebicha	Sh	YA64
65.	*Vernonia leopoldii* (Sch.Bip.)	*Asteraceae*	Sooyyoma adii	Sh	YA65
66.	*Vernonia myrantha* Hook.f.	*Asteraceae*	Reejji	Sh	YA66

S/N	Scientific name	Family	**Local name**	**Ha.**	**Coll. No**
67.	*Zehneria scabra* (1.f) . sound	*Cucurbitaceae*			
68.	*Bersema Abyssinica*	*Meliamthaceal*	Lolchisa	H	YA 68
69.	Gyphatemma lypopetalium	*Vitaceae*	Hiderefa	CL	YA69
70.	*Celosia anitheliminthic*	*Amaranthacae*	Amasillo	H	YA70

KEY: In bold are medicinal plants

Appenidix 4 .Major human diseases and number of plant species used by indigenous people ofYayo Area.

Disease treated	**No. of species**	**Percentage (%)**
Stomachache	11	7.3
Evil eye	8	5.2
Fibril illness	7	4.6
Gonorrhea	7	4.6
Internal parasite	6	4
Ring worm	6	4
Tetanus	6	4
Tonsillitis	6	4
Teethinfection	5	3.3
Rabies	5	3.3
Wound	5	3.3
Malaria	5	3.3
Dandruff	4	2.6
Diarrhoea	4	2.6
Headache	4	2.6
Hepatitis	4	2.6
Homeoroide	4	2.6
Kidney problem	4	2.6
Skin rush	4	2.6
Leg Swelling	3	2
Hypertension	3	2
Snake bite	3	2
Cough	3	2
Spiderpoison	2	1.2
Suddensickness	2	1.2
Tapeworm	2	1.2
Blood clotting	2	1.2

Nasal bleeding	2	1.2
Broken bone	2	1.2
Scabies	2	1.2
Eyeinfection	2	1.2
Liverproblem	1	0.6
Influenza	1	0.6
Goiter	1	0.6
Evil spirit	1	0.6
Amoeboesis	1	0.6
Anaemia	1	0.6
Poisoning	1	0.6
Taniaversicolaries	1	0.6
Taenia pedies	1	0.6
Diabet	1	0.6
heart failure	1	0.6
Pain	1	0.6

APPEDEX 5 List of medicinalplants used for human, scientificname; family;local name; habit; parts used; disease treated; methods of preparation with dosageused ;routeof appiication and collection number.

Keys!

Scientific name	Family	Local Name	Ha	Pu	use	Diseasetr.	Modeofpreparation	Route
Acaciaabyssinica.	Fabaceae	Laaftoo	T	L	Hu	Goiter (Inniqqii)	Leafof *Acaciaabyssinicais*smashedandthesapis Applied tothegoiterforthreedays with needle.	Dermal
Acmella caulirhiza.	Asteraceae	Gutichaa	H	Flower	Hu	Tonsilites (Harsasse)	Five flowerof*Acmellacaulirhizais*Chewedandspittedon epiglot. Tonsilites	Oral
Allium sativum	Alliaceae	Qullubbi Adii	H	R	Hu	Malaria	Bulb of*Allium sativum*andrhizomeofGinger officinale	Oral
			H	,,	Hu	Stomach Problem	Bulb of*Allium sativum*andseedof seedofLepidium Sativumarepouindedtogetherandeatenwithinjera.	Oral
				R	Hu	Stomach pain	*Allium sativum,*Ginger officinale & Nigell satva crushed & mixed with water give one cap for three	Oral
Albiziagummifera	Fabaceae	Anbabesaa	T	Ba	Hu	Stomachache	Chewed and swallowing	Oral
				Ba	Hu	Diarrhea	Powderedand1coffeecupistaken	Oral
				Hu	Hu	Tonsillitis	Chewed&swallowing	Oral
Securidica longipeduculata	Polygalaceae	Xemenay	Sh	R	Hu	Intestinal parasite	Pounded root mixed with water & is given to drink.	oral

Bidens biternata	Asteraceae	Maxxanne	H	L	H	Hu	Fibrill illness(Michii)	Leaf of Bidens biternata is smashed and sniffed	Nasal
Bidenspilosa.	*Asteraceae*	Maxxanne abba sabbuu	H	L	H	Hu	Taneia pedis	Leafof *Bidenspilosais* immersedin hot water and	Dermal
				L	H	Hu	Nasal Bleeding	Freshlysqueezedleavesareinhaledthroughnasal Opening.	Nasal
Verbena officinalis	*Verbenaceae*	Atuche	H		L	Hu	Tonsillitis	Squeezing the leaves and drinking the juice	Ora
Zingiber officinale	*Zingibilaceae*	Zingibil	H	R	Hu	Unexplained stomach ache		chewing the rhizome and swallowing the juice	Oral
Ageratm conyoidul	*Asteraceae*	Tuufoo	Her	L	HU	Blood ciotting		Leaves crushed and squeezed on bleeding part put on dermals	Dermal
Capparis tomentosa	*Capparidaceae*	Harangama	Sh	RL	R	Hu	Sudden Sickness	Root of *Capparis tomentosa*is driedpowdered and preserved.Onespoon of the powderis mixedwith alcohol andgiventohuman.	Oral
				L	L	Hu	Evil eye	Leafof *Capparistomentosa*and Rutachalepensisar poundedandmixedinwater taken one cap for 3 daystogetherandonedomestic alcohol cupis	Oral
				L	R	Hu	Intestinal Worm	Root of *Capparistomentosa*is dried and powdered, Mixedwithwater.Threespoonis	Oral
				L	L	Hu	Tooth Infection	Leaf of *Capparistomentosa*, Crotonmacrostachyus VernoniaamygdalinaandCarissaspinaru	Oral
					R	Hu	Evil disease (jinni)	Root of *Capparistomentosa* Lam burned by fire its smoke Steamed by paciant	Oral and nasal

				,,	Hu	Evil eye	Root ofCratevaadansoniiis poundedwithroot of*Ruta chalepensis*. The solutionis sniffed.	Nasal
				L	Hu	Tooth Infectionqe	Leafof *Cratevaadansonii,vernoniaamygdalina*, *Carissaspinarum* and*Crotonmacrostchys* are smashed together androlledinleaf,andheatedoncharcoaland put oninfectedtooth.	Oral
Crotalaria incanaL.	*Fabaceae*	Atarii Kuruphee	Sh	L	Hu	Tetanus (hadhaa)	Leafof *Crotalariaincanais* crushedandput onswelled Area	Dermal
				Sap	Hu	Hepatitis (sibira)	Sapfromthewholepart ofthe plant is directly creamed Onaffectedarea.	Dermal
Croton macrostomachnus	*Euphorbiaceae*	Bakkannisa	T	L	Hu	Ring Worm (roobb)	Leafof *Crotonmacrostachyusis* crushedandsmashed the extract is creamed on affected area.	Dermal
		Rigaaraaba	*T*	*B*	*Hu*	*Coronary Heart*	Bark of*Crotonmacrostachyus*and*Vernonia Hymenolepis*arepowderedtogether and3-4spoonsof powder is takenwithtella.	Oral
	Poaceae	*Coqorsa*	*H*	*L; F.*	*Hu*	*Snakepoison (Buutii)*	Leafof*Crotonmacrostachyus*withleaf of*Brucea Antidysenterica*crushedtogetherandusedasskin washon affected area.	Dermal
	Asparagaceae	*Sarriiti/ Qastanicha*	*H*	*L*	*Hu*		Root of*Crotonmacrostachyus*and*Carissaspinarum*are Choppedtogetherandfumigated.	Nasal
				L	Hu	Febrile Illness	Leafof Crotonmacrostachyus andOcimum urticifolium arefumigated.	Oral& Nasal
				L	Hu	Headache	Leafof *Crotonmacrostachyus*and*Ocimumurticifolium*aresmashedan	Nasal
				B	Hu	Wound	Bark of *Crotonmacrostauchyus*is driedandpowdered, Addedtowound	Dermal
	Asteraceae	*Reejji*	*SH*	L	Hu	Ring worm	Leaf of *Crotonmacrostachyus* Del &*Clematissimensis* Fresen crushed &add on the affected area.	Dermal
					Hu	Qaaqe	Leaf of *Crotonmacrosachys* Del.L&*Clematissimensis*crushed& add on head hair skin.	Dermal
DiscoingsexWild & Drummond	*Vitaceae*	*Hidareenfa a*	*Cl*	*Ls R*	Hu	Tetanus	Leaf of *Crotonmacrosachys* and *commelinadiffuse* Burm.f.crushed and smashed the extract is creamedon affected area.	Dermial

The bark of rigaraaba crushed by morter mixed with water &given for pacient1 glass for 3 days

Above ground parts of Cynodon dactylon is rubbed to the affected skin for seven days with butter

Squeezedwithleavesof Stereospermum kunthianumandCitruslimonand1 coffeecupisgiven

Poisonin. Squeezedandgiven

Diabetes Powderedandtakenwithhoney

Wound Theleafissqueezedinthearea

Bloodclot Squeezedinthearea

Weightloss Squeezedandgiven1glasscuphy addingsalt.

Echinops kerebicho	*Asteraceae*	Qarabicho	H	R	Hu	Snake repellent	Root of*Echinopskerebichois*driedandsmokedin house**.**	nasal & oral
				,,	Hu	Internal parasite	Root of*Echinopskerebicho*is driedpowderedand Mixedwithwater.Halfofteacupis giventohuman.	Oral
				,,	Hu	Febrile Illness	DriedRoot of*Echinopskerebicho*is fumigated.	Nasal
				,,	Hu	Gonorrhea	Root of*Echinopskerebicho*andbarkof*Croton Macrostachyus*arepoundedtogethermixedwithh oney. Onecupofteais takenby human.	Oral
Ehretiacymosa	*Boraginaceae*	Ulaaga	T	L	Hu	Pain (waransa)	*Ehretiacymosa*leafis smashedandthesapis taken by human.	Oral
Ekebergia capensis.	*Meliaceae*	Somboo	T	B	Hu	Wound	Bark of*Ekebergiacapensisis* powderedand halfa spoonis addedtowound.	Dermal
				Sa.	Hu	Hemorrhoid.	Sapexudate of *Ekebergiacapensisis*directly applied to Hemorrhoid	Anal
Sapium ellipticum	*Euphobiaceae*	Bosoqa	H	L	Hu	Hemorrhoid	Leaf of S*apitumelliptiicum*&nobbe collected and &grind by mortar & mixed by little water	Dermal
			H	L	Hu	Tetanas	Leaf heated by fire & touch by the leaf on the wound.	Dermal
				L	Hu	Diharea	With leaf of *Clerodiummyricoides* and *Burceaantidysenterical*Fresn boild and drink the solution	Oral
Embelia schimperi	*Myrsinaceae*	Haanquu	Sh	Se	Hu	Tape Worm	Seedof*Embeliaschimperiis* driedandpowdered,Mixedwithwater,two glasses is taken once.	Oral
				L	Hu	Internal Parasite	Leafandseedof*Embeliaschimperi*andleafof *Crotonmacrostchys*arepoundedtogetherandone glass is takenby human.	Oral
Catha edulis	*Celastaceae*	Chat	T	L	Hu	Urinerary infection	Leaf dried pounded & mixed with leaves of *venrnoniaamygdia*. The mixed then boiled together the filter is saved as drink.	Oral

Euphorbia lathris	*Euphorbiaceae*	Adaamii	T	St.	Hu	Ascaries (maagaa)	2-3 drop of*Euphorbialathris*sapis pounded withteff andgiventohuman.	Oral
				L	Hu	Skin Hemorrhoid	The sap of Euporiba*latthryis* is add on wound of hemorrhoid upto healed.	Dermal
Ficus sur	*Moraceae*	Harbuu	T	Sa.	Hu	Ringworm	Sapfrom*Ficus sur*iscreamedonaffectedskin.	Dermal
Ficus sycomorus L.	*Moraceae*	Qiltu	T	Sa.	Hu	Hepatitis (sinbira)	Sapof*Ficussycomorusis* creamed directly on skin.	Dermal
				B	Hu	Rabies	Bark of *Ficussycomorus*androot of*PrunusAfricana are*powderedtogetherandbackedwithteff	Oral
				B	Hu	Hemorrhoid.	Barkof*Ficussycomoruis* driedpowderedandmixed	Dermal
Cynoglossumcoerulem Hochst.Dc.	*Boraginaceae*	mattarree	H	L&Seed	Hu	Teap worm	Crushed the leaf&the seed & mixed with water drink one bush one morning	Oral
Rumex nervosus.	*Polygonaceae*	Dhangaggosaree	H	R	Hu	Hepatites	Root of *Rumexnervosus.* Vahl crushed by mortar & dried to powder mixed by water its syrop 2spoon given to human to drink for 3 days.	Oral
				R	Hu	Hypertiton	Fresh root juice given to drink with coffee.	Oral
Indigofera Hochstetteri	*Fabaceae*	Qoricha hadha'a	H	R	Hu	Tetanus	Root of*Indigoferahochstetteri*is powderedandmixed Withbutterandputonaffectedarea.	Dermal
				L	Hu	Tonsilites	Leaf is chewedandspitted on Tonsilites	Oral
Kalanchoe pettiana	*Crassaceae*	Busuqqe	H	L	Hu	Intestinal parasite	Leaf of *kalanchepettiana* is grind &squised &its sap 2-3 spoon given topacient.	Oral
				L	Hu	Tetanus caused by worm	*Kalanchoepettiana* leaf added in fire & pick from fire creamed to the wound of tetanus.	Dermal
Justica schimperiana	*Acanthaceae*	Dhumuugaa	Sh.	RL	Hu	Rabies	Root andleafof *Justicaschimperiana*is pounded Togetherandmixedwithwaterand2-3cupoftella is usedasadrink.	Oral
				R	Hu	Gonorhea	Root of*Justicaschimperiana*andleaf of *Erythrinabrucei* arepoundedandconcoctedtogether.Onecupof	Oral

Asparagus africanus	*Aspargaceae*	Saritii	Sh	L	Hu	Poisoning and diabetes.	Leaves Squeezed and given one glass pair day for three days	Oral
Grewiia spp.	*Tirianceae*	Balantayi	T	L	Hu	Ring worm	Leaf of Balantayii crushed by morter & mixed with water creamed the skin	)ermal
Ruta chalepensis	*Rutaceae*	Cilaatama	H	L	Hu	Fibrl (michi)	Leaf of *Rutachalepensis*,*Ocimumgratissimum*L. &*Clerodenrummyricoide*(Hochst)vatkek e are boiled and bathed for 1-3 days	Derm
				L	Hu	Evil eye	Pounded dried leavesis given to inhale nasally.	Nasal
				L	Hu	Infulenza	Leafof *Rutachalepensisis*pounded withbulb of*Alliumsativum*mixedwithsoupandusedasadrin k.	Oral
				L	Hu	Stomach pain	Leaf of *Rutachalepensis*.L &*Oclmumgratissiumum*.L grinding together & wixed with water give to the paciant 2 tea cap for 3 days	Oral
Guizota schimbri	*Asteraceae*	Keello	H	F	Hu	Eye infection	Fresh flower juice is mixed with water applied in to the eye	Dermal
Burcea antidysenterical	*Simaroubaceae*	Qomanyo	Sh	L	Hu	Intestinal parasite	The leaf boil with milk & drink one cap per three days	Oral
				L	HU	Evil eye	With root of *Cratevaadansoni*&root of *Rutachalepnsis* is pounded three spoons are used as adrink.	Oral
Lagenaria Siceraria	*Cucurbitaceae*	Buqqe Hadhaa	Cl.	F	Hu	Tinea Versicolor	InnerpartoffreshfruitofLagenariasicerariais Creamedonaffectedheadskin.	Dermal

				Fu	Hu	Malaria	Ripefruit ofLagenariasiceraria is boredrinsedwith Coldwater,oneglassisusedasadrinkearlyin	Oral
				Fu	Hu	Scabies(C ittoo)	Innerpartoffreshfruitof*Lagenariasicerariais* creamedonaffectedheadskin.	Dermal
Trichilia dregeana	*Meliaceae*	Luuyaa	T	Bar	Hu	Disease of bone	Creashing the bark of Luuyyaa and mix wit tea dirinking one bush for five days	Oral
				Ba	Hu	Rebies	Crushing the bark and mix wih water drinking one cup for three days	Oral
Millettiaferrugi nea	*Fabaceae*	Sotalloo	T	L	Hu	Blood pressure	Dried andpowdered leaf of *Millettiaferruginaea* are mixed with water dirinking quarter of the bush for thre days	Oral
Lippiaadoensis .	*Verbenaceae*	Kusaayee	Sh	L	Hu	Ring Worm (Roobbii)	Leafof *Lippiaadoensis*is directly rubbed on affected skin.	Dermal
Nicotiana tabacum.	*Solanaceae*	Tamboo Nyaata	Sh	LR	Hu	Blood clotting	Leaf of *nictinatabacum* isdirectly rubbed and smashed on wound stop bleeding	Derma;l
				,L,	Hu	Headache	Driedandpowderedleafof *Nicotianata bacum*sniffed	Nasal
Lippia abyssinica	*Verbenacecae*	Biqila waaddi fooni/kosor otii	H	L	Hu	Blood pressure	Leaf of Kosorot dried and powdered &two spoon of kosorot powder added to tea & given to human.	Oral

Moringa stenopetla	*Moringacae*	Moringa	T	L	L	Blood pressure	Lealeaf of *MoringaStenopetla* are powdered and & added to steamed watertea cap for five days the patient drink	Oral
Ocimum gratissimum.	*Lamiaceae*	Daamakasee	Sh/ H	L	Hu	Febrile illness	Leafof *Ocimumgratissimumis* smashedandsniffed nasally.	Nasal
Ocimum urticifolium Roth.	*Lamiaceae*	Hanccabbi Adii	H	L	Hu	Febrile illness	Leafof *Ocimumurticifolium,Crotonmacrostachy*usand*Claus enaanista*are smashedtogetherandthesapis sniffednasally	Nasal
				L	Hu	Headache	Leafof *Ocimumurticifolium, Carissaspinarum*and Thalictrumrhynochcarpumaresmashed together rand sniffed	Nasal
Capsicumannuum	*Solanaceae*	Berberie	H	L.	Hu	Malaria	Mixing with *ocimumflium,LepidiumsativumAlliumsativum* by crushing eattin wih injera.	Oral
Erythrina Brucei	*Fabaceae*	Waleensuu	T	B R	Ls Ls	Swelling (dhitoo)	Bark of *Erythrinabrucei*poundedwithleafofTeclea nobilismixedwithwaterandhalfaglassis givento affected man	Oral
Datura Stramonium	*Solanaceae*	Manjii	H	Fu	Hu	Malaria	Powderedfruitof*Daturastramonium*ismixedwith honey andthreetofourspoonsareeatenwithpounded *Alliumsativum*.	Oral
Teclea nobilis	*Rutaceae*	Hadheesa	T	R	Ls	Wound	Root of*Tecleanobilis*is poundedmixedwithcold waterand3glassesgivento.	Skin Surface
Melina azedrach	*Meliaceae*	Baybay	T	L	HU	Teeth disease	Smashed thev sap on the teeth	Oral
				R	HU		Crushed and mix wth water boil and made steam	Nasal

Datura stramonium	*Solanaceae*	Manjii	H	Fu	Hu	Scabies (citto)	Powderedfruitof*Daturastramonium*2-3spoonofthe powderis mixedwithbutterandcreamed.	Dermal
Prunusa Africana	*Rosaceae*	Hoomi	T	Ba	Hu	Rabies	ark of *PrunusAfricana*&*FicasSycomory* powdered &ixed with teff flour backed made bread & given to human	Oral
Artemisia abyssinica	*Asteraceae*	Ariti	H	L	HU	Evil spirit	Crushed fresh root of A. abyssinica is homogenized in water and the patient smell and drink	Oral Nasal
Vernoniaamygdalina Del.	*Asteraceae*	Ebicha	T	L	HU	Gastric	Chewedandthesapisswallowed	Oral
Vernoniaspecies	*Asteraceae*	Reji	Her	L	HU	Wound	Squeezedandpainted	Dermal
Clerodendrum myricoides	Lamiaceae	/ Yero	S	*L*	*HU*	Fibril	Boiled andWash with leaves of crotum macrostachyus and ocium lamiifolium	oral
Bersema abyssinica fresen	*Melianthaceae*	Lolchisa	T	L	Hu	Dysentery	The leaf *Berceaabyssinicafresen* grind& mixed with water & the peciant drink one tea cap for one day. The leaf ofwith in a water one cap given to the	Oral

Vernoia myrantha	*Asteraceae*	Rejji	R	L	hu	Heal wound	*Vernoiamyrantha* and *Crotonmacrostachyus*wash the scribe and heal	Dermal
Senna occidentalis	*Fabceae*	A/qamalee	Sh	L	Hu	Skin ring worm(baarulle)	The sap of leaf of *Sennaoccidentalis*on creamed on skin ring worm until it healed	Dermal
Datura stramonium	*Solonacceae*	Asangira	H	L	Hu	Stomach pain	Leaf of smached & its fluid collected in cap 1-2 cap taken by humans for 2 days.	Oral
			H	L	Hu	Wound	Leaf of smached & one to three drop of itrs fluid droped on the wound couninously	Derimal
				L	Hu	Dandruff	Fresh leaf juice is applied directly on the scalp.	Dermal
				Se	Hu	Skin	Powdered seeds applied directly on the skin	Dermal
Stephaniaabyssinica	*Menispermaceae*	Hidda Kalaala	Cl.	L	Hu	Wound	Leafof*Stephaniaabyssinica*is poundedandasmall amount is addedtowound.	Dermal
Thalictrum rhynocatrpum	*Ranunculaceae*	Hunde sirabuzu	H	R	Hu	Liver disease R	Root of *Thalictrumrhynochcarum*, &*Rumexnervosus* Vahl crushed & its powder boiled with water & give one cap per day for three days.	Oral

				,,	Hu	Tetanus (Hadhaa)	Root of*Thalictrumrhynchocarpum*and*Tecleanobilis*is poundedtogether. 2-3teaspoonsaretakenby human.	Oral
					Hu	Sudden Sickness	Root of*Thalictrumrhynchocarpum*,*Cucumisaculeat*us and Premnares inosaarepoundedtogetherand powdered.Twospoonsaremixedwithalcohol andused asadrink	Oral
Pycnostachysabyssinica	*Labiatae*	Yeero	Sh	L	HU	Fibrilillness	Boiledandwashedwithleavesof*Crotonmacrostachyus*and*Ocimumlamiifolium*	Oral
				L	HU	Eyeproblem	Crushedand put ontheleavesonthe eye	Optical
				L	HU	Stomach problemof	Boiledonfireandthesapisgivento children.	Oral
				L,,	Hu	Stomach Ache	Intestinalprasitescanbekilledbyusing pounded twings *Vernoniaamygdalina*,*bullb* of *Alliumsativumwithrhizome*of Ginger officinale and eaten with honey.	Oral
Vernonia hymenolepis	*Asteraceae*	Sooyyoma	Sh.	L	Hu	Gonorrhea	Leaftwingeof *Vernoniahymenolepis*andbark Of*Crotonmacrostachyusare*poundedtogetheran d mixedgroundhoney and3-4spoonis takenearly inthe morningforfourdays.	Oral
Phytolacca dodecandra	*Phytolaccaceae*	Handode dhala	Sh	R	Hu	Gonorrhea	The bark of the root of *phyttttolccadodecndera* are crashed &its fluid sqused droped into cup of tea and measured by one line of finger & taken for 3 days	Oral
Cyphostemma lyphopetlium	*Vitaceae*	Hidda reeffa	Cl	L	Hu	Weight loss	Squeezed the leaf given one cap per day for five days.	Oral

Pterolobium Stellatum	Fabaceae	Harangamaa Qore	Sh	R	Hu	Evil eye	Root of*Pterolobiumstellatum*and root ofRuta	Nasal
			Sh	R	Hu	Evil eye	Root of *pterlobimstellatum* grind & burned steamed	Steam
Withania somenifera	Solonaceae	Gizawwaa	Sh	L	Hu	Malaria	The leaf of *Withniasomenifer* grind& mixed with water the paciant drink one cap of tea	Oral
				L	Hu	Tumor	The leaf of *Withniasomenifer*&Burcea abtidysenterrica Fresen crushed & mixed with water one cap given to the paticant for 3 days.	Oral
				L	Hu	Evil eye	The leaf of *Withniasomenifer*&*Burceaabtidysenterrica* Fresen crushed & mixed with water one cap	Oral
				L	Hu	Stomach Ache	The leaf *Withniasomenifer* grind & mixed b with water and thepaticant drink half of cap of tea for one day.	Oral
				L	Hu	Tumor	The leaf of Withnia *somenifer*&*Burceaabtidysenterrica*Fresen grind & mixed with water one cap given to the paticant for 3 days.	Oral
Bersema abyssinica	*Melianthaceae*	Lolchisa	T	L	Hu	Dysentery	The leaf *Berceaabyssinica* fresen grind& mixed with water & the peciant drink one tea cap for one day. The leaf ofwith in a water one cap given to the paticant for 3 days.	Oral
Tragia brevipes .	*Euphobiaceae*	Hadha ormaa	CL	R	Hu	Failarity of sex	The root of *hadhaormaa* grind by morter & changed in to powder & mix with water give one cap mornining for three days.	Oral
Celosia anithelminthic	*Amaranthacene*	Amaasiloo	H	L	Hu	Teap worm	Crushing the leaf and dried and mix with water driking one bush for one day	Oral

Vernonia amygalina	*Asteraceae*	Ebicha	Sh	L	HU	Malaria	Crushedleavesof *Vernoniaamygdalina*concoctedwith leavesof Rutachalepensis.Onecupisservedasadrink for 3-5 days withcoldwater inthe morning.	Oral
Rumex nervosus	*Polygonaceae*	Dhangaggo	Sh	R	Hu	Skinrash (Shiffe)	Root of *Rumexnervosus*is dried and powdered. 3-4 Spoonof the powderis mixedwithbutterand creamed	Dermal
							Onaffectedskin &taken with food.	
				L	Hu	Cough	Leafof Ruta *chalepensisis*pounded with*Cussonia*	Oral
				R	Hu	Hepatitis	The root of *Rumexnervous* vahl& kello grind & make powder & mix with water given one cup of tea to human.	Oral