Addis Ababa University, College of Natural and Computational Sciences

Ethnobotanical Study of Medicinal Plants Used by the Community of Woliso District, South West Shoa Zone, Oromia Regional State, Ethiopia

By: Tesfaye Tilahun

Thesis Submitted to the Department of Zoological Sciences, College of Computational Sciences of Addis Ababa University in Partial Fulfillment of the Requirements for the Degree of Master Science in General Biology

August, 2024
Addis Ababa University
Ethiopia

Addis Ababa University

This thesis is prepared by me, Tesfaye Tilahun Lemma, entitled: *Ethnobotanical Study of Medicinal Plants Used by the Community of Woliso District, South West Shoa Zone, Oromia Regional State, Ethiopia*, and submitted in partial fulfillment of the requirements for the Degree of Master of Science in Zoological Science complies with regulations of the University and meets the accepted standards with respect to originality and quality. Thus, I declare that this thesis is my original work and has not been presented in any form at any university.

Submitted by:	Signature	Date
Tesfaye Tilahun (Student)	_____	_____
Approved by:	Signature	Date
Dr. Tegenu Gelana (Advisor)	_____	_____

Abstract

This ethnobotanical study explores the traditional knowledge and use of medicinal plants by communities in the Woliso District, South West Shoa Zone, Oromia Regional State, Ethiopia. Despite the area's rich biodiversity and cultural heritage, documentation of local medicinal plants remains scarce. This research seeks to address this gap by identifying and cataloging plant species, their applications, and preparation methods utilized by community members.

Data collection involved 62 randomly selected general informants (31 males and 31 females) and 38 traditional healers (33 males and 5 females) through questionnaires, focus group discussions, and direct observations. Various analytical methods were employed, including Jaccard's similarity index, informant consensus factor, fidelity level, and statistical tests like ANOVA and t-tests.The findings revealed 96 medicinal plant species from 42 families and 85 genera, used for treating 67 ailments in humans and livestock. Specifically, 82 species (85.42%) were for human health, 6 species (6.3%) for livestock, and 8 species (8.33%) served both purposes. Herbs were the most common growth form; while the Asteraceae family had the highest species count. Leaves were the most utilized plant part, with squeezing being the predominant preparation method. Oral administration was the most frequent route, accounting for 59.56% of uses. Factors such as gender, age, and education influenced knowledge of medicinal plants. Major threats to these plants included agricultural expansion and firewood collection, with no conservation initiatives currently in place. Raising awareness about the importance of conserving medicinal plants is essential to protect traditional knowledge and biodiversity in the area.

Keywords/Phrases: *Traditional healers, Descriptive statistics, Ethno botany, Indigenous knowledge, Traditional Medicinal Plants*

Acknowledgements

First of all, I would like to express my gratitude to my adviser, Dr. Tegenu Gelana, for his wise counsel, helpful critiques, and inspiring remarks, from the first development of the proposal, analysis of the data up to the completion of this study. I appreciate his nice approach, constructive comments, willingness to share experiences and smooth treatments. I would like to thank the Addis Ababa University Department of Zoological Sciences and Addis Ababa University itself for having me as a student. I am also very grateful to and deeply thankful to the Ministry of Education of Ethiopia for providing the funding source and for this chance.

My sincere and special gratitude goes to the community of Woliso District for their support during data collection in the field. I have great respect and special thanks to the culture and tourism office of Woliso District, Woliso District administration, Woliso District health office and agriculture office for their cooperation, facilitating all administrative requirements during the actual field study, and provision of reliable information.

I would like to express my gratitude to Dr. Getachew Adino, a lecturer in the Department of Medicine at Debre Tabor University, for his invaluable help in identifying and going over the relevant information that needed to be sorted through in order to complete this study. I want to thank my friends for their tremendous assistance in gathering information needed to finish this project.

Lastly, I want to truly express my thankfulness to my family. Your support and affection have stayed with me throughout my life.

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Acronyms and Abbreviations

ANOVA	Analysis of Variance
DMR	Direct Matrix Ranking
EMA	Ethiopian Mapping Agency
FL	Fidelity Level
GDP	Gross Domestic Product
GIS	Geographic Information System
GPS	Global Positioning System
ICF	Informant Consensus Factor
IK	Indigenous knowledge
IUCN	International Union For Conservation Of Nature
JI	Jaccard"s Similarity Index
MAPs	Medicinal and Aromatic Plants
ONRS	Oromia National Regional State
PR	Preference Ranking
TMPS	Traditional Medicinal Plants
WDADO	Woliso District Agricultural and Developmental Office
WDHO	Woliso District Health Office
WHO	Worled Health Organization

1. Introduction

1.1 Background of the Study

Ethnobotany is a broad term that refers to the study of direct interrelations between humans and plants (Martin, 1995). The focus of ethnobotany is on how plants have been or are used, managed and perceived in (Yayesh *et al.*,2015). In developing countries, the human societies used plants for food, medicinal, rituals, social life and others. The relationship between plants and human cultures is not limited to the use of plants for food, clothing and shelter but also includes their use for religious ceremonies, ornamentation and health care (Khan *et al.*,2012). The practice of traditional medicine of plant origin is known worldwide. Medicinal plants have been used as a source of medicine to treat illness since time immemorial. For instance, in China traditional medicines of plant origin account for 30–50% of total medicinal consumption, and the traditional systems of health care are incorporated into the formal component of national health care system (Yayesh *et al.*,2015).

In developing countries, majority of population mainly depend on herbal preparation to help enhance their health. In Africa up to 80% of the population uses traditional medicine to help meet their health care needs (WHO, 2002). The use of traditional medicine is still wide spread in Ethiopia, and due to its acceptability, availability and popularity, about 90% of the populations use it for health their care needs. For a long time, plants have provided a source of emerging modern medicines and drug compounds. Medicines that derived from plants have made large contributions to human health and in the development of new drugs (Kefalew *et al.*,2015).

The Ethiopian indigenous medicinal plant knowledge, which is available in rural communities and perpetuated by word of mouth within families and the communities, consists of fragile traditional skills that are likely to be lost when communities emigrate from rural areas to towns or to other regions with a different flora; and can also be lost by life style changes due to industrialization, rapid loss of natural habitats, drastic alteration of the local ecology (Shiberu & Getu, 2017). The Ethiopian flora is estimated to contain between 6500 and 7000 species of higher plants of which about 10% are endemic. The country is well known for its significant geographical diversity that favors the formation of different habitats and vegetation zones

(Woldearegay & Teso, 2022). Therefore, some of these plants may have chemical compounds of therapeutic value that may be used in the treatment of major diseases such as HIV/AIDS, malaria, cancer, etc. The traditional knowledge as well as medicinal plants used by the local people may be under threat mainly due to deforestation, degradation and cultural shift (Birhanu *et al.*,2015). The current loss of medicinal plants in the country due to natural and anthropogenic factors links with the missing of valuable indigenous knowledge associated with the plants. This strong link suggests a need to conduct ethnobotanical research and to document the medicinal plants and the associated indigenous knowledge. Such studies are useful to identify threatened plants and to take appropriate conservation measures (Gebre, 2018).

Indigenous people have developed their own locality specific knowledge on plant use, management and conservation (Cotton, 1996). In Ethiopia many research have been done on ethnobotany based on indigenous knowledge. However, as compared to the cultural, linguistic and floral diversities we have, these studies are far less than complete. In some areas ethnobotanical studies are even not undertaken completely. One of the areas where ethnobotanical research is lacking is Woliso District found in South West Shoa Zone of Oromia National Regional State (ONRS). The study of how people use plants for different reasons, known as ethnobotany, is super important for understanding traditional knowledge and cultural practices. In a specific area in Ethiopia called South West Shoa Zone, the people in Woliso District have a long history of using plants for healing. This research is all about documenting and analysing the variety of medicinal plants they use, to learn more about their traditional healthcare methods and how plants can be used for healthcare. By studying this, we hope to help preserve traditional knowledge, support the sustainable use of medicinal plants, and maybe even help blend traditional healthcare with modern medicine. Therefore, this study is designed to carry out ethnobotanical investigation on medicinal plants of Woliso District with the following general and specific objectives.

1.2 Statement of the Problem

Ethnobotanical studies of medicinal plants remain incomplete, as indigenous communities possess unique, locality-specific knowledge regarding the use, management, and conservation of these plants.

A number of things put the traditional knowledge and medicinal plants in Woliso District under danger. Natural environments and cultural practices are under threat due to modernity, growing urbanization, and a lack of rigorous documentation. Without conservation measures, we risk losing this priceless knowledge.

To identify and record local medicinal plants and their preparation techniques, an ethnobotanical study is necessary. Future generations will benefit from this information being preserved, and conservation policies for sustainable resource use will be informed by this research.

1.3 Research Question

This research aims to document and analyse the indigenous knowledge and practices related to the medicinal and practical uses of local flora. The following primary research questions will be attempted to be addressed by the study's findings.

1. Which medicinal plants are used to cure animal ailments and what are the most prevalent health conditions in the research area?
2. Which portion of the plant is better for treating illness?
3. How are traditional medicines prepared, and what traditional knowledge and practices are linked to their use?
4. What key factors threaten the region's medicinal plants, and how do local communities preserve their knowledge of these valuable resources?

1.4 Objectives of the Study

1.4.1 General Objective

This study aims to identify the medicinal plants commonly used by the community and examine the variety, distribution, and customary applications of medicinal plants used by the local communities in Woliso District. Special attention was paid to their roles in healthcare, preparation and application techniques, and the status of these plants' conservation in relation to indigenous knowledge and practices.

1.4.2 Specific Objectives

- To collect, identify and document widely available traditional medicinal plants that are used by the local people for the treatment of human and livestock ailments in the study area.
- To document plant parts used for medicinal purposes, methods of preparation and ways of administration.
- To record and document indigenous knowledge of the local people on medicinal plants.
- To document the threat of medicinal plants in the study area.
- To evaluate the conservation methods of traditional medicinal plants.

2. Literature Review

2.1. Ethno-Botany's History and Development

Historical accounts of traditionally used medicinal plants show that different medicinal plants were in use as early as 5000 to 4000 BC in China and 1600 BC by Syrians, Babylonians, Hebrews and Egyptians (Rahman *et al.*,2019). Therefore, plants have been vital sources of both preventive and curative traditional medicine preparations for human beings and livestock since time immemorial. Although various animal and mineral products also contribute to human welfare, plants are most essential to human wellbeing especially in supplying his basic needs. According to Cotton (1996), the close interaction and dependency of humans on plants is studied under the field of ethnobotany.

John Hershberger proposed the term ethnobotany for the first time in 1895 (Balick & Cox, 2020) and He defined it as the study of the use of plants by aboriginal peoples. However, this term has been given different interpretations and definitions depending on the interest of workers involved in the study (Cotton, 1996). Ethnobotany tries to find out how people have traditionally used plants, for whatever purposes, and how they are still doing so (Mosissa & Atinafu, 2021). Ethnobotany is human evaluation and manipulation of plant materials, substances, and phenomena, including relevant concepts, in primitive or unlettered societies (Von Reis & Lipp, 1982).

According to Turner (2020), ethnobotany is the science of people’s interaction with plants. It is difficult to tell exactly when the term ethnobotany became part of modern science. However, it can be traced back to the time when humans started making conscious interaction with plants and animals. Ethnobotanical work seems to have started with Christopher Columbus in 1492, at a time when he brought tobacco, maize, spices and other useful plants to Europe from Cuba (Cotton, 1996) and when other immigrants from the new world documented food, medicine and other useful plants of the Aztec, Maya and Inca peoples (Martin, 1995). The relationship between humans and plants is as old as human existence on earth (Geta *et al.*,2020).

Ethnobotany is a broad science which includes studies of modern cultures, conservation and management system (Martin, 1995). According to (Cotton 1996), the study of ethnobotany leads

to know the function of plants in as food, magic, rituals, household utensils and implements, medicine, fire wood, building, pesticides, clothing, shelter and other purposes and is also used to define local community plant resource needs, utilization and conservation.

2.2. Indigenous Knowledge (IK)

Indigenous knowledge refers to the accumulation of knowledge, rule, standards, skills, and mental sets, which are possessed by local people in a particular area (Kebebew, 2017). Indigenous knowledge (IK) is the knowledge used by local people or unique to a given culture or society. It is the basis for local-level decision making in agriculture, health care, food preparation, education, natural-resource management, and a host of other activities in rural communities (Warren, 1991). IK is now considered to be cultural knowledge in its broadest sense; including all of the social, political, economic and spiritual aspects of a local way of life. One of the indigenous knowledge is knowledge on the use of plants by humans as medicines. When primitive man started to select his food from plants growing nearby, he must have kept some of those which he found to cure some of the ailments or which he thought would cure disease (Kebebe *et al.*,2022). Considerable indigenous knowledge system, from the earliest times, is linked to the use of traditional medicine in different countries (Wondimu *et al.*,2007).

The complex knowledge, beliefs and practices, generally known as indigenous knowledge develops and changes with time and space. One important feature of indigenous knowledge system is its adaptive skills for local people acquired informally through interaction with the natural environments (Kebebew, 2017). People in Ethiopia have their own indigenous knowledge on plant resource utility. Such knowledge systems are cumulative, representing generations of experiences, careful observations and trial and error experiments (Tamene, 2020). Indigenous knowledge on remedies in many countries including Ethiopia passed from one generation to the other generation verbally with great secrecy (Eshete *et al.*,2016).

Indigenous knowledge is important for an essential first step for development projects, allows better innovation and adaptation of technologies, adds to scientific knowledge, increases understanding between researchers and local people, increases the local capacity to experiment and innovate and empowers local people (Martin, 1995) and also relevance to conservation and

sustainable development because of locally appropriate, diversified production systems, respect for nature, flexible and social responsibility (Kahan *et al.*,2012). One of the widely used indigenous knowledge system in many countries is the knowledge and application of traditional medicine. Such knowledge known as ethnomedicinal knowledge involves traditional diagnosis, collection of raw materials, preparation of remedies and its prescriptions to the patients (Shiberu & Getu, 2017).

2.2.1 Threats to Indigenous Knowledge of Medicinal Plants

(Von Reis & Lipp, 1982) reports that although Ethiopia's traditional medicinal divisions are the best places to learn about the uses of medicinal plants, it is very hard to get their medicinal knowledge because they view their indigenous knowledge as a trade secret that is only verbally passed down to their older sons when they are the oldest. Knowledge is impacted by modern schooling, claim (Regassa, 2013). However, the growth of contemporary education also exacerbates the loss of knowledge, leading the younger generation to downplay its old values. He made the observation that children attending contemporary schools are displaying a disinclination to pick up knowledge from their parents, which is indicative of the conventional knowledge that is progressively vanishing. This suggests that the majority of the community's ethnomedical knowledge is held by its elderly members and that it can be challenging to transmit this knowledge to the younger generation. According to (Teklehaymanot, 2007), people who used and profited from medicinal plants were the ones who primarily conveyed information about them and their uses. Indigenous knowledge and the use of medicinal plants are disappearing quickly over the world due to the effects of modern education, expanding health care, and urbanization (Albuquerque *et al.*,2017). Because of this, the public today has limited access to the knowledge and expertise of traditional medicinal herbs and medicine (Balick & Cox, 2020). The problem is exacerbated in developing nations where vital knowledge is not written down but is instead transmitted orally from one generation to the next. To make matters worse, the younger generation of today frequently has different goals and priorities than older generations. This ancient knowledge is therefore destined to disappear even more quickly than the plants themselves (Turner, 2020).

2.3. Traditional Medicinal Plants (TMPS)

Traditional medicine is defined 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 (Fassil & Gashaw, 2019). According to Fassil & Gashaw (2019), 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 cannot 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.

In human history medicinal plants have been identified and used. Plants have the ability to synthesize a wide variety of chemical compounds that are used to perform important biological functions, and to defend against attack from predators such as insects, fungi and herbivorous mammals. At least 12,000 such compounds have been isolated so far; a number estimated to be less than 10% of the total (Tapsell *et al.*,2006). The use of herbs and spices in cuisine developed in part as a response to the threat of food-borne pathogens. Studies show that in tropical climates where pathogens are the most abundant, recipes are the most highly spiced. Further, the spices with the most potent antimicrobial activity tend to be selected (Sherman & Hash, 2001). Also meat is less spiced than vegetable, because it is less resistant to spoilage. Many of the common weeds that populate human settlements, such as nettle, dandelion and chickweed, have medicinal properties (Stepp, 2004)

In Ethiopia, more than 95% of traditional medical preparations are of plant origin and more than 80% of the people are dependent on plants for their health services. The wide spread use of traditional medicine among both urban and rural population in Ethiopia could be attributed to cultural acceptability, efficacy against certain types of diseases, physical accessibility and economic affordability as compared to modern medicine (Terefe *et al.*,2015)

2.4. Modern Study of Medicinal Plants

Ethnopharmacology is a highly diversified approach to drug discovery involving the observation, description, and experimental investigation of indigenous drugs and their biologic activities. It is based on botany, chemistry, biochemistry, pharmacology, and many other disciplines (anthropology, archeology, history and linguistics) that contribute to the discovery of natural products with biologic activity (Hamburger *et al.*,1991). At least 7,000 medical compounds in the modern pharmacopoeia are derived from plants (Meskin *et al.*,2002). In many medicinal and aromatic plants (MAPs), significant variations of plants characteristics have been ascertained with varying soil traits, and the selective recovery and subsequent release in food of certain elements have been demonstrated. Great attention must be paid to choose soil and cropping strategies, to obtain satisfactory yields of high quality and best-priced products, respecting their safety and nutritional value (Green *et al.*,2015). Digoxin is a purified cardiac glycoside that is extracted from the foxglove plant, Digitalis lanata. Digoxin is widely used in the treatment of various heart conditions, namely atrial fibrillation, atrial flutter and sometimes heart failure that cannot be controlled by other medication. The use of herbs to treat disease is almost universal among non-industrialized societies (Hassan *et al.*,2021). Many of the pharmaceuticals currently available to physicians have a long history of use as herbal remedies, including opium, aspirin, digitalis, and quinine. Shaw *et al.*,(2012) reported that the World Health Organization (WHO) estimates that 80% of individuals in various Asian and African countries currently utilize herbal medicine as part of their primary health care. Today many scientists discover drugs from extraction of plant which treat disease. Such area are Pharmacologists, microbiologists, botanists, and natural-products chemists are combing the Earth for phytochemicals and leads that could be developed for treatment of various diseases. In fact, according to the World Health Organization, approximately 25% of modern drugs used in the United States have been derived from plants (Carrubba & Scalenghe, 2012). From 120 active compounds currently isolated from the higher plants and widely used in modern medicine today, 80 percent show a positive correlation between their modern therapeutic use and the traditional use of the plants from which they are derived (Fabricant & Farnsworth, 2001). Plants were a significant source of new, pharmacologically effective chemicals until recently, and many well-known medications were either directly or indirectly produced from plants. Despite the current emphasis on synthetic

chemistry for the discovery and production of drugs, plants still play a major role in disease treatment and prevention. 11% of the 252 medicines that the WHO classified as essential and fundamental at the beginning of the twenty-first century came only from flowering plants (Semwal *et al.*,2021). Illiterates with only a minimal formal education are more knowledgeable than those with greater levels of education. This might be because traditional medical knowledge is being negatively impacted by contemporary education (Kidane *et al.*,2018).

2.5. Traditional Medicinal Plants in Ethiopia (TMPs)

The use of medicinal plants in Ethiopia accounts a long history to treat a variety of ailments (Kebebew, 2017). The introduction of modern medicine to Ethiopia dates back to the 16th century during the regime of Emperor Libne Dingel (1508- 1540). The first government run modern health care was established in 1906 with the opening of Menelik II Hospital in Addis Ababa. However, the growth and development of modern health care in Ethiopia as a whole has been very stunted and to date, its coverage is less than 50% of the population (Yayesh *et al.*,2015). In Ethiopia, traditional medicine is used by 90% of the population as their primary means of treating illness (WHO, 2002). The source of the plants used for therapeutic purposes is the natural vegetation stocks that are being depleted as a result of environmental degradation and a notable loss or drop in the number of medicinal plant species. The issue of medicinal plant conservation in Ethiopia today calls for aggressive studies and documentation before the accelerated ecological and cultural transformation distort the physical entities and the associated knowledge base (Hunde *et al.*,2006).

The Ethiopian indigenous medicinal plant knowledge, which is available in rural communities and perpetuated by word of mouth within families and the communities, consists of fragile traditional skills that are likely to be lost when communities emigrate to towns or to other regions with a different flora; and can also be lost by life style changes due to industrialization, rapid loss of natural habitats, drastic alteration of the local ecology. Anthropological events have major contributions to these changes (Shiberu & Getu, 2017). Therefore, the study of medicinal plant through ethnobotany is crucial work to record, document and conserve based on the indigenous knowledge of the local people, it reflects the direct questions of the residents who receives from their parents. So ethnobotanical study is baseline information for a particular plant by getting

information from who live around them. According to Yayesh *et al.*,(2015), Ethiopian flora is estimated to contain between 6500 and 7000 species of higher plants of which about 12% are endemic. It is therefore not surprising that some of these plants have chemical compounds of therapeutic value that may be used in the treatment of major diseases (Woldearegay & Teso, 2022). Ethiopia is also a home of many languages, cultures and beliefs which in turn have contributed to the high diversity of traditional knowledge and practices of the people which, among others include the use of medicinal plants. Plants have been used as a source of medicine in Ethiopia from time immemorial to treat different ailments. In 1993 it was reported that 80% of the Ethiopian population still depends on traditional medicine for their health care practices. More than 95% of traditional medical preparations are of plant origin (Mosissa & Atinafu, 2021).

Traditional Ethiopian medicine includes several elements or disease prevention. In the past, the spread of highly infectious diseases such as smallpox was prevented by deserting places where the epidemics occurred. Moreover, people were inoculated by taking pus from a sick person during special rituals. Sweeping or covering floors with particular plants is another traditionally practiced disease preventive measure. Other methods of disease prevention include isolating people with contagious diseases, prohibition or controlling movement and taking children away from the affected areas (Kebebe, 2022).

2.5.1 Plants Used for Ethnoveterinary Medicine in Ethiopia

Above 70% of Ethiopian people depend on livestock husbandry (Admassu, 2003). In Ethiopia 90% production of crop depends on the power of animal. Therefore, livestock are the most important factor for sustainable agricultural production (Behnke & Metaferia, 2011). Although Ethiopia is rich in livestock as the same time they are affected by disease this lead to the reduction in crop production, so this factors lead to low GDP (Duguma, 2013). To resist this disease indigenous knowledgeable person practice by trial and error to cure the diseased livestock, this leads to ethnoveternary practice. The availability of modern health care system is less in the rural are. This results in the dependence of the people on the traditional medicinal plant to treat their livestock. In Ethiopia until 1908 in which modern medicine started, ethnoveterinary practice were the dominant one (Yirga *et al.*,2012).

Aloe vera is one of the plants that is most commonly used in Ethiopia for ethnoveterinary purposes, according to Giday *et al.*,(2009), reflecting the plant's widespread use among traditional healers. One of the often utilized plants in Ethiopian ethnoveterinary medicine is aloevera. Cattle with a range of ailments, including skin infections and digestive problems, are treated with aloe vera gel derived from the leaves (Giday *et al.*,2009). In Ethiopia, people often use bitter leaf, also known as Vernonia amygdalina, to treat sick animals. It's like a natural remedy for stuff like worms, coughs, and fevers in livestock. (Balick, 2020)

2.6. Significant Threats to Medicinal Plants

The harvesting of medicinal plant species is greater as there is evidence that extinction of such plants species is obvious. Disturbance and over exploitation by human activities are the major causes of global reduction of plant diversity and an average of one out of species of vascular plants known are rare or are under sever threat (WHO, 2003). Over exploitation may lead to scarcity and incase of medicinal plants this means more time will be needed to collect parts of plants required by traditional healers. (Turner, 2020) observed that with increased scarcity, commercial trade develops and price rise and this means more exploitation will occur. Another threat to medicinal plants is a result of demand of botanicals locally and/or at international level which results in over exploitation and lack of regeneration programs.

90% of plant materials used as medicinal plants is collected from the wild with concurrent regeneration activities, driving many medical plant species to extinction or severe genetic loss (WHO, 2002). People use many wild species of plants for food, medicines, clothing, shelter, fuel, fiber, income generation and the fulfilling of cultural and spiritual needs throughout the world (Tamene, 2020). Recent evidence from Ethiopia as well as other countries indicates that the existences of these indigenous resources are threatened. The most serious proximate threats generally are habitat loss, habitat degradation and over harvesting (Khan *et al.*,2012).

A major threat to Ethiopia's population of medicinal plants is habitat destruction brought on by deforestation, urbanization, and agricultural expansion, according to (Teklehaymanot, 2007). He says that the loss of this ecosystem is what leads to the decline in the quantity of medicinal plants and the loss of biodiversity, which is vital to their survival. According to Teklehaymanot (2009),

overharvesting medicinal plants for trade, traditional medicine, and other uses poses a serious threat to their continued existence in Ethiopia.

A study conducted in Ethiopia found that over use of medicinal herbs has led to the extinction of certain species and the near extinction of others in some areas. In order to preserve Ethiopia's priceless medicinal plants for future generations, the study emphasizes the urgent need for conservation initiatives and sustainable management techniques (Regassa, 2013). To record, analyze, and share information on the interaction between medicinal plants and human society, ethnobotanical studies are therefore helpful.

2.7. Conservation of Medicinal Plants

Conservation is defined as the sustainable use of biological resources. In a broad sense, conservation is achieved through in-situ and ex-situ means. The concept of sustainability is now seen as the guiding principle for economic and social development, particularly with reference to biological resources (Cunningham, 2014).

As mentioned on the above there are two main types of conservation methods that have been under taken around the world aimed at protecting threatened medicinal plant species from further destruction (Cunningham, 2014). These are: in-situ conservation is conservation of species on their natural habitats like natural reserves, parks, home gardens etc. Some traditional medicinal plants have to be conserved in situ due to difficulty for domestication and management (Cunningham, 2014). Moreover, some plants fail to produce the desired amount and quantity of the active principles under cultivation out of their natural habitats and ex-situ conservation of species out of their natural environments like field gene bank, seed bank and botanical garden conservation. Another way to preserve medicinal plants is to guarantee and promote their traditional growth in designated areas (Wondimu *et al.*,2007). This may occur in graveyards, churches, mosques, terrified grooves, farm margins, riverbanks, roadside vegetation, and live fences around fields and gardens. In order to conserve useful plants (including medicinal plants) which are threatened due to natural or manmade factors in Ethiopia, in-situ and ex-situ conservation strategies should be complimentarily implemented (Wondimu *et al.*,2007).

It is essential to conserve medicinal plants in order to preserve biodiversity and guarantee their continued use in medicine and other fields. It is necessary to take action to protect these plants because they are threatened by overharvesting, habitat degradation, and climate change. We can ensure the survival of medicinal plants for future generations by putting initiatives into place including creating protected areas, encouraging sustainable harvesting methods, and increasing public knowledge of their significance (Kala & Sajwan, 2007). The value of these natural resources is highlighted by the preservation of medicinal plants, which not only helps to create new medications and treatments but also preserves traditional knowledge.

Due to overuse and destructive harvesting (collecting roots and bark), medicinal plants are thought to be at risk for extinction. So, in gene banks and botanical gardens, therapeutic plants can be preserved by applying the proper conservation techniques. This type of medicinal plant conservation is also possible in home gardens because of their advantageous location and superior farming technique for the growth, enhancement, and preservation of medicinal plants (Kala & Sajwan, 2007). This can be achieved by employing strategies such as community-based resource management, enforcing strict regulations against wild harvesting, and promoting the growth of therapeutic plants (Cotton, 1996).

3. Materials and Methods

3.1. Description of the Study Area

3.1.1. Geographical Location of the Study Area

Woliso District, in the South west Shoa Administrative Zone of Ethiopia's Oromia Regional state, served as the study's location. This location is located around 114 kilometers south west of Addis Ababa, the capital city of Ethiopia. Several districts encircle Woliso: Becho to the northeast, Goro to the south, Amaya to the west, Wenchi to the northwest, Dawo to the north, and Saden Soddo to the east. Woliso Town, the administrative center, Dilala, Qorke, and Gerbo are a few of the significant towns in the Woliso District.

The area is well known for its varied farming practices, which include raising crops and cattle. Furthermore, Woliso's remarkable natural features have made it a well-known tourist destination in Ethiopia. These include a volcanic peak with naturally occurring hot spring (Tekalign, 2015). Woliso's unique combination of natural beauty and agricultural wealth makes it more appealing to tourists as well as farming enthusiasts. The way these components are put together has a big impact on the local economy and culture (Tekalign, 2015).

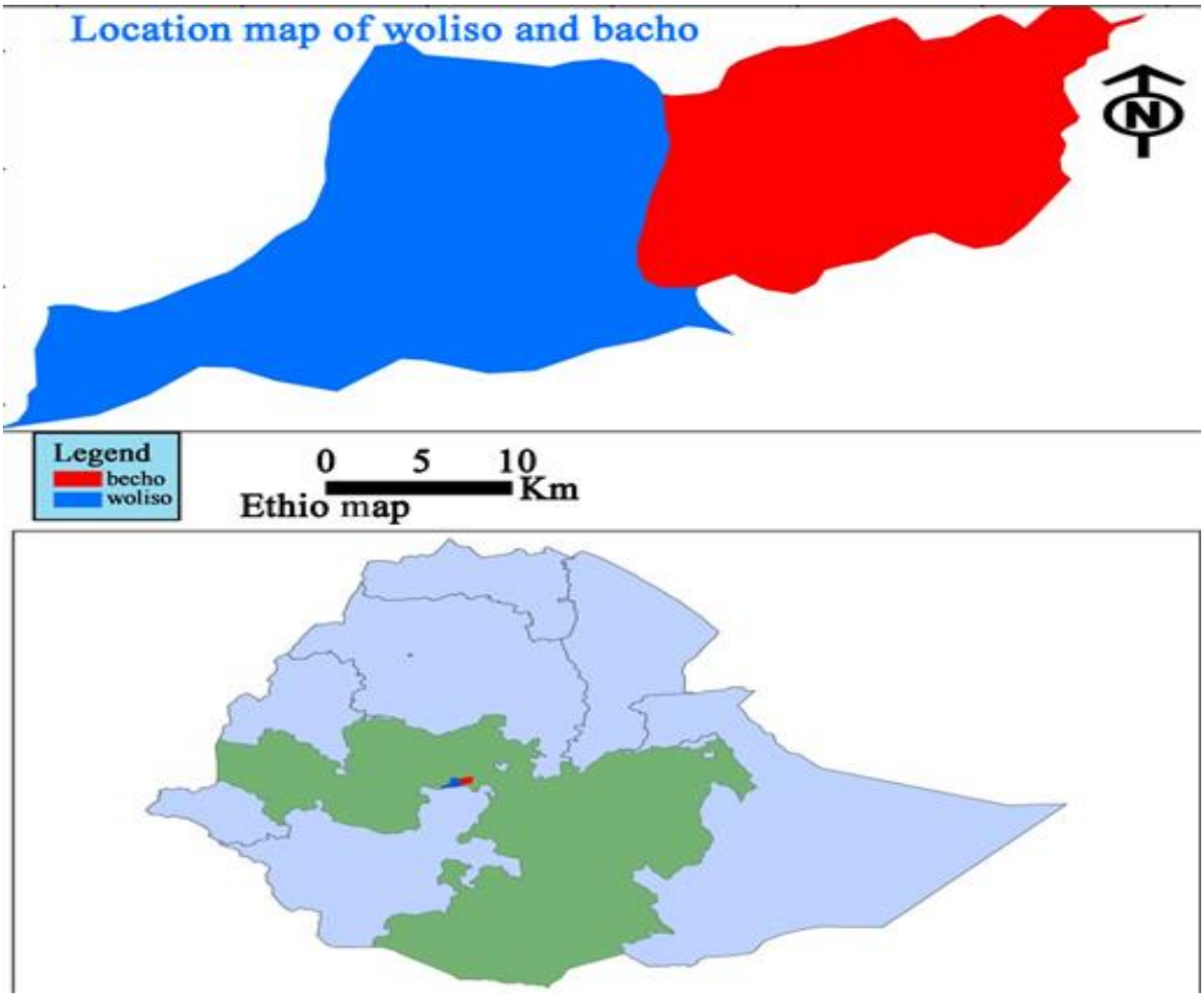

Fig.1: A map of Woliso District. (Source: A geographic information system (GIS)).

3.1.2. Population Structure

There are 38 kebeles in the Woliso District, of which 3 are found in Woliso town. This District had a total population of 238,000 according to the 2007 national census, of which 119,328 were men and 118,672 were women. Of these, 1.8% of the total lived in urban areas. While 22.31% of the population identified as Muslim and 9.42% as Protestant, the bulk of the people are practice Ethiopian Orthodox Christianity, with 67.05% of the total adhere to this belief. The approximate area of the Woliso District is 1,115.01 square kilometers. This District has a population density of roughly 235.6 persons per square kilometer. This density is greater than the Zone average,

suggesting that the area is significantly populous in relation to the surrounding areas. (Doutreloup *et al.*,2022).

According to the 1994 national census reports the five largest ethnic groups reported in Woliso were the Oromo (77.51%), Sebat Bet Gurage (12.63%), the Amhara (3.75%), the Silte (3.71%), and the Soddo Gurage (0.99%); all other ethnic groups made up 0.41% of the population. Orom0 language was spoken as a first language by 76.12%, 10% spoke Sebat Bet Gurage, 9.22% spoke Amharic, 2.97% spoke Silte, and 0.79% spoke Soddo; the remaining 0.9% spoke all other primary languages reported (Ababa, 2011).

3.1.3. Topography and Climate

Woliso is situated in the midland, or "woina dega," a subtropical agro ecological zone, at an altitude of approximately 2,063 meters above sea level. The landscape, which consists of rolling hills and valleys typical of the Ethiopian highlands, supports a diverse range of vegetation and microclimates. This comprises croplands that are dotted with shrub lands and natural woods (Doutreloup *et al.*,2022).

Woliso has a diverse climate with well-defined rainy and dry seasons. The pleasant wet season, which lasts from June to September, peaks in July with an average rainfall of roughly 312 mm. On the other hand, the dry season, which lasts from October to May, is usually warmer, partially cloudy, and has much less precipitation (Tekalign, 2015).

Woliso's yearly average temperature ranges from roughly 13.6°C to 25°C, with a mean of roughly 19.3°C. Generally speaking, February and March are the hottest months, and June through August is the coolest. The rainy season receives the majority of the average annual rainfall of 761 mm, while the months of October through April get significantly less rainfall. This can have an impact on agricultural production, as rainfed agriculture is essential to the local economy (Doutreloup *et al.*,2022).

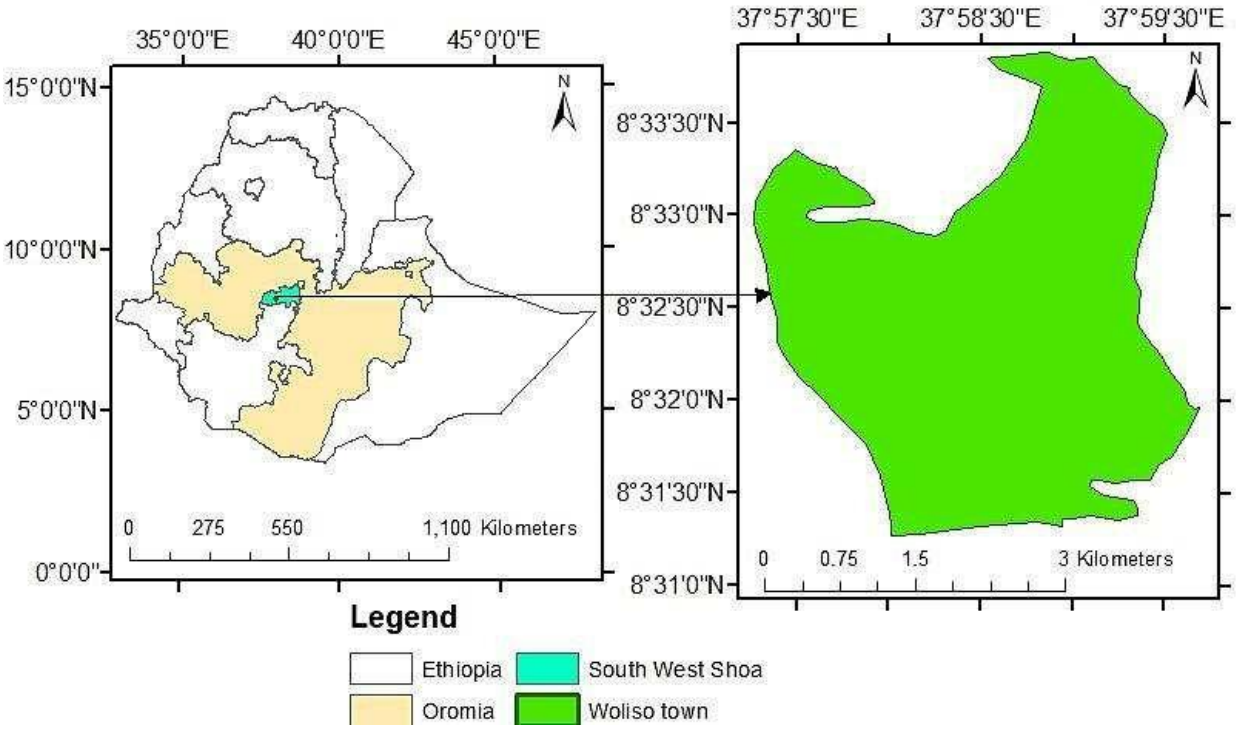

Fig.2: A Map showing picture of Woliso's Topography and Climate. (Source: A geographic information system (GIS)).

3.1.4. Medical Services

Acute upper respiratory infections and acute febrile diseases are among the most prevalent health problems in humans, as indicated by WDHO (2015), which lists these conditions in the top 10 disorders (see Table 1).

Table 1: Top Ten Human Diseases in Woliso District

Type of disease	No of people affected	Percentage
Acute upper respiratory infection	15538	23.87
Acute febrile illness	8082	12.42
Dyspepsia	7557	11.61
Other or unspecified infectious and parasitic diseases	5603	8.61
Other or unspecified diseases of the eye and adnexa	5289	8.12
Pneumonia	4908	7.54
Urinary tract infection	4850	7.45
Dental and gum diseases	4564	7.01
Typhoid fever	4435	6.81
Disease of musculoskeletal system and connective tissue	4272	6.56
Total	65098	100

3.1.5. Land Use and Agricultural System

The District covers a vast area of 111,501 hectares, according to data from the Woliso District Agricultural Development Office (WDADO, in 2015). The District's reliance on farming for both economic and subsistence reasons is highlighted by the fact that agriculture is the primary land use. The area is used for roads, buildings, and water features in addition to agricultural land, suggesting a combination of infrastructure and rural development. Additionally, the area has a variety of geographic factors that affect agricultural methods and land management plans in addition to adding to its ecological diversity (Deksiso & Gebru, 2022). The District's need for efficient planning and resource management is highlighted by this combination of land uses.

Table 1: Land Use Patterns of Woliso District

Land use	Area(ha)	Percentage
Agricultural land	2363	38.36
Residence, road and water bodies	1995	32.40
Grazing land	815	13.23
Forest area	624	10.12
Irrigation area	363	5.89
Total	6160	100

Source: (WDADO, 2015)

3.2. Reconnaissance Survey and Selection of Study Sites

There are numerous communities and 38 kebeles in the Woliso District. In order to find potential kebels, a reconnaissance study was conducted in the first place. This survey looked at various aspects, including altitudinal diversity across kebeles, the availability of traditional healers, and previous medical usage. Three kebeles, namely Abado Lemen, Bedesa Koricha, and Fodu Gora, were intentionally selected based on this information. 100 people above the age of 20 were chosen to participate in the ethnobotanical data collecting. After stratifying the 62 respondents into male and female respondents, 62 of them were chosen at random in a 1:1 sex ratio, while 38 of them were traditional medicine practitioners who were specifically chosen as key informants. Selecting informants was done in accordance with Martin (1995).

Table 2: Total Number of Informants in the Study Area in Each Kebele

No.	Name of Kebele	Traditional Healers			Non-Traditional Healers			Total Informants		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
1	Abado lemen	10	3	13	10	10	20	20	13	33
2	Bedesa koricha	12	1	13	11	11	22	23	12	35
3	Fodu gora	11	1	12	10	10	20	21	11	32
	Total	33	5	38	31	31	62	64	36	100

3.3. Data Collection Technique

The gathering of ethnobotanical data was take place between Januwary 1 and April 30, 2023. Three kebeles in the District were purposefully chosen for the purpose of collecting ethnobotanical data based on their history of traditional medicinal usage, and respondents were chosen from the specified kebeles. Out of a total of 100 participants, which included general informants and traditional healers, traditional healers served as key informants for this study. While other respondents were selected at random, key informants were chosen based on specific criteria derived from the data collected from the local population. The data collection methods included semi-structured interviews, group discussions, and field observations, which involved interviewing key informants and making direct observations in the field.

First, key informants were individually questioned about the local names of the medicinal plants, how they are used to treat illnesses, the illnesses they are used to treat, the part(s) of the plants that are used, how they are prepared, how much to use, indigenous knowledge about them, the threats to the plants, and other information were gathered. They were invited to participate in additional group talks and field walks for on-site plant observation. A similar approach was also be used on a sample of randomly chosen general informants. Collection, pressing, and drying of voucher specimens were done in order to identify them. Keys and images were being used for

preliminary field identification of certain species. Additional identification of every species was being done through comparison with real specimens, images, and taxonomic keys from the Flora of Ethiopia and Eritrea with the help of Dr. Getachew Adino, lecturer at Debre Tabor University department of medicine.

3.3.1 Semi-Structured Interviews

We carefully prepared and conducted semi-structured interviews in accordance with the methodologies outlined by Martin (1995) and Cotton (1996). Prior to the interviews, we created a comprehensive list of topics and issues to cover during the semi-structured format. This allowed us to ensure consistency across interviews while still providing flexibility to explore new and additional suggestions that arose organically during the interview process. The semi-structured approach facilitated a conversational flow that encouraged participants to share valuable insights and perspectives relevant to the data collection objectives. Careful preparation and execution of the semi-structured interviews was critical to gathering high-quality data for the study (Appendix 4).

Fig.3: Photos Showing Semi-Structured Interviews in Some Study Sites

3.3.2 Direct Field Observations

In the ethnobotanical study of medicinal plants in Woliso District, direct field observations were conducted to gather data on the use and collection of medicinal plants by local communities. Observations included noting the specific plants used, their parts used, and the methods of preparation. Researchers also recorded the traditional knowledge and practices of the local healers, including their methods of diagnosis and treatment. This method allowed for the collection of contextual data, including the social and cultural aspects of plant use, which would not be captured through interviews or surveys alone. The observations were documented using field notes and photographs to ensure accuracy and detail.

Fig.4: Photos Showing Direct Field Observations in Some Study Sites

3.3.3 Group Discussion

Locals were selected for focus group discussions during their gathering at the town market. The Woliso District's utilization of medicinal plants and their importance were the main topics of discussion in the group. Aiming to record traditional knowledge about medicinal plants, their applications, and conservation tactics, the debate included members of the local community, including farmers, traditional healers, and interested citizens. Twelve people made up the group, seven of them were traditional healers and five of them were other community members. Based

on their familiarity with regional medicinal plants and their traditional medical practices, the participants were chosen.

3.3.4 Ethical clearance

In order to guarantee that the study was carried out ethically, the researcher secured the required clearances from pertinent authorities. Throughout the research procedure, all participants gave their informed consent, and their identities and confidentiality were strictly maintained. A comprehensive assessment was carried out to recognize and address any possible hazards or unfavorable consequences for the participants. In addition, the researcher followed all legal and ethical criteria for data collection, processing, and reporting. Because of this dedication to ethical principles, the study was carried out sensibly and with the highest regard for the rights and welfare of the participants.

3.3.5 Data Quality Assurance

A number of steps were taken to guarantee the accuracy of the data gathered. These included frequent supervision and monitoring of data collection operations and thorough training on protocols and methodologies for data collectors. Furthermore, data validation procedures were performed in order to identify and correct any errors or inconsistencies in the data. In addition, quality control and data cleaning methods were used to guarantee the dependability and correctness of the information gathered.

3.4. Data Analysis

In this study, both quantitative and qualitative data analysis methodologies were used. The ethnobotanical data was summarized and the demographic features of the informants were analysed using descriptive statistics like frequencies and percentages.

3.4.1 Jaccard's Similarity Index

To examine the similarity of medicinal plant knowledge between kebeles at various altitudes, Jaccard's similarity index was determined. For this, data sets consisting of the presence of a certain plant species and its usefulness as medicine, or its absence/not being thought of as a medication, are employed.

$$JI = \frac{c}{a + b + c}$$

Where JI stands for the Jaccard similarity index, "c" denotes the number of species shared by the research sites, "a" is the number of species present exclusively in study site A, and "b" denotes the number of species present exclusively in study site B. The JI scores range from 0 to 1, with 1 signifying full resemblance and 0 indicating no overlap.

3.4.2 Independent Sample t-Test and Analysis of Variance (one-way ANOVA)

Gender, age group and educational level were analyzed using analysis of variance (one way-ANOVA) by using the number of medicinal plants reported as a dependent variable and gender, age group, and education level as independent variables. Differences in traditional medicinal knowledge due to gender were analyzed using an independent t-test.

3.4.3 Multiple Regression Analysis

Multiple regression analysis was used to identify the demographic variables that influence traditional knowledge. Age, gender and level of education were all be used as independent variables in this study, while the number of plants known were the dependent variable. SPSS version 20 was used for the statistical testing.

3.4.4 Informant Consensus Factor (ICF)

Informant consensus factor (ICF) employing the formula employed by Rodrigo *et al.,(*2005) and Teklehaymanot (2007), was determined for groups of diseases to determine the informants' agreement on plant use as traditional remedies. Following are the steps for calculating ICF: divided by the sum of the number of usage citations for each disease (nur) minus the number of species utilized (nt) for that disease.

$$ICF = \frac{nur - nt}{nur - 1}$$

3.4.5 Fidelity Level (FL)

Fidelity level: The following equation was also be used to compute the fidelity level (FL), or the proportion of informants who claim to have used a certain plant for the same primary purpose, for the most commonly reported diseases or disorders (Teklehaymanot,2007).

$$\boldsymbol{FL}(\%) = \frac{\boldsymbol{NP}}{\boldsymbol{N}} \times \mathbf{100}$$

Where N is the total number of informants who use the plants as medicine to treat any given ailment, and Np is the total number of informants who claim to have used a specific plant species to treat a specific condition.

3.4.6 Preference Ranking (PR)

Preference ranking was undertaken in accordance with Martin (1995) and Cotton (1996) for the most significant medicinal plants used in treating a given sickness in order to compare the most effective medicinal plants used by the community to treat the specific ailment.

The best chosen medicinal plant species for treating the condition was determined by polling ten informants. Each informant was given the listed medicinal plants that have been claimed to treat the illness, along with paper tags on the leaves of the plants that were used. They will then be asked to rank the remaining plants in order of preference, giving the highest value to the species they believe was best treat the illness and the lowest value to the least effective.

Each species' value was added together, and the rank for each species was established using the overall score. This aids in displaying the hierarchy of the most efficient medicinal plants that the locals utilize to cure the illness.

3.4.7 Direct Matrix Ranking (DMR)

Following Martin (1995) and Cotton (1996), a direct matrix ranking exercise was conducted to compare the multipurpose use of a specific species and to relate this to the level of its utilization vs its dominance. Out of all the medicinal plants, multipurpose plant species were chosen based on the information gathered from informants, and use diversities of these plants were documented for a key informant who was award use value to each species. The key informants

were then be asked to rate their use (5 being best, 4 being very good, 3 being good, 2 being less used, 1 being least used, and 0 being not used). As a consequence, we ranked the results for the selected multifunctional medicinal plant species by taking the average value of each use diversity for a species, adding the values of each species.

4. Results and Discussion

4.1. Demographic Characteristics of Respondents in the Study Area

Of 100 informants four different age groups were randomly selected from the study area: 20 to 40 years, 41 to 60 years, 61 to 80 years, and 81 years and older. With 52 informants, the age range between 41 and 60 showed the highest representation among these age groups. Nearly behind, 26 informants belonged to the 61–80 age categories, suggesting a sizable proportion of participants in the middle to older age ranges. This distribution offers insightful information on the informants' demographics, which may have an impact on the study's conclusions.

The number of female informants was clearly lower than the number of male informants (64), indicating that women were underrepresented in the sample. To address this discrepancy and ensure a 1:1 sex ratio, non-healer informants were selected through a random selection process, as explained in the methods part of the study. Of the 38 traditional healers in the research area, only five were female, indicating a significant gender gap in this field. This gap raises important questions about the accessibility and inclusion of healthcare practices within the community.

The social structure of the community is reflected in the marital status of 69 of the informants, which may have an impact on their health-seeking habits. The fact that 58 informants were illiterate or unable of reading and writing was another alarming discovery, raising serious questions about their educational backgrounds. People's ability to acquire essential health information and engage with health services can be greatly impacted by this lack of literacy. Comprehending the demographic parameters is crucial in order to grasp the context of the study and its potential consequences for health interventions within the region. The relationships between the informants' ages, genders, marital statuses, and educational attainment offer a thorough picture that can guide the development of future healthcare plans and laws that are suited to the needs of the local population.

Table 3: Age, marital and educational status distribution of respondents in the study area

Categories	Demographic characteristics	Sex and number of informants		
		Male	Female	Total
Age group	20-40	13	6	19
	41-60	35	17	52
	61-80	15	11	26
	≥81	1	2	3
	Total	64	36	100
Marital status	Single	14	3	17
	Married	41	28	69
	Divorced	7	2	9
	Windowed/er	2	3	5
	Total	64	36	100
Education Level	Illiterate	27	31	58
	Elementary education	28	3	31
	Secondary education	9	2	11
	Total	64	36	100

4.2. The Study Area's Medicinal Plants

A total of 96 medicinal plant species spanning 85 genera and 42 families were collected, identified, and recorded from the research region (Appendix Table 3). Of these, six plant species (6.25%) were reported to treat only livestock ailments, eight plant species (8.33%) were reported

to cure both human and livestock ailments, and the majority, 82 plant species (85.42%), were reported to treat only human ailments. This outcome demonstrated that the local population possesses extensive knowledge and expertise in utilizing traditional methods to treat human and cattle diseases.

According to the World Health Organization, 90% of the total population in Ethiopia relies on traditional medicine as their primary form of healthcare (WHO, 2002). This heavy reliance on traditional medicine can be attributed to several factors, including its advantages in terms of biomedicine, accessibility, cost-effectiveness, and cultural acceptability. Traditional medicine is deeply rooted in the local culture and is highly accepted across the nation, as highlighted by Tamene (2020). As a result, people frequently turn to traditional medicine as an effective and affordable alternative healthcare option.

The research zone revealed that the Asteraceae family had the highest number of species (10), followed closely by Poaceae (8). Other families with a significant number of species included Fabaceae, Lamiaceae, Rosaceae, and Solanaceae, each with 5 species. Cucurbitaceae, Euphorbiaceae, and Rutaceae had 4 species each, while Apiaceae, Brassicaceae, Polygonaceae, and Verbenaceae had 3 species each. Acanthaceae, Alliaceae, Amaranthaceae, Musaceae, and Urticaceae had 2 species each, and the remaining 24 families had only 1 species each.

The diversity of medicinal plant species across these families highlights the richness of traditional knowledge and the potential for further research and conservation efforts in the region. Understanding the traditional uses and distribution of these plants can contribute to the development of sustainable management strategies and the preservation of valuable ethnobotanical knowledge.

4.2.1 Distribution of Habitats and Forms of Plant Growth

In a comprehensive analysis of therapeutic plants, a total of 54 species of herbs were identified as the most commonly utilized in traditional medicine. Following herbs, shrubs accounted for 26 species, trees contributed 13 species, and climbers represented just 3 species (see Figure 3). This distribution underscores the significant role that herbs play in the medicinal practices observed throughout Ethiopia. Notably, several comparable studies, including those by *Khan et al.*,(2012),

Kidane *et al.*,(2018), Giday *et al.*,(2009), have consistently reported that herbs dominate the landscape of traditional medicinal plant usage in the region.

A closer examination of the sourcing of these medicinal plants reveals that a substantial majority, approximately 51.04%, were harvested from their natural habitats. These habitats include diverse ecosystems such as forests, grazing pastures, riverbanks, and roadside areas. In contrast, 43.75% of the plants were cultivated in home gardens, while 5.21% were found in agricultural fields or as live fences. This data highlights a crucial aspect of medicinal plant sourcing: the majority are not cultivated or regulated by human intervention. Instead, they are subject to various natural and anthropogenic factors that can disrupt their availability.

These findings resonate with earlier studies conducted by Birhanu *et al.*,(2015) and Gebre (2018), which similarly concluded that a larger proportion of medicinal plants utilized by local communities were sourced from wild habitats rather than cultivated gardens. This trend emphasizes the reliance on natural ecosystems for medicinal resources, raising important considerations for conservation and sustainable practices in the management of these valuable plant species.

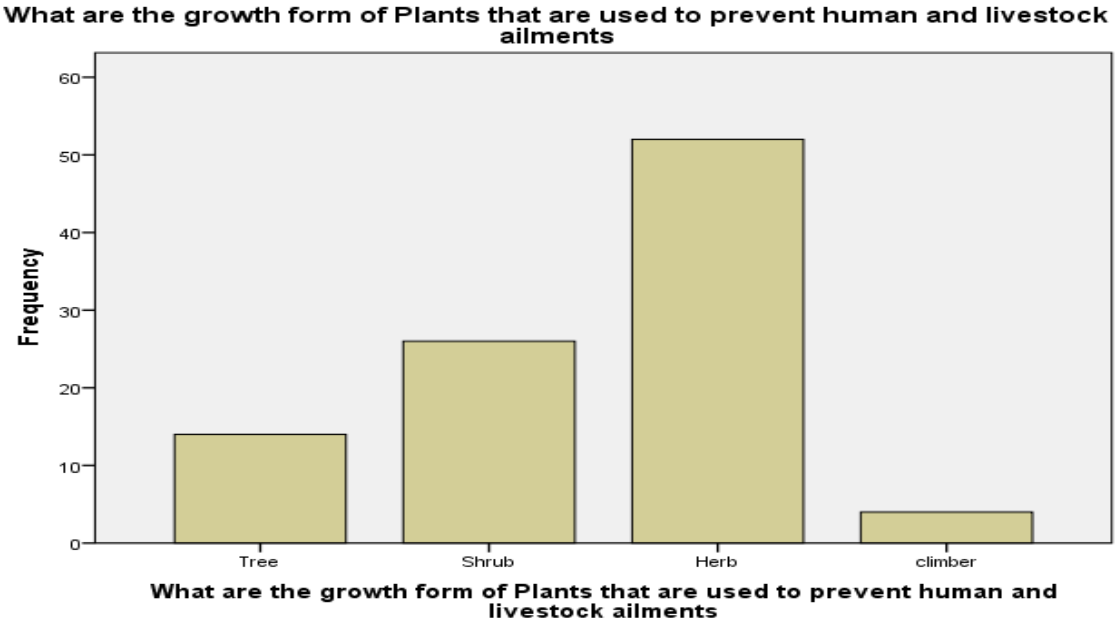

Fig.5: The type of growth and proportion of plant species used to treat human and animal illnesses in Woliso District

4.2.2. Remedy Administration, Preparation and Dosage

In the study area, a significant majority of individuals rely on fresh plant parts, accounting for 61% of the remedies utilized, while 37% of respondents prefer dried plant materials. This preference for fresh plant parts is supported by other research, which indicates that fresh components are often considered to possess greater therapeutic potential compared to their dried counterparts (Gebre, 2018). Among the various plant parts employed in these remedies, leaves emerge as the most frequently used, followed closely by seeds, as illustrated in Table 5. This trend aligns with findings from other studies conducted by Hassan *et al.*,(2021), Birhanu *et al.*,(2015) and Giday *et al.*,(2009) which highlight the prominence of leaves in traditional medicinal practices.

Interestingly, many practitioners create remedies by combining different parts of the same plant or by mixing parts from various plants, showcasing a nuanced understanding of the synergistic effects of these combinations. While harvesting leaves is generally sustainable and does not harm the plants, it is crucial to note that excessive collection of seeds or roots can pose significant risks to plant health and biodiversity. Therefore, a balanced approach to harvesting is essential to ensure the continued availability of these valuable natural resources for future generations.

Traditional medicine practitioners take into account a person's age and gender when figuring out how much of a remedy should be given. However, there is no uniformity between different villages or among different medicine people in terms of the amount of the remedy. Generally, local objects like spoons and cups are used as a measurement. The length and frequency of the treatment is based on how bad the illness is. According to the people who were asked, traditional remedies usually don't have bad side effects. If there is, they use antidotes like dairy products, coffee, and lemon to counteract it.

Table 5: Parts of the Plants Used in Preparation of Remedies in the Studied Area

No.	Parts used for remedies preparation	Number of citations	Percentage
1	Leaf	87	37.99
2	Root	36	15.72
3	Fruit	19	8.30
4	Seed	47	20.52
5	Bark	8	3.49
6	Stem	8	3.49
7	Bulb	11	4.80
8	Flower	1	0.44
9	Latex	10	4.37
10	Rhizome	1	0.44
11	Thorn	1	0.44
Total		229	100

4.2.3 Methods of Treating Illnesses in Local Communities

In local communities, various traditional methods are employed to address both human and animal illnesses, reflecting a rich cultural heritage and deep understanding of local medicinal practices. Among these methods, squeezing emerged as the most popular treatment approach, utilized by 33.54% of respondents. This technique involves applying pressure to specific parts of the body or using natural substances to extract therapeutic properties. Following squeezing, pounding or powdering remedies accounted for 24.05% of treatment methods, where herbs or other natural ingredients are crushed to enhance their medicinal effectiveness. Additionally, crushing was reported by 18.35% of individuals as a preferred method. These findings are

consistent with research conducted by Kefalew *et al.*,(2015) in Ada'a District, East Shoa Zone of Oromia regional state, Ethiopia. The continued use of customary methods emphasizes how important local expertise is to healthcare.

Table 4: Method of preparation of medicinal plants used to treat both human and livestock ailments in the study area.

No.	Method of preparation	Number of citations	Percentage
1	Squeezing	53	33.54
2	Pounding/powdering	38	24.05
3	Crushing	29	18.35
4	Boiling (burning)	25	15.82
5	Powdering	7	4.43
6	Chewing	6	3.80
Total		158	100

4.2.4 Route of Administration of Remedies

The survey results revealed that the respondents favored various methods for administering traditional herbal treatments. Oral ingestion (59.06) in liquid or solid form was the most popular method. Other common techniques included rubbing preparations onto the affected area, applying lotions and ointments topically and tying treatments directly onto the skin (30.41), and utilizing drops or inhalation for problems relating to the eyes, ears, or respiratory system (Fig 6). The choice of treatment method was largely influenced by the location of the ailment, with external skin problems typically receiving topical applications. These findings were consistent with previous studies conducted by Duguma (2013), Yirga *et al*.,(2012) and Giday *et al.*,(2009), which also highlighted the diversity of traditional herbal treatment administration techniques used by local communities.

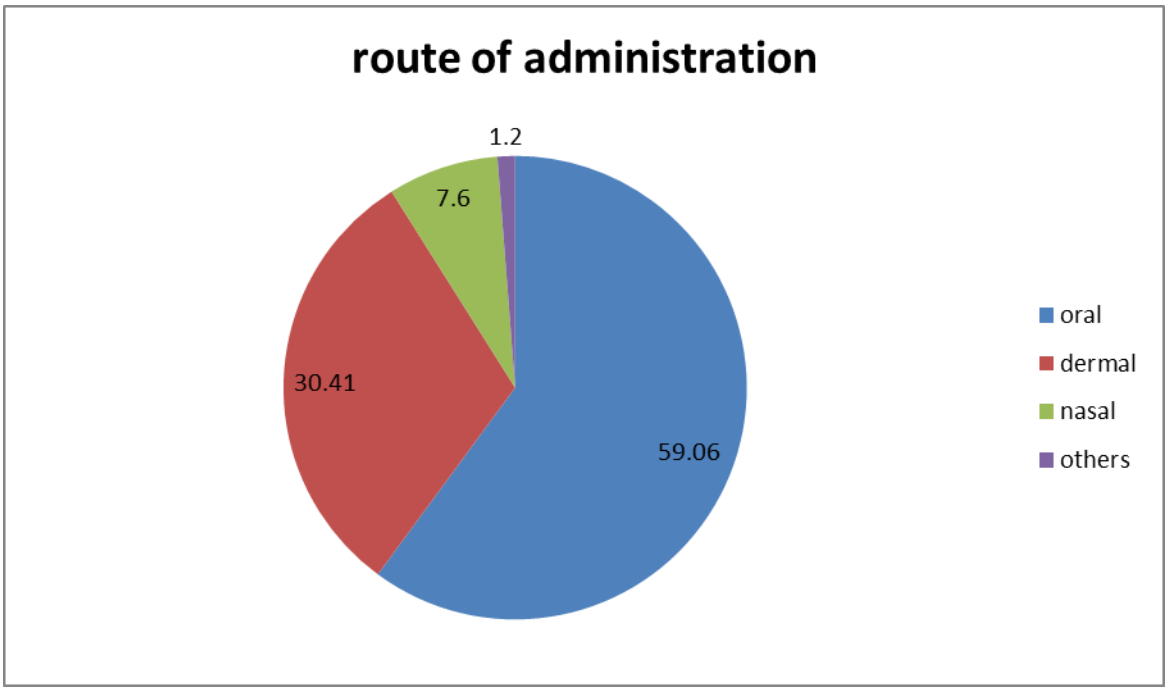

Fig.6: Route of Administration of Remedies in the study area

4.3. Use Knowledge and Importance of Ethnomedicinal Plants

An investigation was conducted to assess Jaccard's similarity index, which was employed to compare the traditional medicinal plant knowledge among three kebeles. The findings indicated that the communities from these kebeles exhibited a notable degree of similarity in their understanding and use of traditional medicine, as illustrated in Table 7. This similarity can be attributed to several factors, primarily the geographical proximity of the three sites and the fact that they are inhabited by the same ethnic group that shares a common cultural heritage. Such cultural cohesion often leads to the preservation and transmission of traditional knowledge across generations.

In particular, the comparison between Abado Lemen and Bedesa Koricha revealed a high similarity index of 0.927, indicating that these two communities have nearly identical knowledge regarding medicinal plants. Meanwhile, the similarity index between Abado Lemen and Fodu Gora was also significant, recorded at 0.802, suggesting that while there are some differences, the traditional knowledge in these areas remains closely aligned.

Additionally, the study utilized multiple regression analysis to identify demographic characteristics that predict traditional knowledge of medicinal plants. The results showed that respondents' reports on the quantity of medicinal plants they utilized were significantly influenced by their sex, age, and level of education, with a statistical significance of $P<0.01$. This highlights the importance of demographic factors in shaping the knowledge and practices related to medicinal plants among the inhabitants, indicating that understanding these variables can enhance efforts to preserve and promote traditional medicinal practices in the region.

Table 5: A Comparison of Traditional Medicinal Plant Knowledge among a Selected Group of Kebeles Using Jaccard's Similarity Index

Kebeles	**Abado lemen**	**Bedesa koricha**	**Fodu gora**
Abado lemen	1.00	0.927	0.802
Bedesa koricha	0.927	1.00	0.792
Fodu gora	0.802	0.792	1.00

4.3.1. Informant Consensus Factor

The study attempted to provide a thorough grasp of the varied health problems that impact people in different demographics by methodically classifying human diseases according to the precise body systems involved. Through this kind of disease organization, the researchers found patterns and trends that might not have been seen with a more broad approach.

The Informant Consensus Factor is computed to determine the degree of homogeneity among informants regarding the plants used to treat each ailment or disease group. The research findings revealed a significantly elevated ICF of ≥ 0.8, signifying vigorous consensus among the subjects regarding the frequency of specific health concerns. In this consensus, several ailments that were often brought up were highlighted, such as respiratory disorders, organ-related issues, bodily edema, and dermatological conditions.

The high degree of agreement between informants highlights the significance of these health issues within the community under study, indicating that they are not only common but also

important topics for concern. These results give medical practitioners insightful information that helps them successfully customize therapies and resources to address these common health conditions.

Table 8: Informant Consensus Factor for Major Human Ailments.

No.	Disease categories	Use citation (Nuc)	№ of species used (Ns)	Informant consensus factor
1	Body swelling disease	79	16	0.808
2	Dermatological and other organs problems	198	40	0.802
3	Respiratory problem	86	18	0.80
4	Abdominal and Gastrointestinal problems	120	36	0.706
5	Headache, Fever and Febrile illness	133	42	0.689
6	Reproductive organ and Genitourinary Problems	25	9	0.667
7	Heredity related diseases	9	6	0.375

4.3.2 Fidelity Level

The fidelity level (FL) is used to determine which plant species are most frequently employed by locals to treat certain diseases. According to Kidane *et al.*,(2018), plant species that successfully treat just one illness would have a 100% fidelity level, whereas those that are used to treat multiple illnesses will have a lower FL. The study found that the FL of the chosen medicinal plants ranged from 75.5 to 100% on average (Table 9). Notably, *Avena sativa*, *Brassica carinata*, *Cymbopogon citratus*, *Dodonea angustifolia*, and *Artemisia abyssinica* had a 100% FL, indicating that these plant species are known to be effective for a single illness. This suggests that the local population relies heavily on these plants for specific health conditions.

Table 9: The Most Often Reported Therapeutic Plants' Fidelity Level Indices

No.	MPs used to treat	Disease treated	N	Np	FL	FL%	Rank
1	*Avena sativa*	Diabetes	5	5	1	100	1
2	*Brassica carinata*	Constipation	9	9	1	100	1
3	*Cymbopogon citratus*	Anthrax	34	34	1	100	1
4	*Dodonea angustifolia*	Wound	25	25	1	100	1
5	*Artemisia abyssinica*	Evil eye	13	13	1	100	1
6	*Leonotis ocymifolia*	Ascarisis	42	43	2	97.7	2
7	*Datura stramonium*	Dandruff	38	39	3	97.4	3
8	*Zehneria scabra*	Sun stroke	33	35	4	94.3	4
9	*Ruta chalepensis*	Common cold	22	24	5	91.7	5
10	*Phytolacca dodecandara*	Rabies	8	9	6	88.9	6
11	*Lepidium sativum*	Amoebic Dysentery	4	5	7	80	7
12	*Croton macrostachyus*	Ring worm	40	53	8	75.5	8

4.3.3. Preference Ranking

Depending on which plants work best for a given ailment, there may occasionally be a preference for a particular species over others. Treatment of wounds, one of the most often reported health problems in humans, demonstrates this inclination in particular. Numerous health issues that affect both humans and animals can be successfully treated by a wide variety of medicinal plant species, according to a study. In particular, it was found that eleven distinct plant species could heal wounds.

Traditional healers, who were chosen at random based on their level of experience, were shown these plants and asked to rank them based on how well they worked on wounds. A scale of 1 to 11 was used in the ranking system, where 11 represented the highest preference. The most popular species for treating wounds, according to the data, was *Dodonaea angustifolia,* closely followed by *Datura stramonium* and *Acanthus polystachius. Cordia africana, Cirsium englerianum, Vicia faba, Ocimum lamiifolium, Coffea arabica, Zehneria scabra,* and *Solanum incanum* were among the other noteworthy species. This methodical ranking emphasizes the value of customary wisdom in choosing therapeutic plants and the part played by indigenous healers in conserving and employing ethnobotanical resources for practical medical remedies.

Table 10: shows the preference ranking of the top eleven MPs based on the level of perceived wound-healing ability as determined by ten randomly selected traditionally trained healers.

No.	Medicinal plants	Key informants											
		R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	Total	Rank
1	*Acanthus polystachius*	4	5	5	5	3	4	4	4	5	5	44	3rd
2	*Cirsium englerianum*	4	5	4	4	3	3	4	5	4	4	40	6th
3	*Dodonea angustifolia*	5	5	5	4	5	5	5	3	5	5	47	1st
4	*Coffee arabica*	5	3	3	4	2	1	1	4	5	3	31	9th
5	*Cordia africana*	5	5	5	3	4	4	4	4	5	4	43	4th
6	*Datura stramonium*	4	5	5	5	4	5	5	3	5	4	45	2nd
7	*Citrus lemon*	4	4	5	3	5	5	4	3	4	5	42	5th
8	*Ocimum lamiifolium*	5	3	2	4	4	1	5	5	3	3	35	8th
9	*Solanum incanum*	4	1	3	3	3	2	1	2	2	5	26	11th
10	*Vicia faba*	3	4	3	3	4	5	5	5	4	2	38	7th
11	*Zehneria scabra*	2	1	4	4	2	2	1	3	4	5	28	10th

Key: R= key respondents

4.3.4 Direct Matrix Ranking

Using a direct matrix ranking method, different medicinal plants were evaluated for their relative importance. On a range of 0 to 5, the key informants assessed how well they used the plants provided. A score of 5 denoted the best use, 4 very good, 3 good, 2 less used, 1 least used, and 0

not used. Based on the rating results, Eucalyptus globules emerged as the most adaptable medicinal plant, taking first place in its diverse uses. *Cordia africana* comes in second place after it, demonstrating its noteworthy medicinal qualities. The following ranks in the matrix contain other species that have been identified as having medicinal value: *Arundo donax, Ficus sur, Croton macrostachyus, Acacia abyssinica*, *Guizotia abyssinica*, *Eragrostis tef*, and *Olea europaea subsp. cuspidata*. Table 11 provides a clear summary of the relative relevance of various herbs in traditional medicine based on this rating. The medical applications of plants are greatly influenced by their distinct qualities, which reflect the wide range of herbal resources that are accessible.

Table 11: Direct Matrix Ranking for Nine Species and Main Use in Study Area

No	Plant species	Use category									
		Medicinal	Food	Forage	Fire wood	Charcoal	Furniture	Construction	Fence	Total	Rank
1	*Acacia abyssinica*	4	0	2	4	5	4	2	5	26	6th
2	*Arundo donax*	3	0	1	3	2	4	5	5	23	9th
3	*Cordia africana*	4	3	2	4	4	5	4	5	31	2nd
4	*Croton macrostachyus*	5	0	2	4	4	4	4	5	28	5th
5	*Eragrostis tef*	3	5	5	2	0	4	5	0	24	8th
6	*Eucalyptus globulus*	4	1	2	5	5	5	5	5	32	1st
7	*Ficus sur*	4	5	3	3	3	3	3	5	29	4th
8	*Guizotia abyssinica*	5	5	5	3	0	2	2	3	25	7th
9	*Oleae uropaea*	5	3	2	3	5	5	4	3	30	3rd
	Total	37	22	20	31	28	36	34	36		
	Rank	1st	6th	7th	4th	5th	2nd	3rd	2nd		

4.4. Acquiring and Sharing Native Knowledge of Medicinal Plants

According to the informants' responses, oral transmission of ethnobotanical knowledge about medicinal plant usage is the norm. It was determined from discussions with informants that the fathers exclusively disclosed information to the male elder family members for private purposes. Sons were occasionally assessed to carefully assume the responsibility based on specific factors. They choose a person to whom indigenous knowledge is to be conveyed based on a variety of factors, including intellectual prowess, loyalty to the family and acceptance by other members of society, as well as faithfulness. Daughters, stay-at-home moms, and family members are also thought of as potential successors. The findings of additional investigations (Regassa, 2013; Teklehaymanot, 2007) support this one. According to this survey, family (10%), trusted sons (20%), and elders (50%), were the most likely ways for indigenous knowledge to be passed on.

Table 12: Way of acquiring and Sharing Native Knowledge of Medicinal Plants

Medicinal Knowledge Transfer	No of informants	%
Indigenous Elders	50	50
Trusted Sons	20	20
Family	10	10
Relatives	12	12
Friedns	8	8

4.5 The Impact of Socio-Demographic Variables on Indigenous Medical Knowledge

To find out if knowledge about medicinal plants differs by gender, age, and educational attainment, statistical analysis was done. The number of medicinal plants reported by the four age groups of informants, which was used as a measure of traditional knowledge about medicinal plants, differed significantly ($P<0.05$) amongst them, according to analysis of variance (one-way ANOVA) (Table 12). The findings showed that as people age, their knowledge of therapeutic plants grows. This suggests that the younger generation lacks the elders' wealth of traditional wisdom. This may be the result of the older people's lifelong experiences interacting with their surroundings and their accumulation of knowledge, as well as the influence that the younger

generations are receiving from. Several researches (Carrubba, 2012; Shaw *et al.*,(2012) and Hassan *et al.*,(2021) reported the same finding. This suggests that within the same community, there are differences in the indigenous knowledge of medicinal plants among individuals of different age groups. Males reported knowing more medicinal plants than females, and traditional medical knowledge also differed considerably ($P<0.05$, independent samples T-test) between genders (Table 13). Similarly, the traditional medical knowledge of the research area was significantly impacted by educational attainment. Informants attested to the fact that educated populations had little interest in practicing traditional medicine. As new generations pay less attention to traditional medicinal plants, modern education and access to modern medication are also contributing to the loss of indigenous knowledge. As a result, it appears that the indigenous knowledge in the studied region is disappearing. Other researchers (Birhanu *et al.*,2015; Gebre, 2018; Cotton, 1996) reported the same outcome.

Table 13: The Respondents' Differences in TMP Knowledge by Sex, Age Group, and Educational Attainment

Sex of the respondents	Mean value	p- value of t- test
Male	**1.13**	**0.001**
Female	**0.67**	
Age of the respondents		**p- value of ANOVA**
20-40	**0.47**	**0.000**
41-60	**0.90**	
61-80	**1.19**	
≥81	**3.00**	
Education level of the Respondents		**p-value of ANOVA**
Illiterate	**1.16**	**0.000**
Elementary education	**0.84**	
Secondary education	**0.27**	

4.6. Threats to Medicinal Plants and their State of Conservation

4.6.1. Threats to the Research Area's Medicinal Plants

According to the informants' comments, there are various anthropogenic elements that have an impact on traditional medicinal plants in the research area. Some significant anthropogenic influences with varied degrees of impact on medicinal plants were mentioned by informants (Table 14). The informants identified agricultural expansion as the main concern, which was followed by the production of firewood and charcoal, excessive medicinal harvesting, urbanization, excessive domestic animal grazing, and construction (Table 14). This finding is consistent with some earlier research done (Warren, 1991; Kebebew, 2017 and Geta *et al.*,2020).

Table 14: List of the Main Human-Caused Reasons that are endangering the Study Area's Medicinal Plant Species

No.	Threating factors	Citation of informants		Rank
		In number	In percent	
1	Over harvesting of medicinal value	70	19.28	3
2	Agricultural expansion	85	23.42	1
3	Urbanization	63	17.36	4
4	Construction	24	6.61	6
5	Need for fuel (fire wood and charcoal)	72	19.83	2
6	Overgrazing by domestic animals	49	13.50	5
Total		363	100	

4.6.2. Status of Medicinal Plant Management and Conservation in the Research Region

There are hardly any management and conservation efforts taking place in the study region. Some locals practiced ex-situ conservation, which involves collecting rare medicinal plant species from the wild and planting them in gardens or farmland. Around their homes and crop field margins, some farmers also plant several medicinal plant species like Eucalyptus trees, *Rosa abyssinica, Rubus apetalus,* etc. for various objectives such as wind break and other protective duties.

According to the informants' responses, the majority of the locals refrain from taking part in the conservation of medicinal plants for a variety of reasons. The majority of the local population lacks motivation, awareness, or awareness of the need to participate in the conservation of indigenous medicinal plants. They also lack knowledge about how to properly manage, conserve, and use medicinal plants, which is the first reason they don't participate in conservation activities. The second factor is a lack of botanical gardens. Some well-known traditional healers advocate for the preservation of medicinal plant species because their extinction threatens their ability to provide remedies and unusual abundance.

The traditional healers have their own specific time and place to collect or harvest, dried and preserved the types of medicinal plants. They preserved or store in the form of powder and dried parts were stored roof corners or outside house, in different containers like pots, bottles or tied with clothes and used when needed. They collected once a year and harvested the leaf, seed, fruit, root and other part of the plant.

5. Conclusions and Recommendations

5.1. Conclusions

The findings of the ongoing ethnobotanical study of medicinal plants in the study region, in conclusion, demonstrated that the local population had a sizable amount of indigenous knowledge about traditional medicine in their area. Indigenous people in the study area have their own traditional methods for treating human and animal health issues based on their culture, customs, and ethical standards. As this study showed, traditional healers, men, illiterate people, and older groups possessed the majority of the knowledge of traditional medicine, which needs to be strengthened by everyone.

This ethnobotanical study identified 96 species of medicinal plants, representing 42 families and 85 genera that are used to cure a variety of illnesses. The Asteraceae family was the most dominating family. The illnesses that are treated most frequently are infections in general, respiratory disorders, bodily edema and dermatological conditions. Leaves and seeds were the components of plants that were used the most. Threats to medicinal plants include habitat loss, overexploitation, and lack of cultivation in the research area.

Studying how different cultures use plants for medicine can teach us a lot about traditional healing methods. It's important to hold onto this knowledge and it could even help us find new medicines. By connecting old-school healing with modern science, we could improve healthcare and come up with better treatments for different illnesses.

By studying how plants are used for medicine, scientists can discover new treatments and learn more about the connection between people and nature. Plus, this research helps protect plants that are in danger of disappearing because of overharvesting or habitat loss. By understanding the cultural and ecological importance of these plants, researchers can work on ways to keep them around for future generations. Ultimately, studying medicinal plants gives us a better understanding of different cultures and how we can use natural resources to improve health worldwide.

5.2. Recommendations

The study's findings have led to the following suggestions being made.

- Traditional healers and the local population should collect the plant's regenerative sections rather than the root portion in order to sustainably employ therapeutic herbs. However, before harvesting a root if its use is required, the user should attempt to establish two or more plants;
- Raise locals' awareness of medicinal plant management and conservation practices;
- The local population should be encouraged to take part in initiatives aimed at managing and conserving medicinal plants by the district health office and health professionals;
- The stakeholders should instruct traditional healers on the most effective ways to gather, record, use, store, and conserve medicinal herbs;
- The government must respect traditional healers and their intellectual property rights, as well as adhere to the guidelines for cooperative work.

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7. Appendices

Appendix 1: Final Results of Multiple Regression Analysis

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients		Sig.
Uu	B	Std. Error	Beta		
1 (Constant) Sex	1.583	.199		7.955	.000
	-.458	.138	-.318	-3.321	.001

a. Dependent Variable: Number of medicinal plants known

Model Summary

Model 1	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.318[a]	.101	.092	.662

a. Predictors: (Constant), Sex

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
1	B	Std. Error	Beta	-.557	.579
(Constant)	-.100	.179		6.269	.000
Age	.498	.079	.535		

a. Dependent Variable: number of medicinal plants known

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.535[a]	.286	.279	.590

a. Predictors: (Constant), age

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.576	.157		10.047	.000
1 Education level	-.402	.094	-.399	-4.302	.000

a. Dependent Variable: Number of medicinal plants known

Model Summary

Model 1	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.399[a]	.159	.150	.641

a. Predictors: (Constant), Education level

Appendix 2: Diseases Affecting People and Animals in the Study Area

No.	English name	Local Name (Amharic/Oromo)	Number of citations of the disease by respondent	affecting humans or cattle?
1	Abdominal pain	Garaa ciniinnaa	61	Human
2	Acne	Shifitaa	44	Human
3	Alopecia areata	Molaauu	23	Human
4	Amoebic Dysentery	Anbeebaa	79	Human
5	Anemia	Hir'ina Dhiigaa	10	Human
6	Anthrax	Abbaa sangaa	68	Both
7	Ascariasis	Maagaa	72	Both
8	Asthma	Aasmii	16	Human
9	Athlete's foot	Hoichoo	12	Human
10	Baldness	Moluu	37	Human
11	Bedevil	Maraatuu	11	Human
12	Bloating	Garaa bokoku	25	Both
13	Bronchitis	Madaa qoonqoo	36	Human
14	Cancer	Nekersa	21	Human
15	Circumcision	Dhaqna qabaa	9	Human
16	Common cold	Qufaa	90	Human
17	Conjunctivitis	Dhukubbi Ijaa	62	Human
18	Constipation	Gogiinsa garaa	71	Human
19	Coughing	Qufa'uu	60	Human
20	Dandruff	Foroforii	81	Human
21	Diabetes	Dhibee Sukkaraa	28	Human
22	Diarrhea	Garaa kaasaa	83	Both
23	Dysentery	Kaasaa Dhiigaa	33	Human
24	Dyspepsia	Rakkoo garachaa	47	Human

25	Dysuria	Ittansiisaa	6	Human
26	Eczema	Cittoo	21	Human
27	Evil eye	Budaa	59	Human
28	Febrile illness	Dhaqna gubaa	18	Human
29	Fowl pest	Dukuba lukku	79	Cattle
30	Gastritis	Dukuba garachaa	30	Human
31	Halitosis	Afaan aja'uu	46	Human
32	Headache	Bowwoo	55	Human
33	Hemorrhoids	Kintaarot	43	Human
34	Hypertension	Dhiiba Dhiigaa	14	Human
35	Intestinal parasite	Rammo Garaa	31	Human
36	Irritating eye	Dhukuba ijaa	20	Human
37	Itch	Hooksisuu	9	Human
38	Jigger	Muujalee	7	Human
39	Leg swelling	Dhita'u mila	33	Human
40	Lose of appetite	Fedhi Gnata Dhabu	47	Human
41	Malaria	Urguftuu	11	Human
42	Mumps	Dhibe hilkani	5	Human
43	Microbial disease	Dhibe Daddarbo	13	Both
44	Nasal bleeding	Funuuna	35	Human
45	Outer ear lesion	Dhibe gura	15	Human
46	Pneumonia	Dhibe Somba	12	Human
47	Rabies	Dhibe Sare	32	Both
48	Retained placenta	Hafuu Diluu	28	Both
49	Rinder pest	Golfaa	82	Cattle
50	Ring worm	Hooqxoo	68	Human
51	Scabies	Shiffee	23	Human
52	Sexual impotency	Salqonamtiif Fedhi Dhabuu	10	Human

53	Snake bite	Bofaan Hidamu	6	Both
54	Stomachache	Ciniinna	49	Human
55	Sunstrock	Gubinsa Aduu	61	Human
56	Swelling	Dhita’a	26	Human
57	Syphilis	Kitinyii	18	Human
58	Tape worm	Koosoo	53	Both
59	Toothache	Dhukuba Ilkaanii	37	Human
60	Trachoma	Tiraakoomaa	42	Human
61	Tuberculosis	Cawwee	8	Human
62	Typhoid	Tasiboo	35	Human
63	Urine retention	Fincaan Diduu	15	Human
64	Uvula illness	Huuba Qoonqoo	28	Human
65	Vomiting	Hooqisuu	12	Human
66	Whit low	Madaa Qubaa	39	Human
67	Wound	Madaa	92	Both

Appendix 3: A List of Medicinal Plants in the Study Area that are Used to Treat Human and Livestock Ailments

No	Scientific Name	Family Name	Local Name	Growth Pattern	Source	Disease Treated	Parts utilized and method of preparation	Administration route
1	*Vachellia abyssinica*	Fabaceae	Girar/ Laaftoo	Tree	Wild	Evil eye	The fresh root of Acacia abyssinica, Clausena anisata, Justicia schimperiana, and the bulb of Allium sativum and grain of Ruta chalepensis are pounded together and insert into nose.	Nasal
2	*Acacia tortilis*	Fabaceae	Cheba/ xaddacha	Tree	Wild	snake bite	The Acacia tortilis fresh root portion is offered for chewing.	Oral
3	*Acanthus polystachius*	Acanthaceae	Kosheshila	Herb	Wild	Wound	Acanthus polystachius, Dodonea angustifolia, and Cordia africana's dried leaf parts are burned, pulverized, combined with honey, applied, and finally exposed to sunlight.	Dermal
4	*Achyranthes aspera*	Amaranthaceae	Xelenji	Herb	Wild	nose bleed	Achyranthes aspera fresh leaf is squeezed and put to the nostril.	Nasal
5	*Allium cepa*	Alliaceae	Key shenkurt/shinkurti diima	Herb	Cultivated	Anemia	Allium cepa's young row bulb is consumed.	Oral
						Sexual impotency	Allium cepa's young row bulb is consumed after being sliced up and combined with honey.	oral

6	*Allium sativum*	Alliaceae	Nech shenkurt/shinkurti adii	Herb	Cultivated	Hypertension	Allium sativum bulb was made as "watt" and consumed after being crushed.	Oral
						Malaria	Allium sativum, Brassica nigra, and Lepidium sativum were ground up, dried, and combined with cheese to make "metatayib," which was eaten with "injera."	Oral
						Cough	Allium sativum bulb is crushed, mixed with water, and left for four days before being consumed with honey.	Oral
7	*Aloe percrassa*	Aloaceae	Eret/argiisa	Herb	Wild	Dandruff	The afflicted head area of the body is covered with latex.	Dermal
						Retained Placenta	Cattle are given Aloe percrassa fluid, crushed Linum usitatissimum grain, and Rumex nepalensis bark that squeezed with water.	Oral
						Eczema	On the injured body part, lippia adoensis juice and aloe percrassa latex are administered.	Dermal
						Baldness	The afflicted head area of the body is covered with latex.	Dermal

8	*Artemisia abyssinica*	Asteraceae	Chiqugn	Herb	Wild	Common cold	Artemisia abyssinica's dried leaf and root portion as well as Prunus africana's leaf and bark portion are mashed, smoked, and scented.	Nasal
						Evil eye	A fresh Artemisia abyssinica leaf is inhaled.	Nasal
9	Arundo donax	Poaceae	Shenbeko	Herb	Cultivated	Headache	The dried root portion of Arundo donax is crushed, combined with water, filtered, and then consumed with honey.	Oral
10	*Avena sativa*	Poaceae	Ajja	Herb	Cultivated	Diabetes	Avena sativa grain ground into a fine powder and used to make "injera" or it can be combined with other grains like Hordeum vulgare and Triticum dicoccum and cooked to produce gruel.	Oral
11	*Beta vulgaris*	Chenopodiaceae	Keysir	Herb	Cultivated	Anemia	Beta vulgaris fruit is prepared as "watt" and served with "injera."	Oral
12	*Brassica carinata*	Brassicacea e	Yeabesha Gomen	Herb	Cultivated	Constipation	After being cut and briefly cooked with oil and Allium cepa, the plant's leaf was ingested.	Oral
13	*Brassic nigra*	Brassicaceae	Sinafich	Herb	Cultivated	Common cold	Crushed Brassica nigra grain is combined with water to make a powder then consumed.	Oral
						Hemorrhoid	Brassica nigra grain will be crushed, and the powder will be used.	Dermal
						Malaria	The dried grain of Zingiber officinale, the bulb of Allium sativum, the seed of Ruta chalepensis, and the seed of Brassica nigra are all combined, then the powder is mixed with water and taken in the morning on an empty stomach.	Oral

14	*Brucea antidysenteric*	Simaroubaceae	Abalo	Shrub	Wild	Acne	Brucea antidysenterica dry seed is mashed, and the powder is applied to the affected body.	Dermal
						Eczema	Brucea antidysenterica's dried seed and Lubinus alibus' grain are combined, mashed, and creamed with butter.	Dermal
15	Buddleja polystachya Fresen	Loganiceae	Anfar	Shrub	Wild	Bedevil	Juice from polystachya and Solanecio gigas is strained and then given to livestock and horses.	Oral
16	*Callisia fragrans*	Commelinaceae	Wenzaferash	Herb	Wild	Hemorrhoid	The injured body portion will receive a latex application.	Dermal
17	*Capsicum annuum*	Solanaceae	Karia	Herb	Cultivated	Common cold	Consumption of Capsicum annuum involves its fruit.	Oral
						Lose of appetite	Consumption of Capsicum annuum involves its fruit.	Oral
18	*Carduus schimperi*	Asteraceae	Yemdirkos heshila	Herb	Wild	Sunstrock	Carduus schimperi's dried root portion is ground up, combined with water, and given to cattle.	Oral
19	*Barleria eranthemoides*	Asteraceae	Yeset aff	Shrub	Wild	Antidote	The dried root of Carthamus lanatus is crushed, soaked in water, and then filtrated. Whey is then added to the solution, and the result is consumed.	Oral
20	*Cirsium englerianum*	Asteraceae	Kosheshila	Herb	Wild	Wound	dried leaf parts of Cordia affricana and Cirsium englerianum are mashed, combined with honey, rubbed, and exposed to sunlight.	Dermal

21	*Citrus lemon*	Rutaceae	Lomi	Shrub	Cultivated	Intestinal parasite	Tea will be paired with lemon juice from a citrus fruit.	Oral
						Cancer	Consuming the fruit raw.	Oral
						Dyspepsia	Suck the fruit's juice.	Oral
						Toothache	With your mouth, hold the lemon juice.	Oral
						Vomiting	Lemon fruit was inhaled through the nose.	Nasal
						Wound	On skin, fruit juice mixed with honey is applied.	Dermal
22	Citrus sinensis	Rutaceae	Birtukan	Shrub	Cultivated	Microbial disease	The plant's fruit is eaten in its whole.	Oral
						Halitosis	Rub the fruit's skin against your teeth.	Dermal
23	*Clausena anisata*	Rutaceae	Limch	Shrub	Wild	Halitosis	Use a Clausena anisata spike to brush your teeth.	Dermal
24	*Clematis hirsuta*	Ranunculaceae	Azohareg	Climber	Wild	Tubercu losis	Clematis hirsuta's fresh root and stem portion are combined, blended with honey, and the resulting juice is then consumed after one day.	Oral
25	*Coffea arabica*	Rubiaceae	Buna	Shrub	Cultivated	Wound	Roasted coffee arabica seeds are ground with salt to a powder, then creamed with honey on the body part that has been injured.	Dermal
26	*Cordia africana*	Boraginaceae	Wanza/waddessa	Tree	Wild	Wound	The dried leaf parts of Acanthus polystachius, Dodonea angustifolia, and Cordia africana are burnt, crushed, combined with honey, applied, and finally exposed to sunlight.	Dermal

27	*Coriandrum sativum*	Apiaceae	Dembelal	Herb	Cultivated	Ascariasis	Crushed Coriandrum sativum grain is combined with water to make a powder, which is then consumed with butter.	Oral
28	*Croton macrostachyus*	Euphorbiacea	Bisana/makkaniisa	Tree	Wild	Ring worm	The tip part of fresh shoot cut and the sap will be applied onto the skin and also the dried epicotyl part of the plant is crushed and applied in the form of powder.	Dermal
						Abdominal problem	Ficus sur and Croton macrostachyus epicotyl, cut and squeezed, consumed with butter	Oral
						Snake bite	Applying chopped, mashed shoot tip with salt and Urera baccifera root to wound	Dermal
						Bloating	Cattle will be given Croton macrostachyus leaf that have been squeezed with water and juice.	Oral
						Syphilis	The plant's leaf's tip is divided into three sections, and after being pressed, the juice is consumed with honey.	Oral
29	*Cucumis ficifolius*	Cucurbitacea	Yemdir embuay	Herb	Wild	Coughing sheep	The plant's leaf's tip is divided into three sections, and after being pressed, the juice is consumed with honey.	Oral
						Rinder pest	The plant's fresh root portion is ground up and given to cattle with bread.	Oral

30	*Cucurbita pepo*	Cucurbitacea	Duba/dab aaqula	Herb	Cultivated	Gastritis	eating Cucurbita pepo fruit that has been boiled and then chilled.	Oral
						Ascaries	Drinking water and honey after crushing the dried Cucurbita pepo seed.	Oral
						Alopecia areata	The plant's fresh leaf portion is squeezed and rubbed on the hair.	Dermal
						Sexual impotency	Cucurbita pepo's seed is roasted and consumed.	Oral
31	*Cyathula capitata*	Amaranthaceae	Shingug	Herb	Wild	Snake bite	The fresh root portion of Urera baccifera is chopped and crushed with salt before being applied to the wound area.	Dermal
						Uvula illness	Cyathula capitata and Rhamnus prinoides epicotyl are mixed with three or seven malt grains, then the cheeks and head are creamed.	Dermal
32	*Cymbopogon citratus*	Poaceae	Tej sar	Herb	Cultivated	Anthrax	Chewing Cymbopogon citratus's young root portion	Oral
33	*Daucus carota*	Apiaceae	Carrot	Herb	Cultivated	Diabetes	Consume fresh Daucus carota roots on a regular basis.	Oral
34	*Datura stramonium*	Solanaceae	Astenagr/ axafaariis	Herb	Wild	Dandruff	Squeeze young leaf, mix juice with butter, apply to area.	Dermal
						Tooth ache	Datura stramonium dried seed is burned and exhales fumes through the mouth.	Oral
						Wound	Fresh Datura stramonium leaves are squeezed to treat wounds.	Dermal

35	*Dodonea angustifolia*	Sapindaceae	Kitikta	Shrub	Both wild and cultivated	Wound	Dodonea angustifolia, Cordia africana, and Acanthus polystachius leaves are dried, pulverized, mixed with honey, applied topically, and sun-exposed.	Dermal
36	*Dracaena steudneri*	Dracaennacea	Merkko	Tree	Wild	Bedevil	Dracaena steudneri's fresh leaf portion is strained, and sheep are given the juice.	Oral
37	*Echinops kebericho*	Asteraceae	Kebercho	Herb	Wild	Tuberculosis	The plant's dried root section is also crushed and combined with water before being consumed, along with fresh or dry rhizomes.	Oral
						Evil eye	Inhaling smoke produced by burning a tiny quantity of dried Echinops kebericho roots	Nasal
38	*Eleusine floccifolia*	Poaceae	Akrma	Herb	Wild	Ache	The person's hand is bound with a fresh Eleusine floccifolia stake.	Dermal
39	*Ensete ventricosum*	Musaceae	Koba/warqee	Shrub	Both wild and cultivated	"Impotence treatment & Bone repair"	Eaten like a true banana, Ensete ventricosum fruit is edible.	Oral
40	*Eragrostis tef*	Poaceae	Key teff/xaafii diima	Herb	Cultivated	Anemia	Eragrostis tef grain powder used to make "injera" or gruel	Oral
						Common cold	The Eragrostis tef grain powder is cooked into "porridge" and consumed right away.	Oral
41	*Eucalyptus globulus*	Myrtaceae	Nech bahr –	Tree	Cultivated	Common cold	Fresh young tree leaf is cooked and covered with vapor to be fumigated.	Nasal

			zaf/bargamo adii			Athlete’s foot	Massage feet with fresh leaf between toes.	Dermal
42	*Euphorbia abyssinica*	Euphorbiaceae	Qulqual/adaamii	Tree	Wild	Rabies	For dogs, Euphorbia abyssinica liquids and bread will be administered.	Oral
43	Euphorbia tirucalli	Euphorbiaceae	Yegeda wottet/aanaa noo	shrub	Wild	Circumcision	On the skin-covered portion of the penis, Euphorbia petitiana fluid will be administered.	Dermal
44	*Ficus sur*	Moraceae	Sholla/qilxuu	Tree	Wild	Abdominal problem	Butter was pressed into the epicotyl of Croton macrostachyus and Ficus sur.	Oral
45	*Foeniculum vulgare*	Apiaceae	Enslal	Herb	Cultivated	Dysuria	Foeniculum vulgare's fresh leaf material is cooked with water, combined with honey, and consumed.	Oral
46	*Guizotia abyssinica*	Asteraceae	Nuge/Nuugii	Herb	Cultivated	Cough and Asthma	The Guizotia abyssinica grain is roasted, ground, cooked with water, and then filtered before consumption.	Oral
47	*Helianthus annuus*	Asteraceae	Sufe	Herb	Cultivated	Jigger	The plant's fresh leaf portion touches and squeezes the body part.	Dermal
48	*Hagenia abysinica*	Rosaceae	Koso	Tree	Wild	Tape worm	Hagenia abyssinica fresh leaf is pressed with water, and the mixture is ingested.	Oral
49	*Hordeum vulgare*	Poaceae	Gebs /garbuu	Herb	Cultivated	Gastritis	Fresh Hordeum vulgare grains will be consumed, as well as roasted and cooked as "kolo" and "beso."	Oral

						Mumps	The Hordeum vulgare grain was crushed into powder for porridge.	Oral
50	*Impatiens ethiopica*	Balsaminaceae	Ensosla	Herb	Cultivated	Retained placenta	Impatiens ethiopica roots are diced up, boiled in water, and then used to rub hands.	Dermal
51	*Justicia schimperiana*	Acanthaceae	Simiza	Shrub	Wild	Anthrax	The juice from cutting off the shoot's tip and pressing it with water is consumed.	Oral
52	*Kalanchoe petitiana*	Crassulaceae	Andaula	Herb	Wild	Body swelling	The swollen body area is touched by the hot, fresh vapor of the Kalanchoe petitiana plant.	Dermal
						Hemorrhoid	The body part is rubbed with fluid as fresh steam from the Kalanchoe petitiana plant is burnt.	Dermal
53	*Lageniaria siceraria*	Cucurbitacea	Kil /buqqee	Herb	Cultivated	Bedevil	Dried Lagenaria siceraria fruit is kept bedside for solitary sleepers.	Put on
54	*Laggera crispata*	Asteraceae	Qes bedeje	Herb	Wild	Sunstrock	The body part is squeezed and rubbed with the plant's fresh leaf portion.	Dermal
55	*Leonotis ocymifolia*	Lamiaceae	Yeferes zeng	Shrub	Wild	Ascaries	The plant's fresh leaf portion was pressed, and the juice was consumed.	Oral
						Anthrax	Fresh leaf juice from the plant is consumed.	Oral
						Sunstrock	fresh leaves brush against a person's body	Dermal

56	*Lepidium sativum*	Brassicaceae	Feto	Herb	Cultivated	Amoebic dysentery	Crushed Lepidium sativum seeds are mixed with water, filtered, and consumed with lemon juice.	Oral
						Bloating	Crushed garden cress seeds, water, filtered, lemon juice added, consumed.	Oral
						Pneumonia	Roasted and crushed Lepidium sativum grain is mixed with water, filtered, and consumed.	Oral
						Hemorrhoid	Lepidium sativum grain is roasted and crushed before the powder is used.	Dermal
57	*Lippia adoensis*	Verbanaceae	Kesy	Shrub	Wild	Eczema	Aloe percrassa latex applies juice from pressed Lippia adoensis leaves to affected areas.	Dermal
						Itch	Apply the juice from a fresh Lippia adoensis leaf that has been pressed with water.	Dermal
58	*Linum usitatissimum*	Linaceae	Telba	Herb	Cultivated	Gastritis	The Linum usitatissimum seed was soaked in water, boiled, then chilled and consumed.	Oral
						constipation	The Linum usitatissimum seed was boiled after being soaked in water, chilled, and consumed.	Oral
						Retained Placenta	Flaxseed, Grewia bark, and water are mixed & Aloe juice is added to create a cattle treatment.	Oral
59	*Lupinus albus*	Fabaceae	Gibto	Herb	Cultivated	Hypertension	Lupinus albus seeds can lower blood pressure when consumed raw or processed into "Gibto areki" through roasting and soaking	Oral
						Eczema	Butter was rubbed with the crushed Lubinus albus grain and the dried Brucea antidysenterica.	Dermal

60	*Solanum lycopersicum*	Solanaceae	Timatim	Herb	Cultivated	Anemia	Consume Lycopersicon esculentum fruit.	Oral
61	*Maytenusa rbutifolia*	Celastraceae	Atat	Shrub	Wild	Leg swelling	The swollen area of the leg will be treated with a fresh Maytenus arbutifolia thorn that has been burned.	Dermal
62	*Musa x paradisiaca*	Musaceae	Muz	Herb	Cultivated	Sexual impotency	Every day, well-ripened Musa x paradisiaca fruit will be consumed.	Oral
						Constipation	Musa x paradisiaca fruit that has fully ripened will be consumed every day.	Oral
						Dyspepsia	Consuming every day	Oral
63	*Ocimum lamiifolium*	Lamiaceae	Damakessi /qoricha michi	Shrub	Wild	Febrileillness	Fresh Ocimum lamiifolium leaves are squeezed, added to tea or coffee, and enjoyed.	Oral
						Sunstrock	The juice from the freshly squeezed leaf is consumed.	Oral
						Wound	Ocimum lamiifolium's fresh leaf section is used to rub and squeeze the body part.	Dermal
						Headache	Ocimum lamiifolium's fresh leaf portion is pressed, and the juice is consumed.	Oral
64	*Ocimum basilicum*	Lamiaceae	Besobila/ masoobila	Herb	Cultivated	Aid digestion	To help with digestion, boil a teaspoon of dried or a handful of fresh basil leaves in water for ten to fifteen minutes, then drink the mixture.	Oral

65	*Olea europaea subsp. Cuspidate*	Oliaceae	Woyra/ejersa	Tree	Both wild and cultivated	Toothache	The body's teeth are touched by the fresh stem portion of Olea europaea.	Dermal
66	*Otostegia integrifolia Benth*	Lamiaceae	Tinget	Herb	Cultivated	Headache	Dried root of Otostegia integrifolia, dry leaves of Artemisia abyssinica and Ruta chalepensis, ground and inhaled.	Nasal
						Common cold	Otostegia integrifolia, Artemisia abyssinica, and Ruta chalepensis were mashed on a stone and inhaled as fumes.	Nasal
67	*Phytolacca dodecandara*	Phytolaccaceae	Endod	Shrub	Wild	Rabies	Every Wednesday and Friday, the fresh root of phytolacca dodecandara is chopped, mixed with water, and consumed with milk or given to dogs with buttermilk.	Oral
						Malaria	The phytolacca dodecandara's fresh leaf and root sections are ground into a powder, which is then mixed with water and consumed.	Oral
						Evil eye	Press the fresh leaves of Vernonia amygdalina & Phytolacca dodecandara to extract juice & drink	Oral
						Anthrax	After being chopped and squeezed for eight hours, the plant's tip is consumed.	Oral

68	*Plantago lanceolata*	Plantaginaceae	Gorteb/gorxobbii	Herb	Wild	Eye diseases	When the plant is cut, the sap is applied to the bodily area that contains the eyes.	Ocular
						Abdominal problem	Plantago lanceolata's fresh leaf portion is squeezed and consumed with honey.	Oral
69	*Prunus africana*	Rosaceae	Homa	Tree	Wild	Common cold	Dried leaves and bark of Prunus africana, Artemisia abyssinica, and Ruta chalepensis are combined, burned, and inhaled through the nose.	Nasal
						Headache	Dried leaves and bark of Prunus africana, along with Otostegia integrifolia, Artemisia abyssinica, and Ruta chalepensis leaves, are crushed by stone and inhaled as a fume.	Nasal
70	*Prunus persica*	Rosaceae	Kock	Tree	Cultivated	Fowl pest	The Prunus persica fresh leaf portion is squeezed with water, and the juice is combined with hen feed before being fed to the chickens.	Oral
71	*Rhamnus prinoides*	Rhamnaceae	Gesho	Shrub	Cultivated	Anthrax	Rhamnus prinoides' epicotyl is pressed, and the juice is consumed.	Oral
						Uvula illness	Rhamnus prinoides and Cyathula capitata's epicotyls are combined with three to seven grains of malt and then creamed before being applied to the head portion of the body.	Dermal
72	*Ricinus communis*	Euphorbiaceae	Gulo	Shrub	Wild	Scabies	Ricinus communis seed extract is pounded and administered topically.	Dermal

73	*Rosa abyssinica*	Rosaceae	Qega	Shrub	Wild	Stomach ache	The plant's fruit is consumed.	Oral
74	*Rosmarinus officinalis*	Lamiaceae	Siga-metbesha	Herb	Both wild and cultivated	Toothache	Rosmarinus officinalis's fresh stem is provided for chewing.	Oral
75	*Rubus apetalus*	Rosaceae	Enjory	Shrub	Wild	Gastritis	Rubus apetalus' epicotyl (3 or 7) is pressed, and the juice is consumed with butter.	Oral
76	*Rumex abyssinicus*	Polygonaceae	Mekmeko	Herb	Wild	Antidote	Rumex abyssinicus' fresh root portion is mashed and taken orally with honey.	Oral
77	*Rumex nepalensis*	Polygonaceae	Tuilt	Herb	Wild	Dysentery	Rumex nepalensis' fresh bark is squeezed with water and given to calves as juice.	Oral
						Ascaries	The plant's fresh root is crushed, combined with water, filtered, and then consumed.	Oral
78	*Lavnaea inthybacea*	Asteraceae	Arge	Herb	Wild	Digestive problems	To prepare wild lettuce for digestive issues, harvest young, tender leaves from clean areas, ensuring proper identification. Rinse thoroughly to remove dirt, then boil for 5-10 minutes or steam to retain nutrients. Season with salt or lemon juice, and serve as a side dish or in stews to aid digestion.	Oral

79	*Ruta chalepensis*	Rutaceae	Tena adam/cira akota	Herb	Cultivated	Malaria	Mash Allium sativum bulb with Ruta chalepensis seeds, add butter, and consumed	Oral
						Evil eye	Ruta chalepensis's fresh leaf portion is squeezed, pressed against the body part, and knotted.	Dermal & Tied
						Common cold	Coffee and Ruta chalepensis' fresh leaf extract are both consumed.	Oral
80	*Saccharum officinarum*	Poaceae	Shenkor ageda	Herb	Cultivated	Coughing	The Saccharum officinarum stem will be consumed.	Oral
81	*Salix subserrata*	Salicaceae	Keya	Tree	Wild	Asthma	The plant's dry bark is burned and fumigated.	Nasal
82	*Sida schimperiana*	Malvaceae	Chifrg	shrub	Wild	Itch	Sida schimperiana's flower is better used to rub the injured area of the body.	Dermal
83	*Solanecio gigas*	Asteraceae	Boz	Shrub	Wild	Evil eye	Allium sativum bulb, Ruta chalepensis leaf, and the fresh root portion of Solanecio gigas are crushed together and scented.	Nasal
						Bedevil	Solanecio gigas and Buddleja polystachya's fresh leaf parts are pressed, and the juice is then given to cattle and horses.	Oral
84	*Solanum tuberosum*	Solanaceae	Dinich	Herb	Cultivated	Gastritis	Solanum tuberosum tubers are boiled and served with cheese.	Oral

85	*Solanum incanum*	Solanaceae	Therch Embuy	Shrub	Wild	Wound	On the body's wound area, Solanum incanum's fluid component will be applied.	Dermal
						Nose bleed	Squeeze the plant's tip and place it into your nose.	Nasal
86	*Stephania abyssinica*	Menispemaceae	Yayt Jero	Climber	Wild	Eye diseases	The epicotyl of Stephania abyssinica is severed, and sap is applied around the eye.	Ocular
87	*Urera baccifera*	Urticaceae	Kusha	herb	wild	Snake bit	Salt and the fresh root portion of Urera baccifera are combined, and after that, the mixture is applied to the area that is wounded.	Dermal
88	*Urtica simensis Steudel*	Urticaceae	Sama	Herb	wild	Gastritis	To prevent stinging, cut Urtica simensis leaves with gloves, rub on ground, boil, grind into paste, add salt and Avena sativa flour, prepare as "watt."	Oral
89	*Trigonella foenum*	Fabaceae	Abish	Herb	Cultivated	hypertension	Trigonella foenum grain is crushed, and the resulting powder is combined with water and consumed with honey.	Oral
90	*Triticum dicoccon*	Poaceae	Sendie/qamadii	Herb	Cultivated	Diabetes	Triticum dicoccon grain is crushed, and the resulting powder is made into gruel and consumed.	Oral
91	*Verbascum sinaiticum*	Verbanaceae	Ketetina	Herb	Wild	Rabies	Verbascum sinaiticum, Stephania abyssinica, and Cucumis ficifolius fresh root parts are combined and given to dogs with bread.	Oral

						Blood clothing	Verbascum sinaiticum's fresh leaf is squeezed, and the juice is then put to the injured body part.	Dermal
92	*Verbena officinalis*	Verbenaceae	Atuch	Herb	Wild	Dysentery	The plant's fresh root portion was ground up and mixed with water for consumption.	Oral
						Stomachache	Fresh Verbena officinalis root is mashed, mixed with water, filtered, and consumed as juice.	Oral
						Diarrhea	Verbena officinalis fresh root portion provided for chewing.	Oral
93	*Gymnanthemum amygdalinum (Delile) Sch. Bip. ex Walp*	Asteraceae	Girawa/ebicha	Shrub	Wild	Stomachache	Vernonia amygdalina's epicotyl is pressed, and the juice is consumed.	Oral
						Bloating	Vernonia amygdalina's fresh leaf portion is pressed, and the juice is given to cattle.	Oral
						Evil eye	Vernonia amygdalina and Phytolacca dodecandara fresh leaf parts are squeezed, and the juice is consumed.	Oral

94	*Vicia faba*	Fabaceae	Bakela	Herb	Cultivated	Bronchitis	The water from the boiling vicia faba grain is consumed.	Oral
						Gastritis	Vicia faba grain is consumed after being roasted, powdered, and combined with water.	Oral
						Wound	The Vicia faba row seed is crushed, and the resulting powder is administered to the wounded area of humans and animals.	Dermal
95	*Zehneria scabra*	Cucurbitaceae	Hareg resa	Climber	Wild	Sunstrock	Fresh leaves of Zehneria scabra are squeezed for juice, which is consumed and massaged.	Dermal
						Wound	The plant's fresh leaf portion is squeezed over the body's wound and creamed.	Dermal
						Swelling	fresh leaf portion is pressed and creamed.	Dermal
96	*Zingiber officinale*	Zingiberaceae	Zingible/ gijinbila	Herb	Cultivated	Common cold	Zingiber officinale grain is cleaned and chewed.	Oral
						Sexual impotency	Zingiber officinale root is cut, combined with honey, and consumed first thing in the morning.	Oral
						Cough	Zingiber officinale grain is cleaned and served for chewing.	Oral
						Malaria	Combine dried Zingiber officinale, Allium sativum bulbs, Ruta chalepensis seeds, and Brassica nigra seeds into a powder. Mix with water and consume on an empty stomach	Oral

Notice: All the Local Names of the Medicinal Plants are in Amharic or Oromo language.

Appendix 4: Sample Questions for Semi-Structured Interviews

This survey is solely being used for research. The results of this study will include documentation of local knowledge, conservation efforts, and the smart and appropriate use of medicinal plants in the study area. As a result, we kindly ask the respondent to complete this survey.

I. General Information about the Respondents

Date…… Area of residence…… Kebele……

Name of respondent---------- sex---------- Age----------

Occupations: Farming……..Trading local items……..Others…….

Marital Status: Single……Married……Divorced……..Widowed……..

Religion: Orthodox----------Protestant---------- Muslim---------- Others

For how long have you lived in this area? A. Since birth. B. For last 25 years. C. For 15 years. D. For less than 15 years.

Level of education: illiterate_____ Elementary_____ High School_____ College_____ University_____

II. Questionnaire for Traditional Healers

1. Describe traditional way of classifying your land area including vegetation, earth geography and the types of soil.
2. List the most common types of human and livestock disease in your local area?
3. How the people treat these diseases in traditional way?
4. What are the medicinal Plants that are used by the local people to prevent various human and livestock ailments?

4.1 Local name of plant_____

4.2 Habitat of plant_____

4.3 Growth form of the plant: Tree_____ Shrub_____ Herb___Climber

5. Which parts of the plants are used for such purpose and how are they prepared?

A. Stem B. Root C. Fruit D. Leaf E. Others

6. Which methods of preparation are you use to make plant parts to the user?

A. Squeezing B.Crushing C. Burning D. Chewing E. Powdering F. Other mechanism.

7. How do you know someone is which types of disease attack?

A. Simply observing of the body

B. By asking the types of symptom of the disease

C. By allowing to go to hospital

D. If any other methods

8. Is there any side effect to the users that take medicinal plants? Yes-----, No------

9. If your answer is 'yes' what do you advise to reduce this side effects?

10. Where do you get such experience in medicinal plant practice?

11. Are you volunteer to transfer this indigenous knowledge to the future generation?

A. Yes B. No

12. If your answer is no what is the reason?

13. How to express your moral satisfaction in practicing of these medicinal plants

III: Questionnaire for Non-Traditional Healers

1. What are your outlooks toward medicinal plants?

2. When your family and livestock get a health problem first where are you go in order to treat this? A. Hospital B. Traditional healers C. Both D. Others

3. Are you using traditional medicinal plant to treat the illness? A. Yes B. No

4. If your answer is 'yes' please mention each plant with respect to each disease and plant part utilize, habit and preparation method.

IV: Questionnaire for Focus Group Discussion in the Residents

1. What are the most common human diseases in your local area?

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2. What are the most common livestock diseases in your local area?

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3. List the medicinal plants used to treat both human and livestock ailments with:

Local name ----------

Growth form ----------

Habitat of plant----------

Disease of treated ----------

Parts of plant used----------

Mode of preparation----------

Mode of administration ----------

4. List the medicinal plants used to treat only human ailments with:

Local name ----------

Growth form ----------

Habitat of plant----------

Disease of treated ----------

Parts of plant used----------

Mode of preparation----------

Mode of administration ----------

5. List the medicinal plants used to treat only livestock ailments with:

Local name ----------

Growth form ----------

Habitat of plant----------

Disease of treated ----------

Parts of plant used----------

Mode of preparation----------

Mode of administration ----------

6. What are the threats of medicinal plants in your locality?

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7. Which medicinal plants species is commonly threatened in your local area? ----------

8. How do the local people manage and conserve these medicinal plant species through their traditional indigenous knowledge?

Appendix 5: Sample Questions for Semi-Structured Interviews in Oromo Language

Guca Sassabbi Eddatto Biqiloota Qorichaf Oolanii Fi Beekumsa Naanawaa Biqiloota Kanaa

Kaayyoon gaafilee kanaa qorannoo gaggeesuu qofaafi. Bu'aan qo'annoo kanaas galmee beekumsa naannoo dhaaf, carraaqqii eegumsa fi haala itti fayyadama biqiloota qorichaf oolanii naanoo sanaa qajeelaa fi bareeda gochuu dha. Kanaafuu gaafilee armaan gadii akka haqaan nuuf guutan kabajaan isin gaafanna.

I)Odeefannoo waliigalaa waa'ee deebii kenna

Guyyaa_____Bakka jireenyaa_____ Ganda_____

Maqaa_____Saala _____ Umurii _____

Hojii: Qoteebulaa _____Daldalaa_____kan biro_____

Haala fuudhaaf heerumaa :

Baaqqe_____kan fuudhe/heerumte_____ Kan hike/hiikte_____Gursummaa_____

Amantaa: Orthoodooxii _____Prootestaantii _____ Musliima _____Kanbiroo_____

Bakka amma kessa jiraachaa jirtu kana yeroo ammamiitiif kessa jiraatte?

A. Guyyaa dhalootaa koo kaasee. B. Waggoota 25 darbaniif.

C. Waggoota 15 darbaniif . D. Waggoota 15 darbanii gadi.

Sadarkaa barnootaa : Kan hin baranne_____ Sadarkaa tokkofaa _____Sadarkaa lammaffaa _____ Koleejii _____ Univarsitii _____

II) Gaafilee Ogessa Fayya Aadaatiif

1. Biqiltuulee, haala taa'umsa lafaa fi gosa biyyoo dabalatee Karaalee (maqaa) ittiin lafa qoqqooduuf fayadamtan ibsi._____

2. Dhukuboota naanoo kanatti yeroo baay'ee namaa fi biqiloota mudatan tarreessi._____

3. Dukkuboota kana namoonni akkamitti karaa aadaatiin yaalamu?_____

4. Dhukuboota adda addaa kan namaa fi beyladootaa ittisuuf biqiloonni namoonni naanoo itti fayyadaman maal fa'aa dha?_____

4.1 Maqaa biqilli sun naannoo sanatti ittiin waamamu_____

4.2 Bidollee biqilichaa _____

4.3 Bifa guddina biqilicha: Muka_____ Biqiltuu_____ Baala___ .

5. Qaama biqilaa kessa kan qorichumaaf itti fayadaman isa kami?

A. Jirma B. Hidda C. Firii D. Baala E. kan biroo

6. Qaama biqilaa qorichumaaf oolu kana akkamitti qopheessu?

A. Cuunfuun B.Unkuteessuu C. Gubuu D. Alafkachuu E. Daakuu F. karaaleen biro yoo jiraatan.

7. Namni tokko dhukuba kamiin akka qabame maaliin beekama?

A. qaama isaa ilaaluu qofan B. Mallattoolee dhukubichaa gaafachuun

C. Akka hospitaala dhaqu gochuun D. karaaleen biro yoo jiraatan.

8. Biqiloota qorichaf olan fayyadamuun rakkoolee miidhaa cinaa ni qaba? Eyyen____, Lakki _____

9. Yoo deebiin kee ‘Eyyeen’ ta’e miidhaa cinaa kana akkamitti hiri’suun danda’ama jettee yaada?_____

10.Muuxannoo biqiloota qorichaf olanitti fayyadamuu eesaa argatte?_____

11. Muuxannoo fi beekumsa kee biyya keessaa kana dhalootaaf dabarsuuf fedhii qabda? Eyyen ____,Lakki _____

12. Yoo deebiin kee ‘Lakki’ ta’e sababni kee maali dha?_____

13. Biqiloota qorchaa kan aadaa kanatti fayyadamuu keetiin aadaa fi duudhaa kee ilaalchisee hagam itti quufta?

III) Gaafilee Ogessa Fayya Aadaa Hin Taaneef

1.Waa’ee biqiloota qorichaf oolani irratti ilaalchi kee maali dha?_____

2.Yammuu maatiin kee yookin beeyladooni kee dhukubsatan fayyisuuf jalqaba essa dhaqxa?

A. Hospitaala B. Ogessa fayyaa aadaa C. Lachuu bira D. Kan biro yoo jiraate

3.Dhukkuba yaaluuf biqila qorichaaf oolu fayyadamta? A. Eeyyee B. Lakki

4.Yoo deebiin kee ‘Eeyyee’ ta’e maaloo dhukuba kamiif biqilli kam akka oolu fi akasumas qaama biqilaa kam akka fayadamnu bidollee biqilichaa fi haala ittiin qophaa’u wajjin eeri._____

IV) Gaaffii Marii Garee Jiraattota Keessatti Xiyyeeffannoon kenameetiif

1.Dhukkuboonni namaa naannoo keetti baay’inaan mul’atan maali?_____

2.Dhukkuboonni beeyladaa naannoo keetti baay’inaan mul’atan maali?_____

3.Biqiltoota qorichaa dhukkuba namaa fi beeyladaa yaaluuf gargaaran tarreessi:

Maqaa naannoo isaanii _____ Haala guddina isaanii _____

Bidollee biqilichaa _____ Dhukuba kamiif akka oolu _____

Qaama biqilaa kam akka fayyadamnu_____ Karaa ittiin qophaa’u_____

Haala ittiin kennamu _____

4.Biqiltoota qorichaa dhukkuba namaa qofa yaaluuf itti fayyadaman tarreessi:

Maqaa naannoo isaanii _____Haala guddina isaanii _____

Bidollee biqilichaa _____Dhukuba kamiif akka oolu _____

Qaama biqilaa kam akka fayyadamnu_____Karaa ittiin qophaa’u_____

Haala ittiin kennamu _____

5.Biqiltoota qorichaa dhukkuba beeyladaa qofa yaaluuf itti fayyadaman tarreessi:

Maqaa naannoo isaanii _____Haala guddina isaanii _____

Bidollee biqilichaa _____Dhukuba kamiif akka oolu _____

Qaama biqilaa kam akka fayyadamnu_____Karaa ittiin qophaa’u_____

Haala ittiin kennamu _____

6.Balaan biqiltoota qorichaaf oolan kan naannoo keessani irra gahuuf malu maali?

_____

7.Naannoo keessan keessatti gosa biqiltoota qorichaaf oolan kessaa kamtu balaadhaaf saaxilamaa dha?

_____

8. Gosoota biqiltoota qorichaaf oolan kana ummanni naannoo beekumsa aadaatiin bulchuu fi kunuunsuu irratti maal fakkaatu._____