JIMMA UNIVER SITY

SCHOOL OF GRADUATE STUDIES
COLLEGE OF NATURAL SCIENCES,
DEPARTMENT OF BIOLOGY

Ethnobotanical study of medicinal plants used to treat human and livestock diseases in Minjarna Shenkora Dstrict, Amhara Regional state, North Shewa, Ethiopia

A Thesis Submitted to Jimma University, College of Natural Sciences Department of Biology in Partial Fulfillment of the Requirements for the Master's Degree in Botanical Science

BY Solomon Getachew

ADVISOR: Mr. Tamene Belude

June, 2023

Jimma, Ethiopia

Jimma University

College of Natural Sciences

Department of Biology

Ethnobotanical Study of Medicinal Plant Used to Treat Human and Livestock Ailments in Minjarna Shenkora Dstrict, Amhara Regional state, North Shewa, Ethiopia

Advisor: Mr. Tamene Belude

A Thesis Submitted to Jimma University, College of Natural Sciences Department of Biology in Partial Fulfillment of the Requirements for the Master's Degree in Botanical Science

June, 2023

Jimma, Ethiopia

DECLARATION

First, I declare that this thesis is my own work and that all sources of materials used for this thesis has been fully acknowledged. This is to certify that the thesis prepared by Solomon Getachew focused on Ethnobotanical Study of Medicinal Plant Used to Treat Human and Livestock Ailments in Minjarna Shenkora District, North Shewa Zone Amhara Regional State, Ethiopia; Submitted to Jimma University, College of Natural Science Department of Biology in Partial Fulfillment of the Requirements for the Master's Degree in Botanical Science. I declare that this thesis has not been submitted to any other institution anywhere for the award of any academic degree, diploma or certificate.

TO BE SIGNED BY THE EXAMINING COMMITTEE:

Chairman	Signature	Date
_____	_____	_____
Advisor	Signature	Date
_____	_____	
Internal Examiner	Signature	Date
_____	_____	_____
External Examiner	Signature	Date
_____	_____	_____

Table contents

Contents page

List of tables

List of Appendices

Pages

List of figures

ACRONYMS

CSAC	Central Statistical Agency
EMA	Ethiopian Methodology Agency
MSWARDO	Minjarna Shenkora Wereda Agricultural Development Office
WHO	World Health Organization

ACKNOWLEDGEMENTS

First and for most I would like to thank almighty God for giving me health, strength and for helping me to accomplish this work, then I would like to express my deeply felt gratitude and appreciation to my advisor Mr, Tamene Belude for his invaluable and constructive comments, suggestions, to help me in identification of species and guidance from the very beginning up to the end. I am very grateful for his constructive and encouragement without him this study would have never reached its preset stage. Next, my deep appreciation and thanks also goes to Jimma University and Jimma University Biology Department, all my teachers for their useful advice and also other staff member for their friendly treatment and cooperation in various support.

Next, my deep appreciation and thanks also goes to Jimma University Biology Department lab assistance by guide me to identify plant species. I also thank my brother Mr. Endale Demrew for his continuous advice and support, he help me from the beginning up to the end. Furthermore, I would like to express my hearts felt gratitude to my loved family for their help economically. As well my gratitude goes to my wife Tenange Bekele for her material and moral support. Her consistent encouragements have been with me from the beginning to the end of my study. In addition, I would like to express my appreciation and thanks to my school Director Birhanu Anania for his great support by give me different materials and all people who participate in this research by giving me important information through questionnaire and interviews. Finally I would like to thank all those who gave me helpful comments for this study. I would also like to acknowledge the Ministry of education for giving me the educational opportunity and financial support during the years of my study.

ABSTRACT

Plants have been used for medicinal purpose more than a century by most of the population in Ethiopia to treat human and livestock ailments. This study is aimed to fulfill the existing knowledge gap by identifying and documenting the indigenous medicinal plants that are used to treat human and livestock ailments in Minjarna Shenkora District. Totally, 282 informants participated in this study. Data was collected through administrating semi-structured interview, observation and focus group discussions. In this study, both qualitative and quantitative data were gathered Data were analyzed by descriptive statistics methods such as percentage and frequency. Overall 72 plant species were recorded consisting 66 genera and 41 families to treat 39 different human and livestock ailments. From these (68.1%) plant species were used only for human disease treatment, (11.1%) plant species were used for only livestock disease treatment and the remaining (20.8%) plants were used for treating both human and livestock ailments treatment. Stomach ache and common cold were the major human ailments in the study area while Rabies was major livestock ailments. The Lamiaceae family, containing 6 species (8.33%), was the dominant family in the other hand Nigella sativa was ranked first on preference to treat stomachache. While Eucalyptus camaldulensis ranked first in its multi-usage. The highest informant consensus value was obtained for reproductive organ disease which was a major disease (0.92). Most medicinal plants were herbs (47.2%) and the dominant habitats were wild (58.3%). The best-harvested plant part was leaf and the preferred route of application was oral (62.1%). The common method of preparation was crushing (43%) and the major application method was drinking (40.2%). Deforestation of plants for agricultural expansion (46%) was the major causes of decreasing in abundance of medicinal plants. In conclusion, medicinal plants are a vital part of health care system for both human and livestock ailments and it also has multi-usage in addition to its medical purpose in the study area. Therefore, training, encouraging and supporting the local people on how to conserve, manage and transfer indigenous knowledge about medicinal plants is crucial for the next generation.

Keywords: - ***Ailments, Ethnobotany, Indigenous knowledge, Medicinal Plants, Minjarna Shenkora District.***

1. INTRODUCTION

1.1 Background of the study

Ethnobotany is the study of interrelations between humans and plants, it is also direct interrelations between humans and plants (Martin, 1995; Balick and Cox, 1996).However, current use of the term implies the study of indigenous or traditional knowledge on medicinal plants. It involves the indigenous knowledge of plant classification, cultivation, and use plants as food, medicine and shelter. Indigenous knowledge refers to the accumulation of knowledge, rule, standards, skills and mental set, which are possessed by local people in a particular area (Quanash, 1998). One of the widely used indigenous knowledge system in many countries is the knowledge of application of traditional medicine. Plants have been used traditionally as source of medicine for centuries against human and livestock ailments. Traditional medicine is defined as indigenous medicine that is used to maintain health and to treat human and livestock diseases. Some recognizes traditional medicine as medicinal use of plants to treat disease. Traditional medicine depends on various locally available plant species and plant based products which are easily accessible and capitalizes on traditional wisdom, repository knowledge, simple to use and affordable. According to Sofowora (1982) about 60-85 of the population in every country of the developing world has relied on traditional medicine. The practice of traditional medicine is widespread in China, India, Japan, Pakistan, Sri Lanka, Thailand and Korea (Paret al., 1965). In China, traditional medicine accounts for around 40% of all health care delivered and used to treat roughly 200 million patient annually (WHO, 2008).

Ethiopia is the origin and center of diversity for many of medicinal plant species. Ethiopian geographical diversity with different habitats and vegetation types favors medicinal plants growth and utilization. Multiple geographical diversity of the country coupled with multiethnic groups make the country home for wide traditional medicine (Dawit and Ahadu , 1993; Mirutse, 2001).The various literature available show the significant role of medicinal plants in primary health care in Ethiopia in which more than 80% of the population in the country uses plant-based traditional medicine as their major primary human health care system and about 90% of the population uses traditional medicine for their livestock (PGRC,1996)

similar to many developing countries particularly that of sub-Saharan Africa countries (Endeshaw,2007). In Ethiopia medicinal plants and knowledge of their use provided a vital contribution to human and livestock health care needs throughout the country the reason why medicinal plants are demanded in Ethiopia is due to culturally linked traditions.

Traditional medicinal plant practice in the country is still continue and widely accepted to use in the prevention and treatment of various ailments due to easily accessible. In line with medicinal price of traditional medicine, the local communities have relatively low cost in using them. But traditional healers know these medicinal plants by different names; as well the use and preparations of these medicinal plants is different in different part of the country. Indigenous knowledge is passed verbally from generation to generation and valuable information can be lost whenever a traditional medical practitioner passes away without conveying his traditional medicinal plant knowledge to others (Endalew, 2007). If this continues, there are probabilities of losing indigenous knowledge of the medical plant from Ethiopia including the study area. In the study area, the society widely use traditional medicine to treat different human and livestock ailments but these medicinal plants which are used to treat human and livestock diseases are not collected, identified, preserved and documented because of this the people obtains them from wild habitats in grass and woody land, in field margin and garden fence as weeds and in many micro-habitats from where they are harvested when they need.

1.2 Statement of the problem

Since ancient time, plants are used as source of both defensive and traditional medicine preparation for both human and livestock. According to Farnsworth (1994) much of indigenous knowledge system from earlier times was linked with the use of traditional medicine in different countries. The world health organization (2004) estimate that 80% of the world population relies on traditional medicine prepared by the use of plants to treat disease. WHO (2004) estimates that of 35,000-70,000 species of plants are used for medicinal purposes around the world. Developing countries should endeavor to develop and utilize local medications that are most appropriate to their local circumstances especially for primary Health care in order to cut down on huge cost associated with incessant drug importation.

Medicinal plants have been commonly used over the years for treatment and prevention of disease and promotion. Today about 25% of drugs prescribed worldwide are derived from plants.

Examples, atropine, morphine, quinine, warfarin, aspirin etc. However, there is a lack of a systematic approach to assess their quality, safety and effectiveness. Ethnobotanical studies conducted in different regions of Ethiopia indicated medicinal plants are threatened due to different human and natural causes. Etana (2007) stated that traditional medicine practice based on medicinal plants should be documented through botanical surveys otherwise such rich heritages will be lost due to various anthropogenic and other natural causes. Getnet (2011) indicated that collecting and documenting ethnobotanical knowledge before it is lost forever is a fundamental urgent task.

The indigenous knowledge of traditional medicinal plants is playing a paramount role to treat different human and livestock ailments in Minijarna Shenkora District. But, it is not well identified about medicinal plants use value, conservation, ways of preparation, amount used, and routes of administration. As well there is no reported study on use and conservation of traditional medicinal plants in treating human and livestock ailments in the study area. Hence, this study was done to fulfill these gaps by assessing indigenous knowledge of medicinal plants use and conservation status accumulated by local communities and also types of medicinal plants which are used to treat human and livestock ailments, type of animal and livestock ailments in Minjarna Shenkora District, Amhara Region, North Shewa, and Ethiopia.

1.3 Research questions

This study was conducted to assess indigenous knowledge of the local people and medicinal plant species used to treat human and livestock ailments through the following questions.

- Which plant species and their part are used to treat human and livestock ailments in the study area?
- What are the threats to and conservation status of medicinal plants in the study are?
- How do the local communities transfer indigenous knowledge practice to the next generation?

1.4 Objectives of the study

1. 4.1General objective

The general objective of the study was assess the indigenous knowledge of the people and medicinal plants used to treat human and livestock ailments, in Minjarna Shenkora District**.**

1.4.2 Specific Objectives

The specific objectives of this study were**:**

- To identify the medicinal plants used in traditional healing system of the people of the study area focusing on growth habit, parts used, and methods of preparation, dosage and mode of application
- To compile indigenous knowledge of the people of the study area.
- To investigate the existing threats to medicinal plants and their conservation in the study area.

1.5 Significance of the study

Conservation of the medicinal plants and the associated indigenous knowledge of people are important. Deforestation and environmental degradation have become issues of national and global concern. This is because loss of vegetation and depletion of natural resource leads to disappearance of herbal medicines. So conservation of vegetation in general and that of medicinal plants in particular is a measure issue. The study of ethnobotanical medicinal plants used to treat human and livestock disease is important for several reasons. The study was carrying out to assess medicinal plants found at Minjarna Shenkora district of Amhara region of Ethiopia. It has the following significances (importance).

1. It is important to know what kinds of medicinal plants are available in the study area.

2. It increases awareness for peoples in the District to conserve these plants.

3. Used to keep and transfer indigenous knowledge of medicinal plants to the next generation.

4. Help to identify and record medicinal plants and their uses
5. To document parts of medicinal plants used to treat human and livestock diseases.
6. To identify types of human and livestock ailments found in study area.
7. The study can have a great importance for future scholars who will pursue to conduct research in the study area.

1.6 Scope of the study

The scope of the research was mainly focus on the study of medicinal plants used to treat human and livestock ailments in Amhara region, North shewa zone, and Minjarna Shenkora district. In view of this, to make the study manageable and to complete with time frame, the study was limited to a few administration units in 6 sample Keble's from the 27 Keble's of the district by taking 282 informants from 6 Keble's. But the researcher feels that it have much better if more Keble's are involved in the study but finance and distance limit the researcher focus to 6 Keble's. The study was conducted from October 2022to April2023 to identify and analysis all medicinal plants used to treat human and livestock ailments and the indigenous knowledge of the local people associated to it.

CHAPTER TWO

2. Literature Review

2.1 Origin and development of ethnobotany

People around the world depend on plants for food, medicine and other multipurpose of life (Martin, 1995).This close interaction and dependency of human on plant is studied under the field of ethnobotany. It is difficult to tell exactly when the ethnobotany becomes part of modern science. However, it can be traced back to the time when human started making conscious interaction with plants. Ethnobotanical work seems to have started with Christopher Columbus in 1492, at a time when he brought tobacco, maize species 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).

John Hershberger proposed the term ethnobotany for the first time in 1895(Balick, 1996). However, this term has been given different interpretation and definitions depending on the interest of workers involved in the study conducted by Cotton (1996).Martin (1995) defined ethnobotany as a study of people's classification, management and use of plants. Ethnobotany is the study of a region's plants and their practical uses through the traditional knowledge of a local culture and people. In 1941, shuts redefined ethnobotany as the study of the relationship, which exists between human and their ambient vegetation (Castetter, 1944; cited in Cotton, 1996). Bye (1985) stated ethnobotany as a science investigates the biological (including the ecological) basis of interaction and relationship between plants and people over evolutionary time and geological space.

Ethnobotanical investigation documents the knowledge on cultural interaction of people with plants. It also tries to find out how local people have traditionally used plants for varies purposes and how they incorporated plants in to their cultural tradition and religions(Balick andcox,1996).Therefore, traditional local communities worldwide have a great deal of knowledge about native plants on which they intimately depend (Langeheim and Thimann, 1982). As stated by Matin (1995)to achieve more detailed and reliable information of plants and plant use, ethnobotanical study needs involvement of specialists from various disciplines, such as plant taxonomist and plant ecologists, anthropologists, linguists, economic botanists,

pharmacologists and others. With such interdisciplinary and multidisciplinary approaches, ethnobotany is aimed at gathering and documenting indigenous botanical knowledge, cultural practice, use and management of botanical resources and discovers benefits from plants.

2.2 Indigenous knowledge

Indigenous knowledge refer to the accumulation of knowledge, rule, standards, skills and mental set, which are possessed by local people in a particular area (Quanash, 1998). The immediate and intimate dependency of local people on natural resources resulted in the accumulation of indigenous knowledge that helped people to adapt to and survive in the environments in which they live. It is local knowledge that is unique to a given culture or society and base for agriculture, health care, food preparation, education, environmental conservation and a host of other activities (Thomas, 1995). Knowledge of plants used by humans is based on thousands of years of experience. It is the result of many generations long year's experiences, careful observations and trial and error experiments (Martin, 1995).

Indigenous knowledge is a body of knowledge built up by a group of people through generation of living in close contact with nature and it is cumulative and dynamic. It builds up on the historical experience of people and adapts to social, economic, environmental, spiritual and political change. The quantity and quality of traditional knowledge differs among community members according to their gender , social standing, profession and intellectual capability. For instance, societies concerned with biological diversity will be most interested in knowledge about the environment.

One of the widely used indigenous knowledge system in many countries is the knowledge and application of traditional medicine. The knowledge involves traditional diagnosis , collection of raw materials, preparation of remedies and its prescription to the patients**(**Farns, 1994).Indigenous knowledge on remedies in many countries including Ethiopia, pass from one generation to the other generation verbally with great secret (Jansen, 1981).Such secret and crude transfer makes indigenous knowledge or ethno medicinal knowledge vulnerable to distortion and in most cases, some of the lore is lost at each point of transfer (Amare,1976), hence there is a need for systematic documentation of such useful knowledge through ethnobotanical research.

2.3Medicinal plants

The plant that possesses therapeutic properties or exerts beneficial pharmacological effect on the human body is designated as medicinal plant (Motaleb, 2011).Medicinal plant is a plant that provides people with medicines to prevent disease, maintain health or cure ailments (Maiti, 2007).It is either "wild plant species" which growing spontaneously in self-maintaining populations in natural or semi-natural ecosystems and could exist independently of direct human action. Medicinal plants are a source of the wide variety of natural antioxidants and anti-cancer, anti-diabetic, anti-atherosclerosis, immune modulator, even Reno-protection and other vital properties which enable to cure different disease (Rafieian, 2012).medicinal plants have been provide mankind with large variety of potent drugs to all infections and suffering from ailment in spite of progression in synthetic drugs (Oladeji, 2016).Medicinal plants also consider as a rich resource of ingredients which can be used in drugs development and synthesis and the survival of human being (Gebrekidan *et al.*, 2018). Medicinal plants are the base for the development of new drug and the endurance of humankind as well as other livestock (Guluma *et al., 2017*).The use of medicinal plants is not only for the treatment of ailments but also as potential material for maintaining good health conditions (Oladeji, 2016).

2.4 Traditional Medicinal plants

The world health organization (WHO, 2002) defined traditional medicine as the total combination of knowledge and practice that can be formally explained and are used in prevention and elimination of physical, mental, or social imbalance and relaying exclusively on practical experience and observation handed down from generation to generation whether verbally , or in writing (Endalew, 2007).Traditional medicine refers to any ancient and culturally based health care practice differing from scientific medicine and is largely transmitted orally by communities of different cultures. Traditional medicine is medicinal use of plants to treat disease and enhance general health and wellbeing. According to Fassil (2001), about 75-90%ofthe rural population in the world (excluding western countries) relies on the 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.

2.4.1Traditional Medicinal Plants in Africa

In Africa , traditional remedies made from plants play an important role in the health of millions of people. The main problem facing the use of traditional medicine is the proof requirement that the active components contained in medicinal plants are useful , safe and effective, this required to assure the medicinal field and the public regarding the use of medicinal plants as drug alternatives. The proof of pharmacology activity that are available at present are mostly based on empirical experience. The scientific proof then becomes the most important things in order to eliminate the concern of using medicinal plants as drug alternative treatment unfortunately, most African countries are notable to conduct researches to provides scientific proof pharmacology. International collaboration is important for African countries, as it would enhance the development of drugs obtained from medicinal plants to their benefits.

2.4.2. Traditional Medicinal plant in Ethiopia

Ethiopia is a country characterized by a wide range of climate and ecological condition , possesses enormous diversity of flora and fauna **(** Pankhurst, 2001). The country possesses a wide range of potentially useful medicinal plants. Plants have been used as a source of traditional medicine in Ethiopia from the time immemorial to combat different human and livestock diseases (Asfaw *et al*, 1999). Due to its long period of practice and existence, traditional medicine has become an integral part of the culture of Ethiopia people (Pankhurst, 1965; (Mirgissa, 1998). According to Dawti (2001), there is a large magnitude of use and interest in medicinal plants in Ethiopia due to acceptability, accessibility and biomedical benefits. In Ethiopia the long history use of medicinal plants is reflected in various medico –religious manuscripts produced on parchments and believed to have originated several centuries ago (Fassil,2001) Medicinal text books written in Geez and Arabic in Ethiopia between the 17 and 18 centuries imply that plants have been used as a source of traditional medicine in Ethiopia health care system . Even today , it is common for people living in rural and urban areas to treat some common human and livestock diseases by using plants available around them Example*: Hagenia abyssinica* to treat tapeworm, *Ruta chalepensis* for various health problems(Abbink, 1995).In Ethiopia little emphasis has been given to traditional medicinal studies over the Past decades (Debella , 2001). Therefore it can be said that ethnobotanical studies are merely at the start in Ethiopia through there have been some attempts in

investigating medicinal plants uses and there is as yet, no in depth study on the relation between medicinal plants and indigenous knowledge on sustainable management of such plant resources.

2.4.3Ethno veterinary Medicine in Ethiopia

Ethnoveterinary medicine is traditional animal health care knowledge. It is the study of Traditional knowledge, skills, methods and practices used for the treatment of livestock ailments (Guluma et al., 2017).Ethnoveterinary medicine provides traditional medicine which are locally available and usually cheaper than standard treatment. Livestock holders can prepare and use homemade remedies with minimum expense. Ethiopia is one of the leading countries of Africa in the livestock population (Eskedar, 2011). According to (Negassa *et at* 2012) Ethiopia is one of the top ten country in Africa in wealth of livestock which is estimated to be about 52 million cattle, 24.2 million sheep, 22.6 million goats 5.7 million donkeys, 2 million horses, 1.1 million camels and 45 million chickens (Central Statically Authority, 2011). Even though the country has plenty of livestock, the sector is not well developed. This is due to different diseases spreading in the country (Duguma, 2013).

Livestock production plays an important role in the livelihood and economy of the majority of Ethiopia population (Endalew, 2007).But the economic benefits from livestock endure insignificant because diseases reduce livestock performance and cause a great economic resource loss especially to the poor farmers (Yibrah, 2014). In most Sub-Saharan Africa including Ethiopia disease remains one of the principal causes of poor livestock performance leading to an ever-increasing gap between supply and demand for livestock and products (Endalew,2007). Due to the insufficient modern animal health services in Ethiopia traditional ways of treatment seem to be a viable alternative to cure livestock (Yibrah, 2015).Further traditional medicinal plants used for the treatment of animals are vital to livestock management for most Ethiopian (Endalew, 2007). In certain parts of Ethiopia, livestock ailments such as anthrax, blackleg, and aplasmosis, ascariasis, leeches, etc have been treated by using medicinal plants (Yibrah, 2014).

Creation of awareness on Ethnoveterinary medicine emphasizing on useful plant use for treatment of livestock has paramount importance to livestock management. In addition, proper documentation and understanding of farmers' knowledge, attitude and practice about the

occurrence cause, treatment, prevention and control of various ailments is important in designing and implementing successful livestock production (Tafese and Mekonen , 2001).

2.5Threats and conservation of medicinal plants in Ethiopia

2.5.1 Threats to medicinal plants

People use many wild species of plants for food, medicine, cloth, shelter, fuel, income generation and the fulfilling of cultural and spiritual needs throughout the world (Zemede, 2001). Ethiopia's traditional medicine as elsewhere in Africa is faced with problems of continuity and sustainability (Kelbessa *et al* (1992).According to Edwards (2001), habitat and species are being lost rapidly as a result of the combined effects of environmental degradation, agricultural expansion, deforestation and over harvesting of species and this is further enhanced by human and livestock population increase. The primary causes of these problems are loss of taxa of medicinal plants, loss of habitats of medicinal plants and loss of indigenous knowledge. Some studies have shown that most of the medicinal plants utilized by Ethiopia people are harvested from wild habitat (Mirutse, 1999; Tesfaye and Zemede, 1999) and hence this aggravates the rate of loss of taxa with related indigenous knowledge and loss of widely occurring medicinal plants species.

There are two sources of threats to medicinal plants; these are man-made and natural causes. Rapid increase in population, the need for fuel, urbanization, timber production, over harvesting, agricultural expansion and habitat destruction are human caused threats to medicinal plants likewise, natural causes include recurrent drought, bush fire, disease and pest out breaks (Ensermu et at, 1992)

2.5.2 Conservation of traditional medicinal plants

Conservation is defined as the sustainable use of biological resources. The concept of sustainability is now seen as the guiding principle for economic and social development, particularly with reference to biological resources. Different ethnobotanical literatures underline that both conserving plant species and documenting and keeping indigenous knowledge associated with them need urgent concerns (Cunningham, 1996). According to Zemede (2001), medicinal plants are considered to be at conservation risk due to over use and destructive harvesting (roots and barks collection). Conservation of these medicinal plants is possible by cultivating them in places of worship (churches, mosques and grave yards), farm margins, river banks, road sides, live fences of gardens and field (Asfaw,2001. Dawit and Ahadu (1993) found that many medicinal preparations use roots, stem and bark by effectively killing the plant in harvest.

Plant parts used to prepare remedies are different; however, root is the most widely used part. Such wide utilization of root part for human and livestock aliments with no replacement has severe effect on the future availability of the plant. In a broad sense, conservation is achieved through *in-situ* and *ex-situ* means of conservation. *In-situ conservation is* conservation of species in their natural habitat. Some traditional medicinal plants have to be conserved *ex-situ* due to difficulty for domestication and management (Zemede, 2001). Ex -situ conservation involves conservation outside the native habitat and used to safeguard populations in danger of destruction, replacement or deterioration (Sarma, 2003) by cultivating at home garden, along roadsides etc. The purpose of this is to raise rare and endangered medicinal plants species. Moreover, some plants fail to produce the desired amount and quantity of the active principles under cultivation out of their natural habitats.

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

Chapter Three
3. Materials and Methods

3.1 Location

Minjarna Shenkora is one of the Districts in the Amhara region of Ethiopia. It is named in part after a historic District of Shewa. Minjar was the southernmost District of Shewa and near the location of the modern District. It is Located at the southern end of the semen Shewa Zone. Minjarna Shenkora is bordered on the east, south and west by the Oromia region, on the North West by Hageremariam kesem, and on the north east by Berehet. The Kesem River forms the boundary between this district, Hageremariam kesem and Berehet. The administrative center of this District is Arerti; other towns in the district include Balchi and Eranbuti. The District is about 120 km Southeast of Addis Ababa, 52km east of Mojo and 250 km from Debre Brahan town, the capital of North Shewa Zone. The study area is suited for the study because for many years the community used traditional medicinal plants to save human and livestock This District is served by the Addis Ababa - Djibouti Railway with Melka Jilostation. It is the only district in the Amhara Region with that train station.

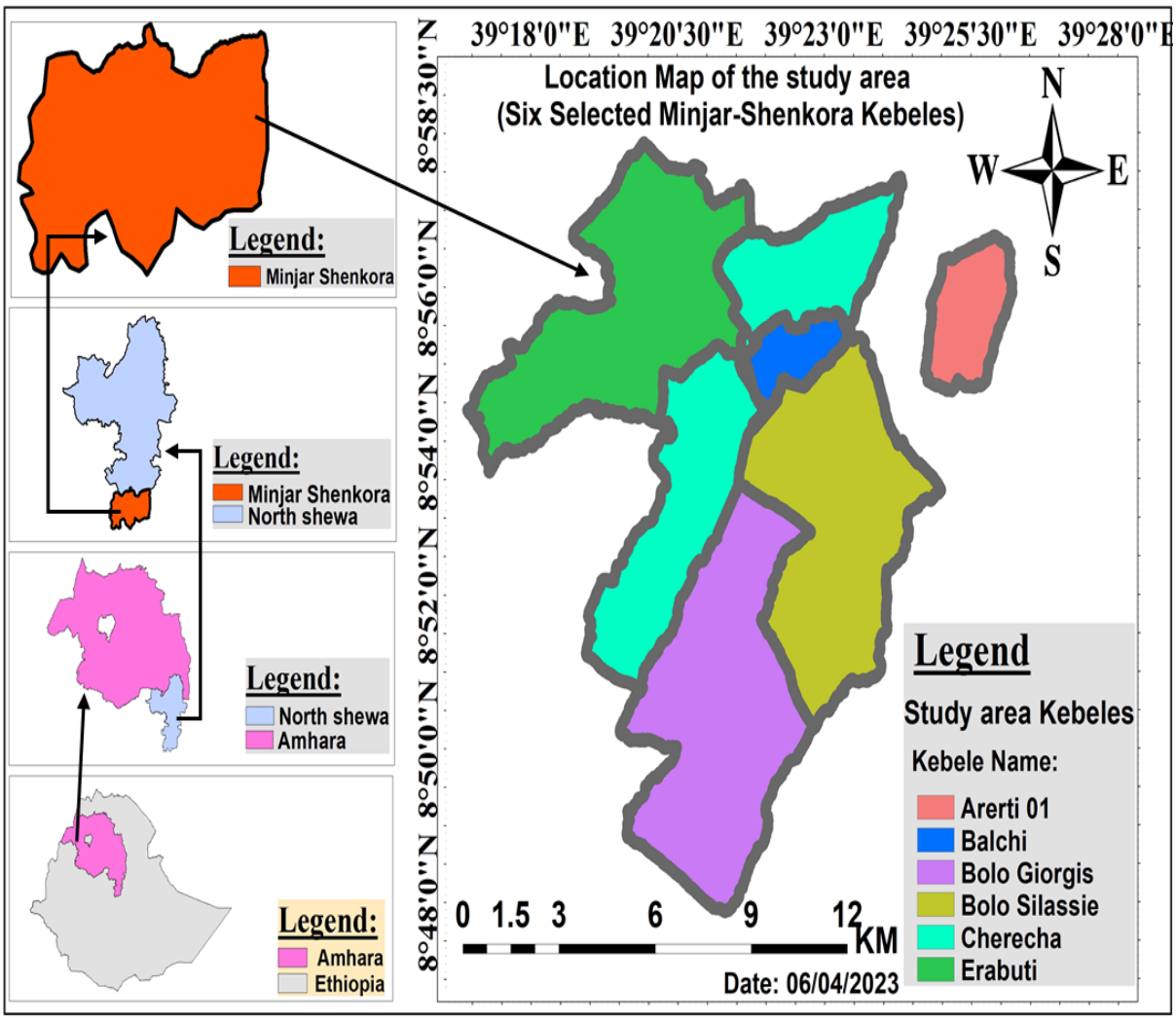

Figure 1: map of study area

3.2 Description of the study area

This study was conducted in Minjarna Shenkora District one of the Districts in North Shewa Zone of Amhara Regional State, Ethiopia. According to Minjarna Shenkora District Agriculture and Rural Development Office annual work report (MSWARDO, 2008), the topography of the study area is characterized by diverse geomorphologic features distributed over the two major agroclimatic zones, 'Dega' (high lands)and 'kola' (low lands). It is characterized by cliffy topographic features 80%, deeply incised valleys 4%, escarpments 14%, and plateaus (2%).The major soil types in the study area, about19.5% of the soil belongs to the grey soils, followed by (19%) black soil, 15% of the soil belongs to the red soil, and the remaining 46.5% belongs to brown soil (MSWARDO, 2008).According to Ethiopian Methodology Agency (EMA,2018) seven years mean monthly maximum and minimum temperature of the study area was 27.4^{o}C and 13.6^{o}C, respectively. The mean monthly maximum temperature ranges between 21^{o}C in December and 30^{o}C in June. While the mean monthly minimum temperature varies between 8.4^{o}C in December and 18.2^{o}C in June (EMA, 2018).

Metrological data taken from Ethiopian Methodology Agency (EMA,2018) , indicates that the study area obtains high rainfall in July and August and low rainfall in December, January and February. The wet season occurs from September to October and the dry season extends from November to June. The mean monthly rainfall of the area varies between11.5 mm (December) and 261.9 mm (July). The 16-year annual mean rainfall of the area was 896.5mm and dry season extends from September to February.

3.3 Human settlement and Land use

Based on the 2007 National census conducted by the Central Statistical Agency of Ethiopia (*CSA, 2007*), this District has a total population of 128,879, an increase of 29.65% over the 1994 census, of whom 66,918 are men and 61,961 women; 12,237 or 9.49% are urban inhabitants. With an area of 1,509.93 square kilometers, Minjarna Shenkora has a population density of 85.35, which is less than the Zone average of 115.3 persons per square kilometer. A total of 29,359 households were counted in this District, resulting in an average of 4.39 persons to a household, and 28,221 housing units. The majority of the inhabitants practiced Ethiopian Orthodox Christianity, with 94% reporting that as their religion, while 5.73% of the population

said they were Muslim. The importance of Belg (short rain season) is strongly emphasized in Minjarna Shenkora district. The dominant crops of the area are Teff, Wheat, Chickpea, Lentils (*Lens culinaris*) and Onion. All the listed crops are equally important subsistence crop. Land is ploughed in January to March for the short rain crop (Belg) and in June or the end of July for the main rainy season crop (Meher). In some part of the District there are nomadic people whose life is depending on domestic animal rearing (*MSWARDO, 2008*).

3.4 Research Design

Morrison (*2007*) point out descriptive survey is the most popular and extensively employed research method. In addition qualitative and quantitative method of research design with simple descriptive statistical method was used. In this study descriptive survey method was employed because it is chosen for appropriateness to the nature of the topic, which needs wider description, cross-sectional investigation of facts and information related to medicinal plants. Descriptive study is helpful when an investigator wants to look in to a phenomenon or a process in its natural contexts in order to get its overall pictures instead of taking one or some of its aspects and manipulating it in a simulated. Thus, descriptive study was intended only to investigate the extent to which perception of traditional practitioners towards traditional medicinal plants and user from a holistic perspective in its natural settings. Moreover, in order to achieve the intended objective both qualitative and quantitative approaches were used.

3.5 Site Selection

A reconnaissance survey was conducted from October to November, 2015EC. After the survey, from a total of 27 Keble in the District 6were selected as study sites for data collection purposively by considering certain criteria such as transportation, Agro-climatic zone, availability of more vegetation. Taking these criteria into consideration, the investigator gathered ethno-medical information and specimen from the community.

3.6 Sample Size and sampling techniques

Sampling is concerned with selection of a sub set of individuals from a statistical population to estimate characteristics of the whole population. Sample size was determined by using Yamane (1967) simplified formula for calculation of sample size from a population which is an alternative to Cochran's formula. According to him, for a 95% confidence level and 0.05 allowable errors (level of precision) then the size of the sample is calculated by using the formula below:

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

Where, N= Total households (N is the population size),n= sample size and e was the level of precision.

The total house hold in the selected Keble were 960 so N= 960 e = 0.05 so that $n= \frac{N}{1+N(e)^2}$

$$n= \frac{960}{1+960(0.05)2} \qquad n=282$$

Table 1: number of households and number of informants selected from each Keble

No	Name of selected Keble	Total number of household	Number of informants selected	Percent (%)
1	Arerti 01	202	59	20.9
2	Balchi	189	56	19.8
3	Eranbute	160	47	16.6
4	Cherecha	150	44	15.6
5	Bologiorgis	134	39	13.8
6	Bolosilase	125	37	13.3
	Total	960	282	100

After determining the sample size, 267 general informants and 15 key informants (traditional healers) were selected. From these general informants 206 informants were men and 61of them

were women). From each Keble from 37 to 59 household informants were selected by considering the population size of the Keble these informants were selected randomly. Regarding traditional healers from 15 traditional healers (key informants) 10 of them were men and 5 of them were women three traditional healers were selected from each 3 Keble and two key informants were selected from each remaining Keble by purposive sampling method. The selection of key informants was based on the recommendations of knowledgeable elders, religious leaders, Keble administrators, literate people, after that, the key informants were identified, later on, interviewed, and followed for further detail.

Table 2: Number of key informants selected from each Keble.

No	Name of Keble	Number of key informants selected from each Keble			Percent (%)
		M	F	T	
1	Arerti 01	2	1	3	20
2	Balchi	2	1	3	20
3	Eranbute	2	1	3	20
4	Cherecha	1	1	2	13.33
5	Bologiorgis	2	0	2	13.33
6	Bolosilase	1	1	2	13.33
	Total	10	5	15	100

The age of the informants included in the study ranged from 30 to 70. The educational levels of the informants were from illiteracy to college level. Most of the informants were illiterate (53, 66%) followed by elementary school (20, 25%). High school6% and college-level education accounted 3%.

3.7 Data Source

The source of data for the research was primary sources. These primary sources were natural habitat and home garden for fresh specimens, market survey where medicinal plants delivered for sale, household, key informants and traditional healers. These data obtained from October to and April 2023.

3.8 Data collection methods

To collect information from the informants. A semi structured interview was the main data collection tool used during the study. A list of questions based on the objective of the study was prepared in English and translated into Amharic local language of the study area. During the interview, information on local name of the medicinal plants, type of disease treated, parts of the plant used, methods of preparation, mode of administration, conservation practices, and use other than medicinal value was recorded. In addition to semi-structured interviews, data were collected through group discussions and guided field walks with key informants for field observations. The discussion was conducted with 7 to 8 key informants mainly focusing on threats to medicinal plants; methods of conservation and how knowledge is maintained and transferred from one generation to another generation. Field observation with interviews was also conducted in both the wild and the home gardens of the study sites to collect the specimens.

3.9 Plant Sample Collection and Identification

Specimens were collected for each Medicinal plant species from home gardens, as well as wild habitat and from market, by using Plant press, Collecting bags and field portfolio. Identification of some common and well known species was made in the field including the local name, habitat, part of plant used and associated plants information. But the confirmation and the identification of unidentified specimens was done at Jimma University by using Flora of Ethiopia and Eritrea volumes (1-8) and with the assistance of experts.

3.10 Data Analysis Method

Both qualitative and quantitative data were collected for the study. The collected data were analyzed in terms of both quantitative and qualitative data analysis methods. In this regard, by using Microsoft excels spreadsheets quantitative data such as frequency, distribution and percentages were calculated, analyzed and summarized. Also, the quantitative data were computed by parameters such as preference ranking, direct matrix ranking, and informant consensus factor (ICF). Also qualitative data was analyzed which were used to provide additional information for the study. But before analyzing and interpreting data editing, coding and verification were undertaken for the sample survey. The most useful information gathered on medicinal plants reported by local people, medicinal value, application, method of preparation, route of application, disease treated, dosage, habits and parts used were analyzed through descriptive statistics.

3.10.1 Preference ranking

Preference ranking is a participatory technique that allows analyzing and identifying problems or preferences stakeholder share in order to implement adequate improvements and solutions in their community and area. Preference ranking was made for some medicinal plants species to assess the degree of effectiveness (the best-preferred medicinal plant species) against stomach ache disease in the area. For this study ranking was done by following Martin's method (*1995*).Seven medicinal plants used to treat stomach ache ailments were selected in the study site and the7 key informants arranged these medicinal plants based on their personal preference. Each rank was given an integral value 1, 2, 3, 4, 5, 6, and7 then the most important medicinal plant was given the highest score (7) while the least important medicinal plant was given (1). Finally, the total values were summed up and the overall ranking of each medicinal plant was determined.

3.10.2 Direct matrix ranking

Direct matrix ranking or DMR describes the method because it moves quickly from early discussion and questioning to recording respondents' views directly onto a table or matrix. It is simple, quick, and informative, and everyone seems to learn something from it. The output of direct matrix ranking shows the highest values (ranks) for multipurpose value of medicinal plants. This analytical tool was used according to Martin (*1995*) suggestions. Six multipurpose

plants that have the highest use-value were selected based on data collected from the society. Again six use attributes of the plant were identified. Having these eight informants was select by random sampling method from elders and traditional healers and told to give values to each medicinal plant-based on the listed attributes. Finally, the given values were added and ranked. The values used for ranking was: 5-best, 4-very good, 3-good, 2-less used, 1-least used and 0-no value.

3.10.3 Informant consensus factors (ICF)

To verify the reliability of the information given by participants during the interview they were asked 2 times to confirm medicinal value of a given medicinal plant. Informant responses related to the former was accepted as important information. Further, Informants Consensus Factor was calculated by below formula;

ICF = Nur – Ns / (Nur – 1) (*Heinerich et al., 1998*).

Where, ICF= Informants Consensus Factor

Nur= number of use citation in each category and Ns= number of species used. Informant consensus was done to identify the agreement of informants on the report cures for frequently occurring diseases.

3.11 Ethical consideration

The respondents (participants) were informed about the research and consent was obtained before taking any information from them. The investigator informed the respondents that the objective of the research is not for commercial purpose and to expose the practitioners but for research and academic reasons and the research result was benefiting the community in general and traditional specialists in particular.

CHAPTER FOUR

4 Result and Discussion

4.1 Result

4.1.1 Diversity of medicinal plant in the study area

In the study area a total of 72 species of medicinal plants were collected, these plants belong to 41 families and 66 genera. In terms of species diversity14 medicinal plant families were represented by two or more species, while 27 families were represented by a single species each. Lamiaceae was the dominant family contributing six species others Euphorbiaceae and Fabaceae five species, Brassicaceae, Asteraceae, Poaceae, and Solanacea each with four species came next(appendix IV).

4.1.2 Growth forms (Habits) of medicinal plants

Regarding the analysis of growth forms herb, shrub, tree and climber were the habits of the medicinal plants found in the study area. Of these the majority of them were herbs constitute the highest number of species which was 47.2% followed by shrubs constitute 27.7% as well trees constitute 23.7% and climbers constitute least 1.4% (figure 2).

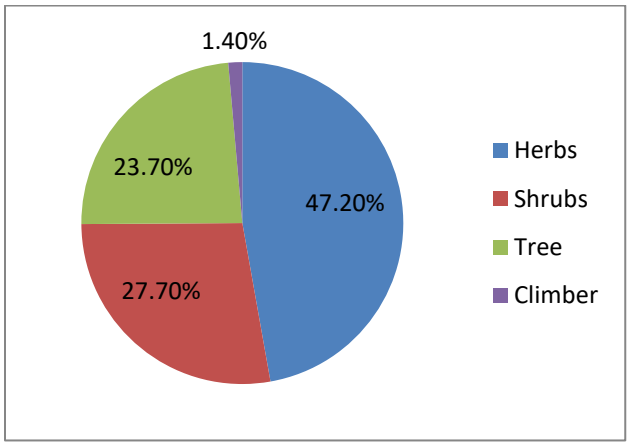

Figure 2: Habits of collected medicinal plants in Menjarina Shenkora District, 2023

4.1.3 Habitat of collected medicinal plants

Plants were collected for medicine from wild, home garden, market and both from wild and home garden. So for this study the major plant species were collected from wild 58.3%, 23.6%

species were from home garden, 15.2% from market and the least from both wild and home garden (Figure 3).

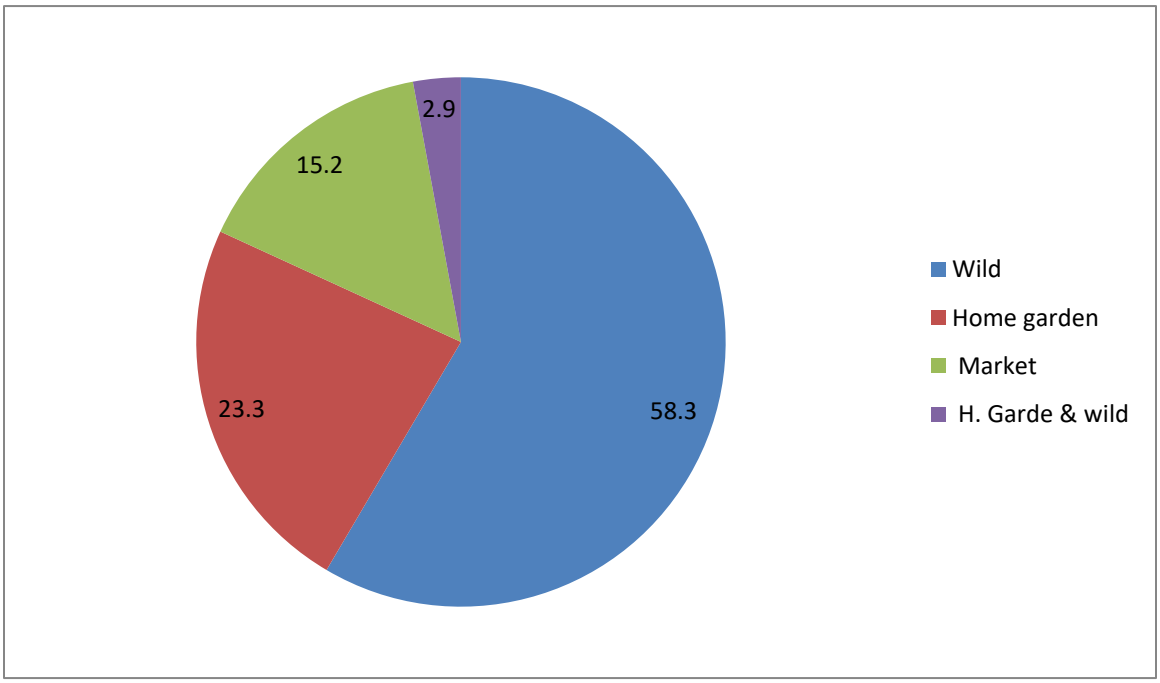

Figure 3: Habitat of medicinal plants in study area

4.1.4 Plant parts used for medicinal

The study revealed that diverse types of plant parts were used to treat various ailments of human and livestock either in combination or alone, of these, leaf, root, bark, stem, latex(from the stem), bulb, seed, fruit and juice (from the fruit), shoot were used to treat both human and livestock ailments in the study area. The analysis of the collected information showed that the mostly used plant part was leaf followed by seed, root, bulb, latex, bark, juice, and stem.

4.1.5Ways (methods) of preparation of Medicinal plants

According to informants various skills associated with medicinal preparation. The results showed that the most remedies were prepared from a single plant parts 93% and 7% was prepared from combined plant parts. As well the majority of the medicines 80.6% in the study area were prepared from fresh parts of medicinal plants followed by dried form 13.7% and 5.7% prepared from a combination of both dry and fresh. The preparations vary based on the type and actual site

of disease treated. The principal methods of medicine preparation were crushing followed pounding (Figure 4).

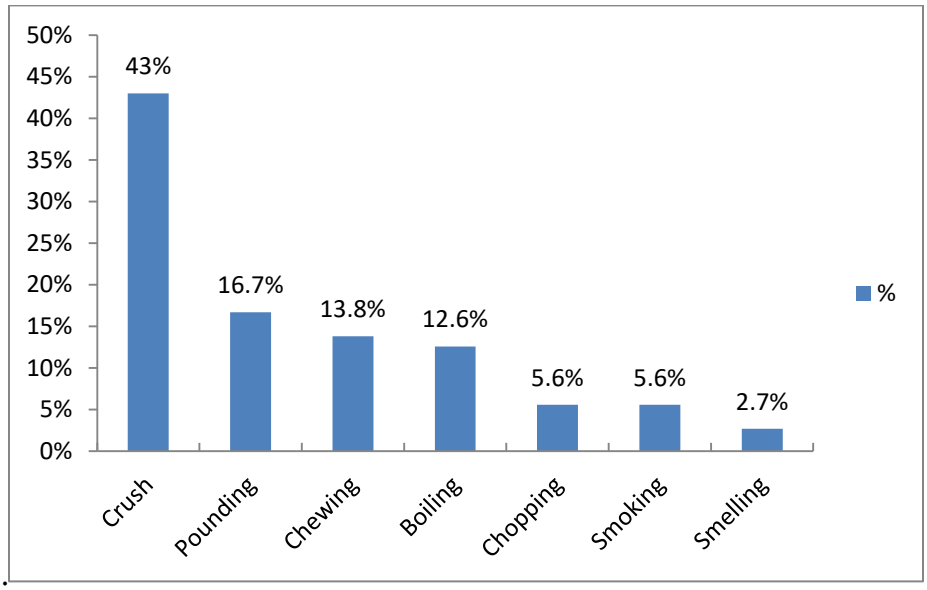

Fig 4: preparation methods of remedies from medicinal plants

4.1.6 Routes of applications and method of application

The current study indicated different routes for the applications of traditional herbal medicines for the treatment of various types of human and livestock ailments. In this study also different routes of application were used, like oral, surface application, nasal, eye administration, from theses oral administration was the most used route which was followed by surface application (Figure 5). Concerning method of application there are wide range of traditional remedy applications were done such as drinking which was account for 40.2%, followed by eating 19.4%, others like cream 13.85, dropping 11.1%, fuming 6.9%, tying 4.1%, smelling 2.7%, smearing 1.4%. This data analysis show that application through drinking and eating were the most common, accounted for the highest followed by cream and drop but fuming, tying, smell and smear were the least.

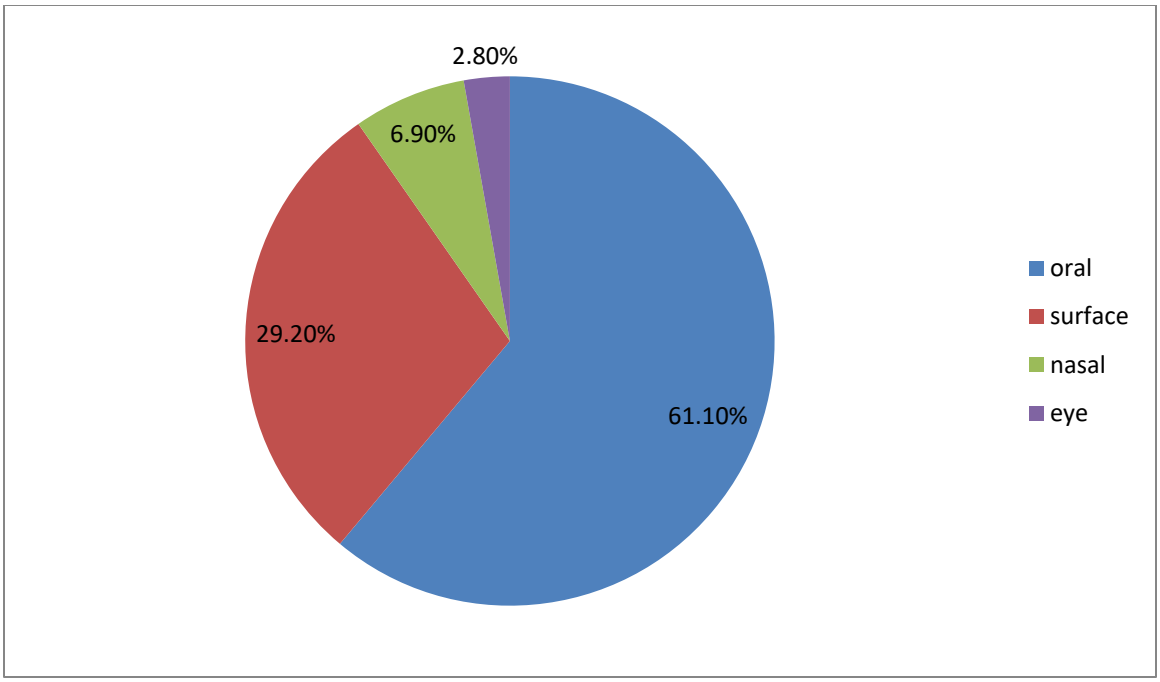

Figure 5: Rout of application of medicinal plants

4.1.7 Dosage and its measurement

Dosages of most medicine were measured by using different traditional tools. The local people of the study area used various units of measurement such as finger length for root, bark, and stem, pinch for powdered, and numbers for leaves, seeds, fruits, and flowers and locally made spoons from plants were used to estimate and fix the amount or dosage of medicine. Sometimes also utilized spoons, coffee cup, "tassa", tea cup, glass, counting number of leaf, seed and fruit, and so on. However, most of the time there was no precise dosage measurement for traditional medicines, As well people determine the amount in count or volume based on the age and physical condition of the patient.

4.1.8 Additives taken with medicinal plant

The study participants mentioned that there are some preparations that need additives, which includes water, butter, honey, boiled coffee, injera and oil. From this water (65.5%) was highly stated by participants followed by butter (11%) and honey (9.5). while boiled coffee (8.3), injera (3.5) and oil (2.2) were respectively mentioned as least preferred additive taken with medicinal plant preparation.

4.1.9 Human Ailments treated

In this study 39 different ailments were recorded (Appendix I) which are treated by 72 medicinal plant species. From these, 28 ailments occurred only in humans which are treated with 68%)plant species, In this regard, stomachache were the most common human ailments recorded in the study area which treated by 918.4% medicinal plant species(Table 3). .

Table 3: Human diseases and number of plant species used by local people in the study area

Disease	No/ of species	Percent (%)
Stomach ache	9	18.4%
Common cold	4	8.2%
Cough	3	6.1%
Skin disease	2	4%
Tonsilitis	2	4%
Head ache	3	6.1%
Fire burn	3	6.1%
Malaria	3	6.1%
constipation	2	4%
Ascariasis	2	4%
Devil illness	2	4%
Ring worm	2	4%
Therest16 diseases treated with one species each	12	25%
Total	49	100%

4.1.10 Livestock ailments treated by medicinal plants

According to the result 11 livestock ailments were identified which are treated by 23 medicinal plants. From these 11 ailments 6 were only occurred in livestock which is treated with 8 plant species. Rabies and hen disease were the main ailments of livestock which occurred in the study area followed by eye disease, liver fluke, urine problem, and external parasites (Table 4)

Table 4: Livestock disease and plant species used by local people to treat these ailments in the study area

Disease	No/ of plant species used	Percent (%)
Rabies	2	25%
Eye disease	2	25%
Liver fluke	1	12.5%
Urine problem	1	12.5%
External parasite	1	12.5%
Hen disease	1	12.5%
Total	8	100%

4.1.11Medicinal plant used to treats both human and livestock aliments

As it was identified there are 5 different types of diseases recorded which were occurred both in human and livestock. To treat them 15 plant species were used. In this particular, *Ranunculaceae* and *Phytolacaceae* families were dominant plant family which were used to treat both human and livestock ailments. From these diseases Febrile illness disease was the major one followed by leech and wound (Fig 6)

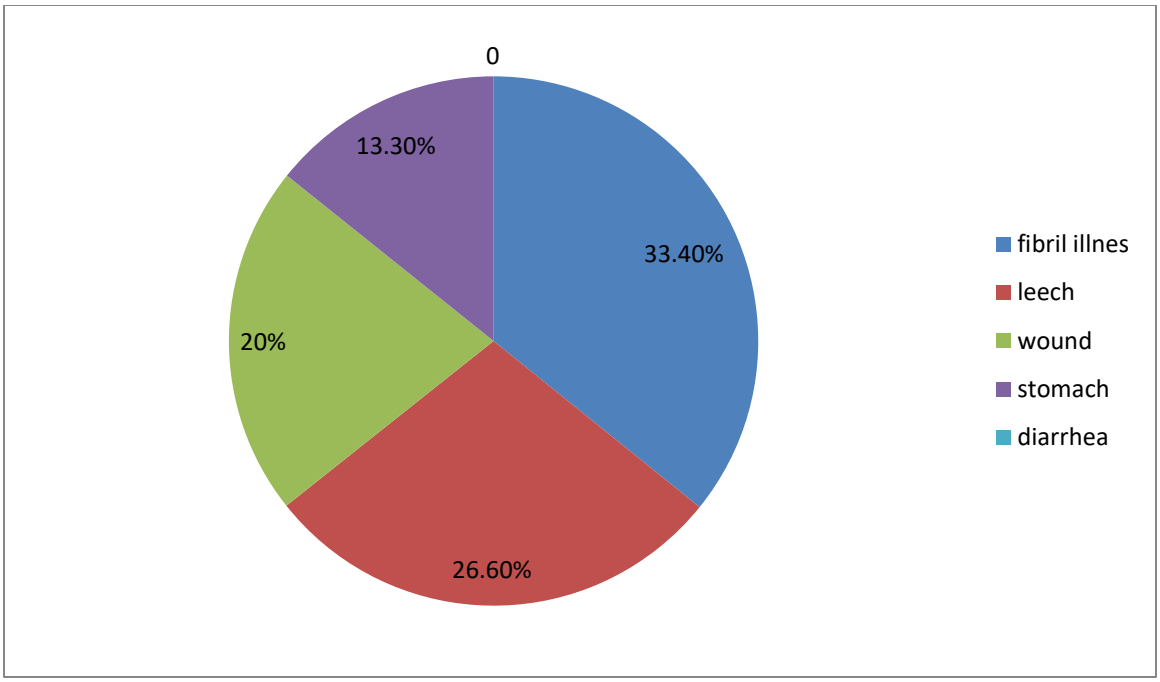

Figure 6: disease occurred in both human and livestock

4.1.12 Preference ranking

Preferences ranking of 7 medicinal plants were reported as effective for treating stomachache in the study area after selecting 7 key participants. For ranking purpose, the seven most cited medicinal plants used to treat stomach ache were selected and traditional healers ranked them based on their preference. Stomachache is widely occurring disease treated by more medicinal plants. The participants were asked to compare the given medicinal plants based on their efficacy. The results *showed* that *Nigella sativa* was chosen as the most preferable medicinal plant, it has highest mark and ranked first (table 5)

Table 5: Preference ranking of medicinal plants used for treating stomach ache.

Medicinal plants used	Respondents(A-G)							Total	Rank
	A	B	C	D	E	F	G		
Nigella sativa	7	7	6	7	7	7	7	48	1st
Ruta chalepensis	6	6	7	6	6	6	6	43	2nd
Citrus aurantifolia	2	4	5	4	5	4	5	29	3rd
Cymbopogon citrates	3	5	4	2	4	5	3	26	4th
Foeniculum vulgare	4	3	3	5	2	1	4	22	5th
Allium sativum	5	2	1	1	3	3	2	17	6th
Senna septemtrional	1	1	2	3	1	2	1	11	7th

4 .1.13.Direct matrix ranking

In the study area, medicinal plants were not only used for human illness treatment and livestock ailments a treatment, but also for construction, firewood, charcoal, fence, furniture, fodder and food. To assess relative usage of medicinal plant in the study area, six (6) multipurpose plant species and six use-values were selected and its score was calculated. In the result of direct matrix ranking, *Eucalyptus camaldulensis*, was ranked first which was the most preferable plant in its multi-usage followed by *Olea europaea* but *Cordia africana was* the least preferable plant species (Table 6)

Table 6: Direct matrix ranking of six medicinal plants on their use value (Ranking value: 5-best, 4-very good, 3-good, 2-less used, 1-least used and 0-no value)

Use of medicinal plant	*Carissa spinarum*	*Eucalyptus camaldulensis*	*Cupressus lusitanica*	*Dovyalis abyssina*	*Cordia africana*	*Olea europaea*
Construction	0	5	0	0	0	3
Firewood	5	5	5	5	3	5
Charcoal making	3	4	3	3	4	3
Fence	4	3	4	4	2	4
Medicinal	5	3	5	5	5	5
Furniture	1	2	2	0	0	1
Total	18	22	19	17	14	21
Rank	4th	1st	3rd	5th	6th	2nd

4.1.14 Informants consensus factor (ICF)

Informant consensus factor was calculated by categorizing all cited human and livestock illnesses in to ten namely, Circulatory disease (blood pressure, anemia), Respiratory disease(cough, common cold, tonsillitis), Digestive system disease(constipation, wart, vomiting, dysentery), Parasites (malaria, ascarisis, ring worm, dandruff, leech), Skin disease(fire burn, skin disease, wound, body swelling, meseals, spider),Sudden disease(head ache, febrile, devil), Gastro-intestinal disease(stomach ache, gastritis), Sensorial problems(tooth, nose bleeding, eye disease), reproductive organ disease(Gonorrhea),Other diseases(hepatitis, hen disease, urine problem).These diseases were categorized based on the nature of disease, place of attack, and

sign and symptoms of diseases. The informant consensus factors have been calculated for each category. (Table7). The highest ICF (0.95) value was obtained for diseases related to Reproductive organ disease (0.92) and Sensorial problems while the least one (0.69) was associated with Respiratory disease.

Table 7: Informant consensus factor for major categories of human and livestock disease

No	Categories of ailments	No. of use citations (nur)	No. of species	ICF
1	Circulatory disease	29	8	0.75
2	Respiratory disease	25	13	0.50
3	Digestive system disease	22	6	0.76
4	Parasites	28	11	0.62
5	Skin disease	29	12	0.60
6	Sudden disease	28	10	0.66
7	Gastro intestinal disease	33	13	0.62
8	Sensorial problems	21	4	0.85
9	Reproductive organ disease	14	2	0.92
10	Other diseases	33	6	0.84

4.1.15. Threat to medicinal plant and conservation mechanisms

Medicinal plants are at increasing risk from destruction of their habitats. The cause of threats to medicinal plants can be generally grouped into natural factors such as drought and human induced factors. However, as respondents reported in this study, most of the causes for the threats to medicinal plants were human induced factors such as agricultural expansion, fire wood, charcoal and timber, construction materials, overgrazing, urbanization, irrigation and over harvesting of known medicinal species. But the major threat to medicinal plants in the study area was agricultural expansion which (table 8).Ranking was done based on the use criteria rated as 6-extremely high, 5-very high, 4-high, 3-medium, 2-low and 1- very low.

Table 8: Ranking factors threatening medicinal plant species in the study area.

Threat factors	Respondents										Total	Rank
	A	B	C	D	E	F	G	H	I	J		
Agricultural expansion	6	6	5	6	5	6	6	6	6	5	57	1st
Firewood and charcoal	5	5	6	4	6	4	5	4	5	4	48	2nd
Construction	4	3	3	3	4	5	3	3	2	6	36	3rd
Drought	2	4	4	5	3	2	4	2	4	3	33	4th
Overgrazing	3	2	2	2	2	3	2	5	3	2	26	5th
medicinal value	1	1	1	1	1	1	1	1	1	1	10	6th

4.1.16. Method of transferring indigenous knowledge

Ethnomedicinal knowledge is concentrated in the elderly and relative members of the community and difficult in its transfer from the elders to the young generation. According to the analyzed result telling indigenous knowledge to the elder son, second son, relatives and friends were the method to transfer indigenous knowledge to the next generation. Most of the respondents (79%) preferred to transfer their indigenous knowledge to their family verbally and the remaining participants (21%)through showing the medicinal plants in the fields.

4.1.17 Marketability of medicinal plants and Cost of traditional medicine

According to the respondents, medicinal plants were marketed in the study area. In this particular study, from 72 plant species recorded in the study area,(15.2%) were collected from the market. According to most traditional healers who have practice to treat a particular ailment the cost of traditional medicine depend upon the current price. Among those which are available for sale in the local markets, some of them are marketed merely for their medicinal value and the rest for other use values (e.g. foods or spices). It may range from 15-400 birr. The table below shows scientific name of plant, Species of plants, measurement and Cost of plant of medicinal plant in the local markets in the study area (table 9)

Table 9: Marketability of medicinal plants and Cost of traditional medicine

No	Scientific name of plant	Species of plants	measurement	Cost of plant/ birr
1	*Coffee arabica*	Rubiaceae	Kilo gram	400
2	*Carthamus tinctorius*	Asteraceae	Kilo gram	150
3	*Citrus aurantifolia*	Rutaceae	Kilo gram	60
4	*Guizotia abyssinica*	Asteraceae	Kilo gram	140
5	*Hagenia abyssinica*	Rosaceae	tassa	30
6	*Lepidium sativum*	Brassicaceae	Cup of coffee	15
7	*Nigella sativa*	Ranunculacea	Cup of coffee	20
8	*Thymus schimperi*	Lamiaceae	tassa	20
9	*Senna septemtrionali*	Fabaceae	Cup of coffee	25
10	*Trigonella foenum*	Fabaceae	Cup of coffee	15
11	*Linum usitatissimum*	Linaceae	Cup of coffee	20

4.2 Discussion

The distribution of informants with respect to age class shows that the majority of informants found between the ages of 25-64. 216 of the total informants were male and 66 were females. Regarding educational status, 183 informants were uneducated, 54 primary school, 31 Secondary school, 12 informants were preparatory school and 2 were graduates (Appendix III). Regarding plant species as the result showed in the study area a total of 72 species of medicinal plants were collected these plants belong to in 41 families and 66 genera. In terms of species diversity fourteen (14) medicinal plant families were represented by two or more species, while twenty seven (27) families were represented by a single species each. Lamiaceae was the dominant family. It is better record than Arebu *et al*, (2017) record 45 and Guluma *et al*,(2017)record 60 medicinal plants. Regarding growth habit, herb, shrub, tree and climber are the habits of the medicinal plants found in the study area. From these most of the medicinal plants were herb followed by shrub and tree. This is due to the herbs presence of all places nearly and most place of the study area.

This result is similar with other studies in which herb are the dominant growth form following by shrub and tree (Kebede *et al.,* 2017; Behailu 2010; Getu, 2017; Tilahun, 2009). Others reported that shrub was the dominant growth form following the herb and tree (Getaneh , 2011; Mersha , 2011). Habitat of collected medicinal plants was collected for medicine from wild, home garden and market. So for this study most plant species were collected from wild. This indicates that the local people have not cultivated most medicinal plants species in their home garden**.** Similar studies in Ethiopian on medicinal plants also showed that traditional medicinal plants were harvested more from wild habitats than from home gardens this finding also shows that contribution of medicinal plants from home garden appears minimum compared to forest and other habitats and it needs to be emphasized. From the whole part of the plant, the collected information showed that the mostly used plant part was leaf followed by seed. This could be due to a leaf is easily accessible part of the plant and with a high content of mineral which needs simple preparation procedures. This result is in agreement with the results of similar studies conducted in different parts of Ethiopia (Arebu, 2015; Getnet, 2011; Getaneh, 2011; Kebede *eta.,* 2017),but other studies in Ethiopia reported root as the most used part of the plant for the preparation of medicinal plant Ketema *et al*. (2013)

Besides, from various methods of preparation in the study, area crushing is the most popular or principal way of preparation followed by pounding, the preparations varies based on the type and actual site of disease treated. In the study area the highest remedial is taken by oral, due to this crushing was the best mechanism to easily access by oral and assimilated easily to the body. This result is similar to the finding of other studies (Kebede et *al*., 2017; Behailu, 2010; Yalew et *al*, 2012 and Atinafu *et al.*, 2016). But, it is opposite with the finding of (Fikiru 2017; Eskedar, 2011; Getu, 2017 and Fisseha et al., 2009) in which decoction was the popular method of preparation. And, others also reported pounding as common way of preparation (Guluma et al., 2017; Abiyu et al., 2014and Mersha, 2011; Mesfin *et al*, 2009).As the results showed that the most remedies were prepared from a single plant parts(93%), similarly various research findings reported the use of single plant species used for traditional remedy preparation (Megersa *et al*, 2013; Eshetu *et a*l, 2016) But the potency of using a mixture of different plant or plant parts increased compared to using a sing plant to cure a disease is evident. As well the majority of the medicines 80.6% in the study area were prepared from fresh parts of medicinal plants followed by dried form 13.7% and 5.7% prepared from a combination of both dry and fresh The study conducted by (Abdurrahman, 2010) indicated that 86%ofpreparationswereinfreshformand (Amare, 1976) reported that most of 64% medicinal plants were used in fresh form and 36% in dried form. The dependency of local people on fresh materials is mostly due to the effectiveness of fresh medicinal plants in treatment as the volatile ingredients are not lost before use compared to the dried forms.

There are different routes for the applications of traditional herbal medicines for the treatment of various types of ailments; the major route of application in the study area was oral. Ethnomedicinal studies done by Adefa and Getaneh, (2013); Ermias, (2014) indicate similar findings. This because most internal ailments require assimilation of medicine to inner structures than external put. This result is quite similar to the findings of similar studies in which the major route of administration is oral (Fikiru, 2017; Getnet, 2011;; Behailu Etana, 2010 and Sintayehu , 2011). concerning method of application there are different application of medicinal plant such as drinking, creaming, eating, smoking, tied, fumigation, tying, dropping, immersion and other mentioned in the study area from this drinking was the main application followed by eating (Tesfaye et al., 2009; Eskedar, 2011; Mersha, 2011); were reported similar findings. Dosages of most medicine were measured by using different traditional tools. Such as finer length for root,

bark, and stem, pinches for powdered, and numbers for leaves, seeds, fruits, and flowers. But most traditional healers have utilized spoons, coffee cup, “tassa”, tea cup, glass, Finger, counting number of leaf, seed and fruit, pinching and so on. They inserted their fingers into those tools to guess the necessary dosage. However, most of the time there is no precise dosage for traditional medicines, but people determine the amount in count or volume based on the age and physical condition of the patient. Other also conducted that mostly doses are determined by approximation (Arebu, 2015).Most medicinal plants taken with additive, which includes water, butter, honey, boiled coffee, injera and oil. From this water was highly stated by participants followed by butter and honey while boiled coffee, injera and oil were least preferred additive taken with medicinal plant preparation. Because water is good solvent and used to easily move through the mouth. This is finding is similar with finding (Fikiru, 2017; Arebu, 2015; Eskedar, 2011 and Tilahun, 2009), but different from the finding of other studies reported honey as major additive (Giday, 2010)

In this study 39 different ailments were recorded which are treated by 72 medicinal plant species, this was better report than (Ketema et al., 2013 and Yayesh et al., 2015) who reported 38 ailments, 34 ailments respectively from these, 28 ailments occurred only in humans which are treated with 49 plant species, In this regard, stomachache and common cold were the most common human ailments recorded in the study area which treated by 9 medicinal plant species and 4 medicinal plant species respectively, According to the result 11 livestock ailments were identified which are treated by 23 medicinal plants. From these 11 ailments 6 were only occurred in livestock which were treated with 8 plant species. Rabies and hen disease were the main ailments of livestock which occurred in the study area. As it was identified there are 5 different types of diseases were recorded which were occurred both in human and livestock. To treat them there are 15 plant species were used. From these diseases Febrile illness disease was the major one followed by leech. Regarding preference ranking *Nigella sativa* was chosen as the most preferable medicinal plant that were as effective for treating stomach ache in the study area followed by *Ruta chalepensis*,. In the result of direct matrix ranking, in this study *Eucalyptus camaldulensis*, was ranked first which was the most preferable plant in its multi-usage like for construction, firewood, fodder, charcoal making and fencing than the other plan followed by *Croton macrostachyus.* But this result was quite different from Endalew, (2007) finding in which

Syzygium guineense was ranked first. The highest ICF value was obtained for diseases related to Reproductive organ disease.

The cause of threats to medicinal plants can be generally grouped into natural factors such as drought and human induced factors. However, in the study area the most causes for the threats to medicinal plants were human induced factors but the major threat to medicinal plants in the study area was agricultural expansion followed by fire wood and charcoal production. It is similar to the finding of (Getaneh, 2011; Sintayehu , 2011).

Ethnomedicinal knowledge is concentrated in the elderly and relative members of the community and difficult in its transfer from the elders to the young generation. According to the analyzed result telling indigenous knowledge to the elder son, second son, relatives and friends were the method to transfer indigenous knowledge to the next generation. Most of the respondents preferred to transfer their indigenous knowledge to their family verbally and the remaining through showing (observation) the medicinal plants in the fields. Indigenous knowledge transfer to the young generation is considered poor which may cause erosion of the practice. Transfer of knowledge to the young generation is affected by modernization .This might be related to the diminishing of interest of the young generation on indigenous knowledge. Similar result was reported by(*Yineger and Yewhalaw*, "2007) where young people showed disinterest(have no interest) on traditional medicinal plants.

CHAPTER Five

5. CONCLUSION AND RECOMMENDATION

5.1Conclusion

Generally, in this ethnobotanical study 72 plant species, 66 genera and 41 families were recorded to treat 39 different human and livestock ailments. In this regard, 28 of the recorded illnesses were occurring only in humans who were treated by 49 medicinal plant species and from this stomach ache and common cold were the major human ailments. Accordingly, 6 livestock ailments were treated by 8 medicinal from this Rabies was the major livestock ailments in the study area. Besides, 15 plant species were used to treat 5 similar ailments that occur in both humans and livestock. In this particular study area Lamiaceae family was the dominant family in the study area followed by Euphorbiaceae.

In the study area, most medicinal plants were herb followed by shrub and tree. Leaf was the major part of plant that it used this better advantage than using root to conserve plant species. While crushing was the major ways of preparation so it was used to mix the gradients easily and to make effective. Concerning method of application drinking was the main method which helps to applied easily both internal and external ailments. When we see rout of application oral was main route of administration in the study area this is very important for internal ailments.. To measure the dosage most of the time there is no precise dosage for traditional medicines, thus lack of precise dosage is one of the drawbacks of traditional medicinal plants. So determining standardized measurements is important. Some preparation of medicine needs additive from these water was highly used. This can help to prepare those medicines which taken through drinking orally. *Nigella sativa w*as the most preferable plant and ranked first to treat stomach ache ailments. While concerning multipurpose of plants *Eucalyptus camadulensis* ranked *first* in their multiple usages. The highest ICF value was obtained for reproductive organ disease the least ICF was for Respiratory disease. Concerning conservation status the major risk factor was expansion of agriculture so it is important replacing of plants by planting others as well cultivating medicinal plant in home garden are important conservation methods by the local community. Concerning transfer of indigenous knowledge, family was the best source of ingenious knowledge but most of them transfer their indigenous knowledge to their family verbally so helping and teaching the families to transfer their knowledge by documenting and by showing.

5.2 Recommendation

Based on the result of the study the following recommendations were forwarded

- Encourage the local people to grow medicinal plants around their home garden.
- Creating awareness to local people about conservation of medicinal plants.
- Train, encourage and support the local people on how to conserve and manage medicinal plants because the local people use only few conservation methods so, the training enables them to get further information in addition to their experience. ‘
- Train and help the local people and traditional healers how to transfer their medicinal knowledge in to their young.
- Establish a traditional healers association in the study area by providing professional support to conserve and to improve the indigenous knowledge on medicinal plants. .
- Traditional healers should be encouraged and recognized by the district administration to give better service to society.
- Training the local people, on resource use value, management and conservation at Keble or woreda level by agricultural experts or development agents, as it facilitates an integration of resource conservation with sustainable use.

References

Abbink, J. (1995). *Medicinal and ritual plants of Ethiopian Southwest. An account of recent research. Indigenous Knowledge and Development Monitor 3(2):*

Abdurhman,N.2010*Ethnobotanicalstudyofmedicinalplantsusedbylocal people in Ofla Wereda, Southern Zone of Tigray Regional State Ethiopia[M. S thesis],AddisAbabaUniversity* Abiyu, E., Zemede, A., Ensermu, K. Raja N. *(2014).Ethnobotanical Study of Traditional Medicinal Plants in and Around Fiche District, Central Ethiopia, Current Research Journal of Biological Sciences. 6(4):154-167*

Adefa, M. and Abraha,B. (2011). "*Ethnobotanical survey of traditional medicinal plants in Tehuledere district South Wollo, Ethiopia, "Journal of Medicinal Plants Studies,vol.5,* Adefa, M. and Getaneh, S.(2013).*"Medicinal plant biodiversity and local healthcare management system in Chencha District, Gamo Gofa. Ethiopia," Journal of Pharmacology and Phytochemistry, vol. 2, no. 1, pp. 284–293, 2013.*

Amare, G. (1976). *Some common medicinal and poisonous plants used in Ethiopian folk medicine. Pp. 63. Addis Ababa University, Ethiopia.*

Amsalu,N. , Bezie, Y. , Fentahun, M., Alemayehu, A.2018). *, "Use and conservation of medicinal plants by indigenous people of Gozamin Wereda, East Gojjam Zone of Amhara region ,Ethiopia: an ethnobotanical approach,"Evidence–Based Complementary and Alternative Medicine,vol.2018,ArticleID 2973513,23pages,*

Arebu, I. (2015).*Ethnomedicinal Study of Plants in Jigjiga Woreda, Eastern Ethiopia, MSc Thesis, Addis Abeba University, Ethiopia*.

Arebu, I., Teferi G., Tsige G., Kaleab A. (2017). *Ethnomedicinal Uses of Plants Among the Somali Ethnic Group, Jigjiga Woreda, Somali Regional State, Eastern Ethiopia, Ethiopia Journal of Health Development. 31(3):188-199*.

Asfaw,D., Dawit A. and Kelbessa U. (1999). *An overview of traditional medicine in Ethiopia: Prospective and Development Efforts..*

Atinafu, K., Shimelis, A., Akalu, M. and Getachew, M. (2016).*Ethnobotanical Investigation of Traditional Medicinal Plants Commercialized in The Markets of Dire Dawa City, Eastern Ethiopia, Journal of Medicinal Plants Studies; 4(3): 170-178*.

Balick, M. J .And Cox, P. A. R. *(1996).Plants People and Culture: The Science of Ethno botany. Scientific American Library, New York, USA,*

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

Behailu, E. (2010*). Ethnobotanical study of traditional medicinal plants of Goma Woreda, Jimma zone of Oromia region. Ethiopia: MSc Thesis, Addis Ababa University*

Bekalo,T,Woodmatas,S and Woldemariam, Z.(2009) "*An ethnobotanical study of medicinal plants used by local people in the lowlands of Konta Special Woreda, southern nations, nationalities and peoples regional state, Ethiopia," Journal of EthnobiologyandEthnomedicine,vol.5,article26,2009.*

Birhanu, Z. Endale, A. and Shewamene,Z.(2015)"*Anethnomedicinal investigation of plants used by traditional healers of Gondar town, North-Western Ethiopia," Journal of Medicinal Plants Studies,vol.3,no.2,pp.36–43*.

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

Central Statistical Agency of Ethiopia (CSA),"*population and housing census of Ethiopia, "ResultsforAmharaRegion,vol.1, 2007 part 1.*

Centeral statical Authority *(2011) livestock sample survey ministry of finance and economic development A. A.Ethiopia.*

Cotton, C.M. *(1996). Ethnobotany: Principles and Applications. John Wiley and Sons, New York, 412pp.*

Cunningham, A.B(1992) "*Wild plant use and resource management," in The Center for Biodiversity, L. A. Bennun, R. A. Aman, and S. A. Crafter, Eds., pp. 109–126, National Museums of Kenya, Nairobi, Kenya*

Cunningham, A.B. *(1996). People, Park and Plants use recommendations for multiple use zones and development alternatives around Bwindi: Impenetrable National Park, Uganda. In: people and plants, working paper 4, pp.18-25(Sample, A.ed).UNESCO, Paris.*

Dawit, A. (2001).*The role of medicinal plants in Health care Coverage of Ethiopia, the possible benefits of integration. In: (Medhin Zewdu and Abebe Demissie (eds.)). Conservation and Sustainable Use of Medicinal plants in Ethiopia. Proceeding of the National workshop on Biodiversity Conservation and Sustainable use of medicinal plants in Ethiopia, 28 April- 01 May 1998, pp.107-118. IBCR, Addis Ababa*

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

Debela, H. (2001). *Use and Management of Traditional Medicinal Plants by Indigenous People of Bosat Woreda, Wolenchiti area: An ethnobotanical approach. M.Sc. Thesis, Addis Ababa, Ethiopia.*

Demie, G. Negash, M. and Awas, T. (2018) "*Ethnobotanical study of medicinal plants used by indigenous people in and around Dirre Sheikh Hussein heritage site of South-eastern Ethiopia," JournalofEthnopharmacology,vol.220,pp. 87–93*

ECOMSC, (2018)-*Eastern Central Oromia Meteorological Service Center*

Edwards, S., 2001. *The ecology and conservation status of medicinal plants in Ethiopia. In: Conservation and sustainable use of medicinal plants in Ethiopia, 46-55,*

Endalew, A. (2007).*Use and management of medicinal plants by indigenous people of Ejaji area (Chelya Woreda), West Shoa, Ethiopia: An ethno botanical approach. MSc thesis, AAU, Ethiopia.*

Endashaw, B. *(2007).Study on actual situation of medicinal plants in Ethiopia.Prepared for JAICAF (Japan Association for International Collaboration of Agriculture and Forestry).*

.Eshetu, M.A. Kelbessa, E. and Dalle, G. (2016). "*Ethnobotanical study of medicinal plants in Guji Agro pastoralists, Bule Hora district of Borana zone, Oromia region, Ethiopia,"Journal ofMedicinalPlantsStudies,vol.4,no.2,pp.*

Eskedar, A. (2011).*Ethnobotanical Study on Medicinal Plants Used By Local Communities in Debark Worda, North Gondar Zone, Amhara Regional State, Ethiopia, MSc Thesis,*

Etana, T. (2007*). Use And Conservation of Traditional Medicinal Plants By Indigenous People In Gimbi Woreda, Western Wellega, Ethiopia, MSc Thesis, Addis Abeba University, Ethiopia,.*

Fassil, K.*(2001).The status and availability of oral and written knowledge on traditional health care in Ethiopia.*

Fisseha, M. Sebsebe, D. and Tilahun, T. (2009).*An Ethnobotanical Study of Medicinal Plants in Wonago Woreda, SNNPR, Ethiopia, Journal of Ethno Biology and Ethno Medicine. 5:1-18*

Gebrekidan, A. Sibhatleab, H.and Gebrekiros, G.(2018*).Indigenous Knowledge Based Identification of Medicinal Plants in Central Zone of Tigray, North Ethiopia, International Journal of Biodiversity and Conservation. 10(6): 265-275. Chicago, USA.*

Getaneh, G. (2011*). An Ethnobotanical Study of Traditional Use of Medicinal Plants and Their Conservation Status in Mecha Worda, West Gojjam Zone of Amhara Region, Ethiopia, MSc Thesis, Addis Abeba University, Ethiopia*

Getnet C. (2011*). An Ethnobotanical Study of Plants Used in Traditional Medicine and As Wild Foods in and Around Tara Gedam and Amba Remnant Forests in LiboKemkem Worda, South Gonder Zone, Amhara Region, Ethiopia, MSc Thesis, Addis Abeba University, Ethiopia.*

Getu, A. (2017).*Plant Diversity and Ethnobotany of Medicinal and Wild Edible Plants in Amaro District of Southern Nations, Nationalities and Peoples Region and Gelana District of Oromia Region, Southern Ethiopia, MSc Thesis, Addis Abeba University, Ethiopia.*

Giday, Y. Asfaw, Z. and Woldu, Z.(2010) "*Ethnomedicinal study of plants used by Sheko ethnic group of Ethiopia," Journal of Ethnopharmacology, vol. 132, no. 1, pp. 75–85,*

Guluma,K., Debela, A. and Morka, A. (2017).*Ethnoknowledge of Plants Used in Veterinary Practices in Midakegn District, West Showa of Oromia Region, Ethiopia. Journal of Medicinal Plants Studies 5(5): 282-288*

Heinrich M, Ankli A, Frei B, Weimann C, Sticher O. (1998*) Medicinal plants in Mexico: healers' consensus and cultural importance. Soc Sci Med.;47:1859–71*

Jansen, J.M. (198*1).the Need for Taxonomy of Health in the Study of Mrican Therapeutics. Social Science and Medicine 12(2):121*

Kebed**e**, T., Tamene, B. and Dereje, D. (2017).*Ethnobotanical Study of Medicinal Plants in Akaki District, East Shewa Zone, Oromia Regional State, Ethiopia, Journal of Medicinal Plants Studies. 5(2): 353-360*

Kelbessa E., Demissew S., Woldu Z., & Edwards, S. (1992*). Some threatened endemic plants of Ethiopia. In Edwards, S., & Asfaw, Z. (Eds). The status of Some Plants in Parts of Tropical Africa (pp. 35-55), Botany 2000: NAPREC, Monograph Series No.2. Addis Ababa University.*

Ketema, T., Etana, D., Spiridoula, A., Adugna, T., Gebeyehu, G. and Jos GM Houdijk (2013).*Ethnomedicinal Study of Plants Used For Treatment of Human and Livestock Ailments By Traditional Healers In South Omo, Southern Ethiopia, Journal of Ethno Biology and Ethno Medicine. 9:1-15.*

Langenheim, J.h. and Thiemann, K.U. (1982).*Plant Biology and its Relation to Human Affairs.University of California, Santa Cruz, New York. Pp. Pp. 12-45*

Maiti S. (2007*). Medicinal and Aromatic Plants in India National Research Center for Medicinaland Aromatic Plants, Boriavi,*

Martin, G.J. (1995).*Ethnobotany: A method Manual. Chapman and Hall, London. Pp. 265-270*

Megersa, M.Asfaw, Z. Kelbessa, E. Beyene, A. andWoldeab, B.(2013).“*Anethnobotanical study of medicinal plants in Wayu Tuka District, East Welega Zone of Oromia Regional State, West Ethiopia,” Journal of Ethnobiology and Ethnomedicine, vol. 9, article68*

Mersha, A. (2011). *Ethnobotanical Study of Medicinal Plants in Guji Agro-Pastorilists, Blue Hora District of Borana Zone, Oromia Region, Ethiopia, MSc Thesis, Addis Abeba University, Ethiopia.*

Mesfin,.D,S.andTeklehaymanot,T.*(2009). "An ethnobotanical study of medicinal plants in Wonago Woreda, SNNPR, Ethiopia," Journal of Ethnobiology and Ethnomedicine, vol. 5, article28.*

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

Mirutse, G. (1999).*An Ethnobotanical study of medicinal plants used by the Zay People in Ethiopia. M.Sc. Thesis. Uppsala, Sweden.*

Mirutse, G. (2001).*An Ethnobotanical Study of medicinal plants used by Zay people in Ethiopia.*

: Shikr ftserie 3:81-99

Motaleb.A. (2011).*Selected Medicinal Plants of Chittagong Hill Tracts, International Union For Conservation Of Nature, Dhaka, Bangladesh, MSc Thesis, and Addis Abeba University, Ethiopia*.

MSWARDO,(2008)*Minjarna Development Office Shenkora Wereda Agricultural.*

Negassa, A., Rashids, S., Geberemedihin,B., (2012*) livestock prodaction and marketing food and agriculture in Ethiopia progress and challenges pp 159-189*

Oladeji, O. (2016). *The Characteristics and Roles of Medicinal Plants: Some Important Medicinal Plants In Nigeria, Natural Products: An Indian Journal. 12(3):1-8.*

Pankhurst, R. (1965).*A historical examination of traditional medicine and surgery.Ethiopian medicinal Journal. 3 (4): 160.*

Pankhurst, R., (2001.) *Traditional Ethiopian knowledge of medicine and surgery: an Introduction of sources. Organization for social science research in eastern and southern Africa (OSSREA)*

PGRC (1996)," *Country report to the FAO international technical conference on plant genetic resources,"Tech. view at Google Scholar*

Quanah, N. (1998). *Bicultural diversity and integrated health care in Madagascar. Nature*

Rafieian-Kopaei M. (2012*). Medicinal Plants and The Human Needs, Journal Of Herb Medicine Pharmacology. 1(1):1-2*

Sarma, S. (2003*).Meghalaya, the land and forest. A remote sensing based study. NEHU.*

Sintayehu, T. (2011).*An Ethnobotanical Study of Medicinal Plants in Wondo Genet Natural Forest and Adjacent Keble, Sidama Zone, Snnp Region, MSc Thesis, Addis Abeba University, Ethiopia.*

Software, A. (1982).*Medicinal plants and Traditional medicine in Africa.John Wiley and Sons. New York. Pp. 255-256.*

Tadesse, B., Dereje, A. and Eyasu, E. (2015).*Ethnobotanical Study of Medicinal Plants in Selected Horro Gudurru Woredas, Western Ethiopia, Journal of Biology, Agriculture and Healthcare. 5(1):83-93.*

Tafesse,M. and Mekonen, L. (2001). *The role of traditional veterinary herbal medicine and its constraints in animal health care system in Ethiopia. In*

Teklehaymanot, T. and Mirutse, G. (2000), "*Ethnobotanical study of medicinal plants used by people in Zegie Peninsula, northwestern Ethiopia," Journal of Ethnobiology and Ethno Medicine, vol. 3, no.12, 20*

Teklehaymanot,, T. Mirutse, G,. (2007). *Knowledge and use of medicinal plants by people around Debre Libanos monstery of Ethiopia. Journal of Ethnopharmacology, 111, 271-283. https://doi.org/10.1016/j.jep.2006.11.019*

Tesfaye, H., Sebsebe, D. and Zemede, A. (2009). *An Ethnobotanical Study of Medicinal Plants Used By Local People in The Lowlands of Konta Special Woreda,Southern Nations, Nationalities And Peoples Regional State, Ethiopia, Journal of Ethno Biology And Ethno Medicine. 5(26): 5-26.*

Tesfaye, A. and Zemede,A. (1999). *Report on Ethnobotanical Study Nations, of Nationalities and People in Gambella and Benishangul GumuzReginal States. Progress Report to Research and Publication Office, Addis Ababa University, Addis Ababa.*

The National Herbarium (2004).*Biodiversity assessment of the Bale Mountains National Park and surrounding areas.Conservation and Sustainable Utilization of Medicinal Plants Project. Addis Ababa.*

Tilahun, T. (2009).*Ethnobotanical Study of Knowledge and Medicinal Plants Use by the People in Dek Island in Ethiopia, Journal of Ethno Pharmacology. 124: 69–78*

Thomas,H.(1995).*Indigenous Knowledge, Emanicipation and Alination.WHO knowledge transfer and utilization. 8(1): 63-73. University of Washington44.*

WHO (2002). *Traditional Medicines Strategy 2002-2005. World Health Organization, Geneva: WHO.* http://www.who.int/medicines/organization/trm/orgtrmmain.shtml.

WHO,(2004*), Guidelines on safety and monitoring of Herbal medicines in pharmaco vigilance system.*

WHO (2008).*Traditional medicine. Fact sheet NO.34*

Yalew, A., Debebe, Y. Ashok, K., Zewdneh, T. and Assefa, A. *(2012). Traditional Medicinal Plants Used by People in Libo-Kemkem District, South Gondar, Ethiopia, Asian Journal of Agricultural Sciences. 4(3): 171-176*

Yamane,.*T, (1967) statistics, An introductory analysis, 2nd Ed. Newyork Harper and Row*

Yayesh, L., Shemsu, U. and Messay, W. (2015*).Ethnobotanical Study on Traditional Medicinal Plants in Degadamot Woreda, Amhara Region, North Ethiopia International, Journal of Research in Pharmacy and Chemistry. 5(2):258-273*

Yibrah,T. (2014). *An Ethnoveterinary Botanical Survey of Medicinal Plants in Kochore District of Gedeo Zone, Southern Nations Nationalities and Peoples Regional State (Snnprs) Journal of Scientific and Innovative Research; 3(4): 433-445*

Yibrah,T. (2015).*Medicinal Plants in the Ethnoveterinary Practices of Bensa Woreda, Ethiopia, Open Access Library Journal. 2: e1258.*

Yineger H.and Yewhalaw,D. (2007), "*Traditional medicinal plant knowledge and use by local healers in Sekoru District, Jimma Zone, Southwestern Ethiopia," Journal of*

Ethnobiology and Ethnomedicine,vol.3,article24,Addis Abeba University, Ethiopia

Yirga,G. (2010) "*Assessment of traditional medicinal plants in enderta district, southeastern tigray, northern Ethiopia African Journal of Plant Science, vol. 4, no. 7, pp. 255–260, 2010.*

Yirga,G.(2010)."*Ethnobotanical study of medicinal plants in and aroundAlamata, SouthernTigray, NorthernEthiopia, "CurrentResearchJournalofBiologicalSciences, vol.2, pp.338–344,2010*

Yirga, G.(2010b). *Assessment of indigenous knowledge of medicinal plants in Central zone of Tigray, Northern Ethiopia.African Journal of Plant sciences. 4, 006-011.*

Zemede, A. (2001). *The Role of Home Garden in Production and Conservation of Medicinal plants. In: (MedhinZewdu and AbebeDemissieeds.).Conservation and Sustainable Use of Medicinal plants in Ethiopia.Proceeding of the National workshop on Biodiversity Conservation and Sustainable use of medicinal plants in Ethiopia, 28 April- 01 May 1998, pp. 76-91. IBCR, Addis Ababa.*

APPENDICES I

Appendices I includes list of medicinal plants used for treating both human and livestock ailment in the study area; with local name, scientific name, type of plant (herb, shrub, tree, climber), used to treat aliments, Used to treat (Human(H), Livestock(Li) Or both(B), methods preparation ; rout of application(oral , topical, nasal);part of plant used (leaf, steam, bark, root, latex, blub, seed) method of application, dosage.(Ms-Minjarna shekora) Notes Type of plant tree(T), shrub(Sh), climber(Cl), herbs(Hr)and used to treat human(H), livestock (Li), both(B)

code	Local name of plant	scientific name of plant	family	Type of plant	Used to treat	Type of disease treated	Way of Preparation	Rout of application	Part of plant used	Method of application	Dosage
Ms 001	Bokolu / eraskimer	*Leonotis nepetifolia*R. Br	Lamiaceae	Hr	H	Headach	Crush the leaf then mix with water then cream, drink with coffee	oral/ topic	leaf	drink	2-3 spun
Ms 002	Gomenzer	*Brassica carinata* ABr.	Brassicaceae	Hr	H	Stomach pain	pound the seed and mix with water and drink	oral	seed	drink	One glass
Ms 003	Buna	*Coffee Arabica* L	Rubiaceae	Hr	H	Fire burn	Roasted, crushed and powdered the seed	topic	seed	Apply on effected area	One spun
Ms 004	Gulo	*Ricinus communis* L. Chakima	Euphorbiacea e	T	Li	Stomach pain	Crush the leaf, add water then drink	oral	leaf	drink	A glass of juice
Ms 005	Melas golgul	*Gladiolus candidus R.*	Iridaceae				pound the root and smear it on	topic	root	smear	One tea spu

				Hr	H	wart	the wart				
Ms 006	Suf	*Carthamus tinctorius* L.	Asteraceae	Hr	H	cough	pound the seed and boil	oral	seed	drink	
Ms 007	Costa	*Brassica oleracea* L. var. acephala	Brassicaceae	Hr	H	constipation	Chopping the leaf and add oil, lomi and green paper	oral	leaf	eat	
Ms 008	Ariti	*Artemisia absinthium* L.	Asteraceae	Hr	H	Headache	Smoke the leaf of the plant or put one or two piece on head.	topic	leaf	smell	Three wise A day
					H	Devil sickness.	Cut the root and put into fire and smoke	Oral & nose	root	smoke	
Ms 009	Key bahirzafe	*Eucalyptus camaldulensis* Dehnh. Cat. Pl. Hort.	Myrtaceae	T	H	Fibril illness	Boil the leaf	Nose	leaf	fume	One time A day
Ms 010	Serdo	*Cynodon spp*	Poaceae	Hr	Live stock	Fibril illness	Smoke when animal is sick.	Nose	Stem and leaf	fume	
Ms 011	Key shinkurt	*Allium cepa* L.	Alliaceae	Hr	H	cough	Cut the onion bulb, boil	oral	Bulb	drink	One tea Glass
Ms 012	Nech shinkurt	*Allium sativum* L.	Allicea	Hr	H	Stomach pain	Crush the bulb and eat with empty	oral	Bulb	eat	Pain
					H	Stomach pain	Crush the bulb and eat with empty	oral	Bulb	eat	Pain
					H	Malaria	pound the bulb, mix with honey	oral	Bulb	eat	Two spun

Ms 013	Erate	*Aloe rivae* Gilbert&sebsebe	Aloaceae	H	Fibril illness	Sock the crushed and dried root into water and drink	oral	root	drink	One spunin in one glass water	
Ms 014	Shefera w	*Moringa oleifera*Lam.	Moringaceae	T	H	Pressure and diabetic	Crush the leaf and mix with water and drink always	oral	leaf	drink	One Glass
Ms 015	Key sere	*Beta vulgaris*L.	Amaranthaceae	Hr	H	Anemia	Eat the bulb with injera	oral	Bulb	eat	
Ms 016	Anfar	*Buddleja polystachya* Fresen.	Loganiaceae	T	H	Ascaries	Crush the leaf mix with water and drink	oral	leaf	drink	One tea Cup
Ms 017	Degeta	*Calpurnia Aurea* (Ait.) Benth	Fabaceae	Sh	H	Hepatitis	Sock leaf into water drinks a tea cup every day for Three week.	oral	leaf	drink	A tea of cup
Ms 018	Papaya	*Carica papaya* L.	Caricaceae	T	H	Common cold Cough	Smoke the leaf for 3 days	Nose	leaf	fume	Cup of Coffee
Ms 019	Agam	*Carissa spinarum* L.	Apocynaceae	Sh	H	Devil illness	Smoke the root, the bark and the steam together	Nose	Root, bark, steam	fume	
Ms 020	Lomi	*Citrus aurantifolia* Burn. F. Lomy	Rutaceae	T	H	Stomach pain	Drink the lemon juice	oral	juice	drink	Half Tea cup
					H	Tonsillitis	Gargle with the lemon juice	oral	juice	drink	
Ms 021	Kimbo	*Rumex obtusifolius*	Polygonaceae	Hr		Stomach pain	Cut the leaf then drop the milk on	oral	leaf	drink	4-5

		Bitter dock(L)			H		coffee glass and add with coffee then drink				drop
Ms 022	Bissana	*Croton macrostachyus* Del.	Euphorbiaceae	T	H	Ring worm	Crush the leaf, mix with butter.	topic	leaf	cream the affected area until recovery	
Ms 023	Serity	*Asparagus setaceus* L.	Asparagaceae	H	Skin disease	Chewing the leaf	surface	leaf	Drope on the surface		
Ms 024	Yefere nji tide	*Cupressus lusitanica* Mill.	Cupressaceae	T	Li	Diarrhea	Crush the leaf, add water	oral	leaf	drink	One glass
Ms 025	Gizawa	*Withania somnifera* L.	Solanaceae	Hr	Li	Rabies	Crush the root and mix with meat	oral	root	Eat	
Ms 026	Carrot	*Daucus carota* L.	Apiaceae	Hr	H	constipation	Eat the blub frequently	oral	bulb	eat	
Ms 027	Kitkita	*Dodonaea angustifolis* L.F.	Latexidaceae	T	H	malaria	Eat the seed with honey	oral	seed	eat	
Ms 028	Koshim	*Dovyalis abyssinica* (A.Rich)warb	Flacourtiaceae	Sh	Li	Liver fluke	Crush the leaf add water	oral	leaf	drink	Two Glass
Ms 029	Wanza	*Cordia Africana* L.	Boraginaceae	T	Li	wound	Crush the leaf	topic	leaf	Put on wound	One supn Or above
Ms 030	Kurkura	*Erythrina abyssinica* Lam. Ex DC.	Leguminosae	T	H	Dandruff	Crush leaf and creamed in the head	topic	leaf	cream	
Ms 031	Nech bahirza	*Eucalyptus globulus*	Myrtac	T		Common cold	Add the leaf and boiled withwater	topic	leaf	fumigate	

	f	Labil*l*.	eae		H					and wash	
Ms 032	Qulqual	*Euphorbia abyssinica* Pax	Euphorbiaceae	Sh	H	Gonorrhea	Eat the latex with injera until heald	oral	latex	eat	
Ms 033	Knchib	*Euphorbia tirucalli* L.	Euphorbiacea	Sh	H	wound	Creamed the latex on the wound	topic	latex	cream	
Ms 034	Ensilal	*Foeniculum vulgare* Mill.	Apiaceae	Hr	H	Stomach pain	Crush the leaf, add water and	oral	leaf	drink	
Ms 035	Nug	*Guizotia abyssinica* L.	Asteraceae	Hr	H	cough	Pound seed, add water ,boil with honey	oral	seed	drink	Half of Coffee cup
					Li	Urine problem	Crush the root then mix with water	oral	root	drink	Half of Tassa
Ms 036	Kosso	*Hagenia abyssinica* (Bruce)J.F Geml	Rosaceae	T	H	Ascaries	Crush seed add water	oral	seed	drink	One cup
Ms 037	Gebs	*Hagenia abyssinica* (Bruce)J.F Geml	Poaceae	Hr	Li	leech	Roast the seed until black, sock into water 4 - 5days,	oral	seed	drink	Two cup
Ms 038	Sensel	*Justicia schimperiana*(Hochst. ex Nees) T.Anders	Acanthaceae	Sh	Ll	External parasite	Crush the leaf and mix with water	topic	leaf	Cream on animal skin	
Ms 039	Boseke	*Kalanchoe petitiana* A. Rich.	Euphorbiacea	Hr	H	Body swell	Crush the root and open the swell part then put	In swell part	root	Put in to swe	
Ms	Feto	*Lepidium*	Brassic	Hr		Fibril					

040		*sativum* L.	aceae		B	illness					
Ms 041	Tinbah o	*Nicotiana tabacum* L.	Brassic aceae	Hr	B	leech	Crush the leaf, add water and drink one time	oral	leaf	drink	Half tea cup
Ms 042	Tikur azmud e	*Nigella sativa* L.	Solana ceae	Hr	B	Stomac h pain	Pound seed and eat with honey/boil with water and honey	oral	seed	Eat/dr ink	
					H	Measle s	Mix pounding seed with crushed garlic, ginger and honey then drink with tea.	oral	seed	drink	One tea Cup
Ms 043	Dama kesse	*Ocimum lamiifolium* Hochst. Ex Benth.	Lamiac eae	Hr	H	fibril	Crush the leaf, mix 2-3 drops in the coffee	oral	leaf	drink	2-3 drop
					B	Fibril illness	Crush the leaf, mix 2-3 drops in the coffee and drink.	oral	leaf	drink	Cup of coffee
Ms 044	Weyira	*Olea europaea* (Wall.Ex G. Don) Cif	Oleace ae	T	B	Fire burn	Burn the leaf, mix with butter	apply on the burnt area	leaf	cream	One time
Ms 045	Tunjite	*Otostegia integrifolia* Benth.	Lamiac eae	Sh	H	Malaria	Crush the leaf and drink	oral	leaf	drink	Half of coffe cup
Ms 046	Endode	*Phytolacca dodecandra* L. Herit	Phytola caceae	Cl	B	leech	Crush the leaf and add one plate in the river	Appl y in the river	leaf	Add in the river	One plate
Ms 047	Gesho	*Rhamnus prinoides* L. Herit.	Rhamn aceae	Sh	H	Tonsilli tis and tooth	Cut the shoot and chewing	oral	shoot	chewi ng	7 shoot

						pain					
Ms 048	Yeahiya joro	*Verbascum sinalticum* Benth.	crophulariacea	Hr	H	Ring worm	Crush the leaf then mix with vaslin	surface	leaf	Cream for 7 days	
					B	Stomach pain	Crush the leaf, add water and drink	oral	leaf	drink	Tea cup /tass
					LI	Sudden disease	Crush the leaf and make the animal drink	oral	leaf	drink	Tea cup
					B	Stomach ache	Crush the root, add water	oral	root		A glass
Ms 049	Lute	*Rhamnus prinoides* L.	Rhamnaceae	Sh	Li	Stomach pain/blotting	Crush the root ,leaf and add water	oral	Root and leaf	drink	One tassa
Ms 050	Embuai	*Solanum campylacanthum* L.	Solanaceae	Hr	H	Stop nose bleeding	Cut the leaf then put in the nose	surface	leaf	put	
					H	Tonsillit	Mix the seed and the juice with water	Drope on tosillit by usig cotton	seed	drope	2-3 drope
Ms 051	Tena adam	*Ruta chalepensis* L	Rutaceae	Hr	human	Stomach pain	pound the seed mix with honey	oral	seed	eat	2-3spoon

						vomiting	Vomiting Crush the leaf and add in coffee	oral	leaf	drink	One coffee cup
Ms 052	Tosegn	*Thymus schimperi* R	Lamiaceae	Hr	H	cough	Add dried leaf in boiled water and drink for 1 week	oral	leaf	drink	Two tea cup per day
Ms 053	Sinafich	*Senna septemtrionalis* (Viv.)	Fabaceae	Sh	H	Stomach pain	Crush the seed and eat with injera	oral	seed	eat	2-3 spoon
Ms 054	Chifreg	*Sida ovate* L.	Malavaceae	Sh	B	Rh factors	Crush and apply root in body or tie in neck	topic	root	tie	
Ms o55	Meserch	*Tamarindus indica* L.	Fabaceae.	Hr	H	Devil sickness	Boil the leaf with the orange then fumigate	Nose	leaf	fumigate	
Ms 056	Abish	*Trigonella foenum* J. M. S	Fabaceae	Hr	H	Stomach pain	Pound and Sock the seed in the water at night and drink	oral	seed	drink	One cup in morning
Ms 057	Grawa	*Vernonia amygdalina* Del.	Asteraceae	T	B	Stomach and blotting	Crush the leaf and mix with water	oral	leaf	drink	One tea cup o one tassa
Ms 058	Zenjibil	*Zingiber officinale* Roscoe.	zingiberaceae	Sh	H	Tonsillitis and common cold	Crush the root and eat with Honey or boil and drink	oral	stem	drink	One tea cup
Ms 059	Salit	*Sesamum indicum* L.	Pedaliaceae	Hr	H	Common cold	pound the seed boil and drink	oral	seed	drink	
Ms 060	Tult	*Rumex nepalensis* Spreng.	Polygonaceae	Hr	B	Stomach pain	Crush the root and mix with water	oral	root	Drink	One tea cup /one tassa

Ms 061	Korch	*Erythrina brucei* Lam.ex.Dci	Fabaceae	T	Li	Eye disease	Crush the leaf and dry then add to effected eye	Eye	leaf	Add	1/3 tea spoon
Ms 062	Besobila	*Ocimum americanum* L.	Lamiaceae	Hr	H	Headach	Cut the leaf then smell	nose	leaf	smell	
Ms 063	Apple/pom	*Malus domestica* Borkh.	Rosaceae	Sh	H	parasites	Swallow the seed with honey	oral	seed	swallow	5-7 seeds in empty stomach
Ms 064	Tembelel	*Jasminum grandiflor* R.	Oleaceae	Hr	human	Skin disease for baby	Chewing the leaf	surface	leaf	On surface	Up to three days
Ms 065	Neme	*Azadirachta indica* AJuss.	Meliaceae	T	Li	Hen disease	Crushing the leaf and root the mix with water, food	oral	Leaf and root	Give for hen to eat	
Ms 066	Tikl e gomen	*Brassical oleraceae* L.	Brassicaceae	Sh	H	Fire burn	Take the leaf and heat by fire then put on wound part	surface	leaf	Put on surface	Use until hea
Ms 067	Ruth	*Oryza sativa* J.M.s	Poacea e	Sh	H	dysentery	Boil the seed then drink the shirop also eat the ruth	oral	seed	drink	
Ms 068	Tejisar	*Cymbopogon citrates* L.	Poacea e	Sh	H	Stomach pain	Chewing the leaf	oral	leaf	chewing	
Ms 069	Telba	*Linum usitatissimum* L.	Linacea e	Sh	H	gastric	Boil the seed then drink	oral	seed	drink	One cup in empty stomach
Ms 070	Atefaries	*Datura stramonium*	Solanaceae	Sh	B	Wound and hen disease	Crush Leaf and seed then put on wound but give for hen with food to eat	Topic and oral	Leaf and seed	Put on wound and give for hen	

Ms 071	Merenz	*Strychnos innocua*	Alogani aceae	Sh	Li	Eye disease	Dry and Crush the leaf	eye	leaf	Put in to eye	
Ms 072	Mesir	*Lens culinaris* Mediki.	Fabace ae	Hr	H	Spider disease	Chewing the seed	surfa ce	seed	Put on the surfac e	

APPENDIX II

Appendix II List of medicinal plants used for treating human and livestock aliments in the study area; with scientific name, local name, family, source; (wild, home garden, market) used to treat human, livestock disease or both, Altitude, Distribution(commonly, sparsely and rarely and finally) C.N(code number) are mentioned.

Scientific name	Local name	Family	source	Used to treat human, livestock disease	Type of disease treat	Altitude	Distribution	C.N
Leonotis nepetifolia R.BR	Bokolu	Lamiaceae	H.gared	Human	Head ach/ mechi	2090	Sparsely	Ms001
Brassica carinata ABr.	Gomenzer	Brassicaceae	H.gard	Human	Stomach pain	2090	commonly	MS002
Coffea aabica L.	Buna	Rubiaceae	H.gard	Human	Fire burn	1927	rarely	MS003
Ricinus communis L. Chakima	Gulo	Euphorbiaceae	Wild	Live stock	Stomach pain	1976	rarely	MS004
Gladiolus candidus(Rendle)Goldblat	Melas golgul	Iridaceae	Wild	Human	wart	2090	rarely	MS005
*Carthamus tinctorius*L.	Suf	Asteraceae	H.gard	Human	cough	1804	commonly	MS006
Brassica oleracea L. var. acephala	Kosta	Brassicaceae	H.gard	Human	constipation	2090	Sparsely	MS007
Artemisia absinthium L	Arity	Asteraceae	H. gard	Human	Headache& Devil	2090	rarely	MS008

					sickness			
Eucalyptus camaldulensis Dehnh. Cat. Pl. Hort.	Key bahir zafe	Myrtaceae	Wild	Human	Fibril illness	1867	commonly	MS009
Cynodon (spp)	Serdo	Poaceae	Wild	Live stock	Fibril illness	2090	commonly	MS010
Allium cepa L.	Key shinkurt	Alliaceae	H.gard	Human	cough	2090	commonly	MS011
Allium sativum L.	Nechi shinkurt	Alliceae	H.gard	Human	Stomach pain Common cold& Malaria	1987	commonly	MS012
Aloe rivae Gilbert&sebsebe	Erate	Aloaceae	Wild	Human	Fibril illness	2092	Sparsely	MS013
Moringa oleifera Lam.	Sheferaw	Moringaceae	Wild	Human	Pressure and diabetic	2098	rarely	MS014
Beta vulgaris L.	Key sere	Amaranthaceae	H. gard	Human	Anemia	1887	Sparsely	MS015
Buddleja polystachya Fresen.	Anfar	Loganiaceae	Wild	Human	Ascaries	2090	rarely	MS016
Calpurnia Aurea (Ait.) Benth	Degita	Fabaceae	Wild	human	Hepatitis	2090	Sparsely	MS017
Carica papaya L.	Papaya	Caricaceae	H.gard	human	Common cold Cough	1804	Sparsely	MS018
Carissa spinarum L.	Agam	Apocynaceae	Wild	human	Devil illness	2090	commonly	MS019
Citrus aurantifolia Burn. F.	Lomi	Rutaceae	H.gard	human	Stomach pain& Tonsillitis	1987	Sparsely	MS020

*Rumex obtusifolius*Bitter dock(L)	Kimbo	Polygonaceae	Wild	human	Stomach pain	1987	rarely	MS021
Croton macrostachyus Del.	Bissana	Euphorbiaceae	Wild	human	Ring worm	2092	commonly	MS022
Asparagus setaceus L.	Serity	Asparagaceae	Wild	human	Skin disease	2094	rarely	Ms023
Cupressus lusitanica Mill.	Yeferenjitide	Cupressaceae	Wild	Live stock	Diarrhea	2096	Sparsely	MS024
Withania somnifera L.	Gizawa	Solanaceae	H.gard	Live stock	Rabies	2090	Sparsely	MS025
Daucus carota L.	Carrot	Apiaceae	H.gard	human	Live stock	2094	commonly	MS026
Dodonaea angustifolis L.F.	Kitkita	Latexidaceae	Wild	human	malaria	1986	Sparsely	MS027
Dovyalis abyssinica (A.Rich)warb	Koshim	Flacourtiaceae	Wild	Live stock	Liver fluke	1986	commonly	MS028
Cordia africana L.	Wanza	Boraginaceae	Wild	Live stock	wound	2090	Sparsely	MS029
Erythrina abyssinica Lam. Ex DC.	Kurkura	Leguminosae	Wild	human	Dandruff	1895	Sparsely	MS030
Eucalyptus globulus Labill.	Nech bahirzaf	Myrtaceae	Wild	Human	Common cold	2090	rarely	MS031
*Euphorbia abyssinica*Pax	Qulqual	Euphorbiaceae	Wild	human	Gonorrhea	2094	Sparsely	MS032
Euphorbia tirucalli L.	Knchib	Euphorbiacea	H.gard	human	wound	2096	commonly	MS033

Foeniculum vulgare Mill.	Ensilal	Apiaceae	H.gard	human	Stomach pain	1986	Sparsely	MS034
Guizotia abyssinica L.	Nuge	Asteraceae	H.gard	Human	cough	1897	rarely	MS035
				Live stock	Urine problem			
Hagenia abyssinica (Bruce)J.F Geml	Kosso	Rosaceae	Wild	human	Ascaries	1986	rarely	MS036
Hordeum vulgare L.	Gebs	Poaceae	H.gard	Live stock	leech	2090	Sparsely	MS037
Justicia schimperiana(Hochst. ex Nees) T.Anders	Sensel	Acanthaceae	H.gard	Live stock	External parasite	2090	Sparsely	MS038
Kalanchoe petitiana A. Rich. e	Boseke	Euphorbiaceae	Wild	human	Body swell	2090	rarely	MS039
Lepidium sativum L.	Feto	Brassicaceae	H. gard	both	Fibril illness	1986	commonly	MS040
Nicotiana tabacum L.	Tinbaho	Solanaceae	H. gard	both	leech	1986	rarely	MS041
Nigella sativa L.	Tikur azmude	Ranunculaceae	H. gard	both	Stomach pain	2090	rarely	MS042
				human	Measles			
*Ocimum lamiifolium*Hochst. Ex Benth.	Dama kesse	Lamiaceae	H. gard			2090	commonly	MS043
				human	fibril			
				both	Fibril illness			

Olea europaea(Wall .Ex G. Don) Cif	Wayira	Oleaceae	Wild	Both	Fire burn	1986	rarely	MS044
Otostegia integrifolia Benth.	Tunjite	Lamiaceae	H.gard	human	Malaria	1998	Sparsely	MS045
*Phytolacca dodecandra*L. Herit	Endode	Phytolaccaceae	H.gard	both	leech	1897	rarely	MS046
Rhamnus prinoides L. Herit.	Gesho	Rhamnaceae	H.gard	human	Tonsillitis and tooth pain	2090	commonly	MS047
Verbascum sinalticum Benth.	Yeahiya joro	Scrophulariacea	Wild	human	Ring worm	2090	Sparsely	MS048
				both	Stomach pain			
				Live stock	Sudden disease			
Rhamnus prinoides L.	Lute	Rhamnaceae	H.gard	Live stock	Stomach pain/blotting	1987	Sparsely	MS049
Solanum campylacanthum L.	Embuai	Solanaceae	Wild	human	Stop nose bleeding	1987	commonly	MS050
					Tonsillit			
Ruta chalepensis L	Tena adam	Rutaceae	H.gard	human	Stomach pain	2093	commonly	MS051
					vomiting			
Thymus schimperi R.	Tosegn	Lamiacea	Wild	human	cough	2095	rarely	MS0

		e						52
Senna septemtrionalis (Viv.)	Sinafich	Fabaceae	H.gard	human	Stomach pain	2092	rarely	MS053
Sida ovate L.	Chifreg	Malavaceae	Wild	both	Rh factors	1986	rarely	MS054
Tamarindus indica L.	Meserich	Fabaceae.	Wild	human	Devil sickness	1986	Sparsely	MS055
Trigonella foenum J. M. S	Abish	Fabaceae	H.gard	human	Stomach pain	1987	commonly	MS056
Vernonia amygdalina Del.	Girawa	Asteraceae	H.gard	Both	Stomach and blotting	2090	commonly	MS057
Zingiber officinale Roscoe.	Zenjibil	zingiberaceae	H.gard	human	Tonsillitis and common cold	2090	rarely	MS058
Sesamum indicum L.	Salite	Pedaliaceae	H.gard	human	Common cold	2092	rarely	MS059
*Rumex nepalensis*Spreng.	Tult	Polygonaceae	Wild	both	Stomach pain	2090	Sparsely	MS060
Erythrina brucei Lam.ex.Dci	Korch	Fabaceae	Wild	Live stock	Eye disease	2095	rarely	MS061
Ocimum americanum L.	Besobila	Lamiaceae	H.gard	human	Head ach	2092	commonly	MS062
Malus domestica Borkh.	Apple/pom	Rosaceae	H.gard	human	parasites	1897	rarely	MS063
Jasminum	Tembelel	Oleaceae	Wild	human	Skin disease	1987	Sparsel	MS0

grandiflor R.					for baby		y	64
Azadirachta indica AJuss.	Neme	Meliaceae	H.gard	Live stock	Hen disease	2090	commonly	MS065
Brassical oleraceae L.	Tikl e gomen	Brassicaceae	H.gard	human	Fire burn	2092	commonly	MS066
Oryza sativa J.M.s	Ruth	Poaceae	H.gard	human	dysentery	2093	rarely	MS067
Cymbopogon citrates L.	Tejisar	Poaceae	H.gard	human	Stomach pain	1992	Sparsely	MS068
Linum usitatissimum L.	Telba	Linaceae	H.gard	human	gastric	1987	commonly	MS069
Datura stramonium L.	Atefaries	Solanacea e	Wild	both	Wound and hen disease	2090	Sparsely	MS070
Strychnos innocua	Merenz	Aloganiaceae	wild	Live stock	Eye disease	2090	rarely	Ms071
Lens culinaris Mediki.	Mesir	Fabaceae	H. gard	human	Spider disease	2092	commonly	Ms072

APPENDIX III

III:Demographic characteristics of respondents in the study area

Characteristics		Frequency	Present (%)
Sex	male	212	75%
	Female	70	25%
Age	25-34	67	23.7%
	35-49	74	26.2%
	50-64	87	30.9%
	>64	54	19.2%
year of resident	1-10	87	30.9%
	11-20	63	22.3%
	21-30	68	24.1%
	>31	64	22.7%
Educational status	Uneducated	183	64.9%
	Primary	54	19.2%
	Secondary	31	11%
	Preparatory	12	4.2%
	Graduates	2	0.7%
marital status	Married	254	90%
	Unmarried	23	8.2%
	Divorced	5	1.8%
Occupation	Farmers	154	54.6%
	Merchants	26	9.2%
	Teachers &doctors	6	2.1%
	other workers	96	34.1%
Total		282	100%

APPENDIXIV:

Species and Families of medicinal plants from Minjarna Shekora District, North Shewa Ethiopia

No	Family	Species	Percent
1	Lamiaceae	6	8.4%
2	Euphorbiaceous	5	6.9%
3	Fabaceae	4	5.6%
4	Brassicaceae	4	5.6%
5	Asteraceae	4	5.6%
6	Poaceae	4	5.6%
7	Solanaceae	3	4.3%
8	Myrtaceae	2	2.7%
9	Alliaceae	2	2.7%
10	Loganiaceae	2	2.7%
11	Apiaceae	2	2.7%
12	Rosaceae	2	2.7%
13	Oleaceae	2	2.7%
14	Rhamnaceae	2	2.7%
15	Acanthaceae	2	2.7%
16	The rest family	26	36.4%
	Total	72	100%

APPENDIXV

Jimma University College of Natural science

Department of Biology

Semi structured interview questions

The objective of this interview is to collect some information of indigenous knowledge of the society about ethnobotanical study of medicinal plants used to treat human and livestock diseases in Minjarna shekora District. So the investigators kindly request you to give true and valuable information for the study.

I. General personal information

Date of interview_____

Name _____

Keble _____

Sex: _____

Age ____ Year of experience: ----------

Mode of practice: ----------

Educational statusA. Illiterate B. Primary education C. Secondary education

Work ----------Marital status----------

1. What are the main human and animal health problems in your locality or Keble? ----------

2. What are the types of human and livestock ailments found in the study area?

3. Are you cultivating medicinal plant in your home garden.

4. What are the major plant species existing within the study area?

5. From where do you collect these medicinal plants?

6. Have you ever use medicinal plant? A. yes B. No

7. Condition of medicinal plants for use: In Fresh _____, dried _____, powdered_____

8. If you use medicinal plant to treat human and livestock disease fill the table below

NO/	Local name of plant	Dosage	Part of plant used	Source of these plants	Way of preparation	Mode of administration	Conservation status	Disease treated
1								
2								
3								
4								

APPENDIXVI.

Indigenous knowledge related interview

1. How will the knowledge of medicinal plants use transferred from elders to younger's in the study area? Through

A. Family B. Traditional healer C. Observation D. Formal education E. Orally

2. What is your way to transfer indigenous knowledge? ----------

3. Availability of medicinal plants in your area as compared to the past:

A. Abundant, B. less abundant C. rare (scarce),

4. What are threatening factors of medicinal plants in your area? A. For medicinal B, Food C. Firewood D. Charcoal E. Fence F. Construction G. Furniture H. Agricultural expansion

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

6. What are the factors affecting the practice of indigenous knowledge on medicinal plants in the study area?

APPENDIX VII

Checklist for traditional healer

I. Personal information

Date:

Name:

Keble: ---------- Sex: ---------- Age: ----------

Education status: ----------

Marital status: ---------- Year of experience: ----------

Mode of practice: ----------

II. Basic information about medicinal plants

1. What are the main human and livestock ailments in your locality or Keble?

2. How do you treat these human and livestock ailments?

3. How do you prepare these traditional medicinal plants to treat ailments?

4. Are there conditions that forbid taking both for human and livestock this traditional medicine?

5. What are the different types of medicinal plants are available in your local to treat human and livestock ailments?

A. Name of the plant----------

B. Habitat of the plant----------

C. Habit of the plant----------

D. Part of the plant used----------

E. methods of Preparation ----------

F. dosage ----------

G. Application method----------

H. Other uses of the plant----------

I. Inefficacy of these medicines----------

APPENDIX VIII

(አባሪ VI)

ጂምማዩኒቨርሲቲየተፈጥሮሳይንስኮሌጅ

የባዮሎጂክፍ

ከፊልየተዋቀረቃለ-መጠይቅጥያቄዎች

የዚህቃለመጠይቅዓላማየሰውንእናየእንስሳትበሽታዎችንለማከምየሚያገለግሉየመድኃኒትእፅዋትሥነ-ምግባርጥናትስለህብረተሰቡየአገሬውተወላጅዕውቀትአንዳንድመረጃዎችንመሰብሰብነው. ስለዚህመርማሪውለጥናቱእውነተኛእናጠቃሚመረጃእንዲሰጡበደግነትይጠይቁዎታል.

ሀ. የግለሰቡመረጃ

1. ስም …… ቀን…….

2. ቀበሌ……

3. ጾታሀ. ወንድለ. ሴት

4. ስራሀ. ገበሬለ. ነጋዴሐ. ሌላ……

5. የትምህርትደረጃሀ. ያልተማርለ. የመጀመሪያደረጃሐ. ሁለተኛደረጃመ. ሌላ…..

6. ሀይማኖትሀ. ፕሮቴስታንትለ. ኦርቶዶክስሐ. ሙስሊምመ. ሌላ……

7. የጋብቻሁኔታሀ. ያገባለ. ያላገባሐ. የተፋታ

ለ. ለህክምናስለሚውሉእጽዋቶችመሰረታዊመረጃ

1.በአከባቢዎ ወይም በኬብል ውስጥ ዋና የሰው እና የእንስሳት ጤና ችግሮች ምንድናቸው

2.. በጥናቱ አካባቢ የሰዎች እና የእንስሳት ዓይነቶች ምን ዓይነት ናቸው?

3. በቤትዎ ጠባቂ ውስጥ የመድኃኒት ተክል እያመረቱ ነው?

4. በጥናቱ አካባቢ ውስጥ ዋና ዋና የዕፅዋት-ማህበረሰቦች ዓይነቶች ምንድ ናቸው?

5. እነዚህን የመድኃኒት ዕፅዋት ከየት ይሰበስባሉ?

6.የሰውን እና የከብት በሽታን ለማከም የመድኃኒት ተክል የሚጠቀሙ ከሆነ ከዚህ በታች ያለውን ሰንጠረዥ ይሙሉ;

No/	የዕፅዋት አካባቢያዊ ስም	የመድኃኒት መጠን	የሚጠቀሙት የእጽዋቱ ክፍል	የሚያገኘኙበት ቦታ	አዘገጃጀት	የአስተዳደር ሁኔታ	ጥበቃ ሁኔታ	የሚያክመው በሽታ	የእጽዋቱሌላ ጥቅም

APPENDIX IX

የአገሬው ተወላጅ ዕውቀት ተዛማጅ ቃለ መጠይቅ

1. አካባቢ ውስጥ የመድኃኒት እፅዋትእውቀት ከአዛውንቱ ወደ ታናሽ ልጅ እንዴት ይተላለፋል?
   ሀ. ከቤተሰብ ለ. ባህላዊ የህክምና ከሚሰጡ ሰዎች ሐ. በማየት መ. ከመደበኛ ትምህርት
2. የአገሬው ተወላጅ እውቀትን ለማስተላለፍ ምን መንገድዎ ነው?

3.. እርሶ ባህላዊ የህክምና እውቀት የሚያስተላልፉት እንዴት ነው?

4. ካለፈው ጋር ሲነፃፀር በአከባቢዎ ውስጥ የመድኃኒት እፅዋት መኖር

ሀ.ብዙ፣ለ.. ያነሰቁጥርያለውሐ. ያልተለመደ ‹

5. በአከባቢዎ ውስጥ የመድኃኒት እፅዋት ስጋት ምክንያቶች ምንድ ናቸው?

ሀ. ለመድኃኒት ረ. አጥር

ለ. ፣ ምግብ ሰ. ኮንስትራክሽን

ሐ. ፋየርዎል ፣ ሸ. የቤት ዕቃዎች

መ.ለከሰል ቀ. የግብርና መስፋፋት

6. የአከባቢው ሰዎች በባህላዊ የአገሬው ተወላጅ እውቀታቸው እነዚህን የመድኃኒት ተክል ዝርያዎችን እንዴት ያስተዳድሩ እና ያገግሯቸዋል?

7. በጥናቱ አካባቢ በመድኃኒት እፅዋት ላይ የአገሬው ተወላጅ ዕውቀት ልምምድ ላይ ተጽዕኖ የሚያሳድሩ ምክንያቶች ምንድ ናቸው?

APPENDIX IIX

List of key informants

No	Name	sex	Keble	Age	Educational status	Year of practice	Marital status	Specialize in treating
1	Abebe Yesuye	M	Balchi	49	Master	20	Married	Stomach pain
2	Liyu Niguse	F	Arerty	45	primary	18	married	Fibril illness
3	Derib Asefa	M	Balchi	61	secondary	32	married	Devil sickness
4	Tigist Belihu	F	Balchi	46	Illiterate	19	Unmarried	Pressure &diabetic
5	Gossa Birhane	M	Arerty	42	primary	16	married	Malaria
6	AlemayehuYeteshsa	M	Arerty	48	primary	17	married	Hepatitis
7	MeskeremTilahun	F	Eranbut	52	Illiterate	21	married	Fire burn
8	YeshiharegWerku	F	Cherech	56	secondary	31	married	Constipation
9	Kibru Metaferia	M	Eranbute	67	Illiterate	35	married	Devil
10	Zelalem Ashagre	M	Eranbute	62	Meserete timhirt	32	married	Eye disease
11	Ayelech Amene	F	Bolo	55	Illiterate	28	married	Ascaries

			silase					
12	Shimeles Tesfaye	M	Bolo silase	58	primary	31	married	Tonsillitis
13	Gezaheng Alemu	M	Bolo geiorgis	39	Illiterate	14	married	leech
14	Belachew Geremew	M	Cherecha	68	Illiterate	40	Unmarried	Rabies
15	Altaye Muluken	M	Bolo geiorgis	38	college	14	married	Gonorrhea