USE AND MANAGEMENT OF MEDICINAL PLANTS BY THE PEOPLE OF JABITEHNAN WOREDA, WEST GOJJAM, AMHARA REGIONAL STATE, ETHIOPIA

M.Sc. THESIS

YESHAMBEL BERHANU

MAY 2017

HARAMYA UNIVERSITY, HARAMAYA

Use and Management of Medicinal Plants by the People of Jabitehnan Woreda, West Gojjam, Amhara Regional State, Ethiopia

A Thesis Submitted to the Department of Biology,

Postgraduate Program Directorate

HARAMAYA UNIVERSITY

In Partial Fulfillment of the Requirements for the Degree of

MASTER OF SCIENCE IN APPLIED BIOLOGY

Yeshambel Berhanu Alebel

May 2017

Haramaya University, Haramaya

APPROVAL SHEET

HARAMAYA UNIVERSITY

POSTGRADUATE PROGRAM DIRECTORATE

We hereby certify that we have read and evaluated this thesis entitled **"**Use and Management of Medicinal Plants by the People of Jabitehnan Woreda, West Gojjam, Amhara Regional State, Ethiopia**"** prepared under our guidance by Yeshambel Berhanu Alebel. We recommend that it to be submitted as fulfilling the thesis requirement

Meseret Chimdessa (PhD)		
Major advisor	Signature	Date
Yohannes Petros (PhD)		
Co-advisor	Signature	Date

As the board of the examiner of the MSc Thesis Open Defense Examination, we certify that we have read and evaluated this thesis prepared by Yeshambel Berhanu Alebel and examined the candidate. We recommend that the thesis be accepted as fulfilling the Thesis requirements for the degree of Masters of Science in applied Biology

Chairperson	Signature	Date
Internal examiner	Signature	Date
External examiner	Signature	Date

DEDICATION

This thesis manuscript is dedicated to my father ‘Molla Nigatu and my mother Fikire Matebie. ‘Etye’, it is your help and encouragement output through the almighty GOD.

STATEMENT OF THE AUTHOR

First, I declare that this thesis is my bonafide work and that all sources of materials used for this thesis have been duly acknowledged. This thesis has been submitted in partial fulfillment of the requirements for M.Sc. degree at Haramaya University and is deposited at the University Library to be made available to borrowers under the rules of the Library. I solemnly declare that this thesis is not submitted to any other institution anywhere for the award of any academic degree, diploma or certificate.

Brief quotations from this thesis are allowable without special permission provided that accurate acknowledgement of source is made. Requests for permission for extended quotation from or reproduction of this manuscript in whole or in part may be granted by the Head of Department or School of post graduate directorate program when in his or her judgment the proposed use of the material is in the interest of scholarship. In all other instances, however, permission must be obtained from the author.

Name: Yeshambel Berhanu Signature: _____

Place: Haramaya University, Haramaya

Date of Submission**:** _____

BIOGRAPHICAL SKECH

The author, Yeshambel Berhanu Alebel, was born on September, 1991 in Azemer-Yebadi kebele, West Gojjam zone, Amhara region, Ethiopia. He attended his elementary education in Zengebal-Bedega; Zengebal Elementary School from 2000 to 2006. He attended his elementary and secondary education at Finote-Selam Elementary and Secondary Junior School from 2007 to 2008 and he attended his secondary education in Finote-Selam town, Damot Secondary High School from 2009 to 2010. He attended his preparatory program in Finote-Selam Damot Secondary Higher Preparatory School from 2011 to 2012. He joined Jimma University in 2013 and attended his education in biology. In 2015, he was awarded a Bachelor of Science Degree in biology. In 2016, he joined Haramaya University School of post graduate directorate program to pursue his Master of Science degree in the department of biology in the program of applied biology.

ACKNOWLEDGEMENTS

The first heartfelt thank is to my major advisor Meseret Chimdessa (PhD) for his sound and unreserved advice till the end of the study and to my Co-advisor Yohannes Petros (PhD). They gave endurance to me and life to my thesis. I have very much appreciated and I am exceedingly indebted to ministry of education of Ethiopia for giving me this opportunity.

My sincere and special gratitude go to the community of Jabitehnan woreda for their support during data collection in the field. I have great respect and special thanks to Jabitehnan woreda administration and Agriculture office for their cooperation, facilitating all administrative requirements during the actual field study, and provision of reliable information.

I sincerely wish to pass my gratitude to my mother Fikire Matebie and all my family members. I do not forget your love and encouragement throughout my life.

ACRONYMS AND ABBREVIATIONS

CBD	Center for Biological Diversity
FAO	Food and Agricultural Organization
FDA	Food and Drug Administration
FL	Fidelity Level
ICF	Informant Consensus Factor
IK	Indigenous Knowledge
MP	Medicinal Plant
PR	Preference Ranking
TK	Traditional Knowledge
TMK	Traditional Medicinal Knowledge
TMP	Traditional Medicinal Plant
WHO	World Health Organization

TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

TABLE OF CONTENTS (continued)

LIST OF TABLES

Table page

LIST OF FIGURES

LIST OF TABLES IN THE APPENDICES

Use and Management of Medicinal Plants by the People of Jabitehnan *Woreda*, West Gojjam, Amhara Regional State, Ethiopia

ABSTRACT

Around 80 % of the people of Ethiopia are estimated to be relying on medicinal plants for the treatment of human and cattle ailments. The purpose of this study was to collect, identify and document ethnomedicinal plants and associated indigenous knowledge of communities of the study area. Ethnomedicinal data were collected by using semi-structured interview, focus group discussion and direct field observation with 54 randomly selected non-healers (Female 27 and Male 27) and 46 traditional healers (Female 6 and Male 40)). To analyze data, descriptive statistics such as percentage and frequency were employed. Moreover, informant consensus factor, fidelity level and preference ranking, independent sample t-test, ANOVA and Jaccard's similarity index were computed. Results show that a total of 82 medicinal plant species distributed among 46 families and 76 genera were collected and documented from the study area as traditional medicine for the treatment of 63 diseases of humans and livestock; of the 82 medicinal plant species, 63 plant species (76.83%) were employed as remedies for human, 10 plant species (12.20%) for livestock, and 9 plant species (10.98%) for both human and livestock remedies. Family wise Asteraceae consisted of the largest number of species. Herbs were dominant growth forms followed by shrubs and trees. Leaves were found to be the most frequently used plant parts followed by roots and seeds. The popular method of preparation was crushing 27(30.00%) and remedies were mostly prepared in fresh form from single plant or multiple plants with or without some additives. Oral administration was the most widely used route of application of remedies, 106 (65.86%). Analysis of Similarity index between the three surveyed kebeles showed that communities of the area have more or less closer indigenous knowledge. Knowledge about medicinal plants was found to be affected by gender, age and educational level. The main threatening factors of medicinal plants were agricultural expansion, use for firewood and charcoal and overharvesting. In order to conserve substantial amount of traditional medicinal plants and knowledge, awareness on conservation of medicinal plants should be given to the locals.

Key words: *Descriptive statistics, Indigenous knowledge, Medicinal plants, Species, Traditional healers,*

1. INTRODUCTION

Traditional medicine is the total combination of knowledge and practices, whether explicable or not, used in diagnosing, preventing or eliminating physical or mental diseases which may rely exclusively on past experience and observation handed down from generation to generation verbally or in writing (WHO, 2001). As elsewhere in Africa, indigenous people in Ethiopia by large have been employing plant- based traditional medicines to fight against various ailments (Pankhurt, 1990). Ethiopia has rich flora, of which some have therapeutic value that may be used in the treatment of many diseases (Kelbessa *et al.,* 2004).

Before the development of modern drugs, treatment of ailments through plant-based medicine was the principal means in Ethiopia and these days' most indigenous people prefer traditional medicines to modern drugs due to their affordability and easy access (Dawit, 2001). The various available literatures show the significant role of medicinal plants in primary health care delivery in Ethiopia where 70% of human and 90% of livestock population depend on traditional medicine similar to many developing countries, particularly those of Sub-Saharan African countries. These plants are part of the economic commodity for some members of the society which make their livelihood on their collection, trade and medicinal practices by practitioners or healers. It thus, has a substantial potential to make contributions to the economic growth and alleviation of poverty in the country (Anteneh *et al.,* 2012*).*

The use of plant based-traditional medicines is almost as old as the history of human kind. Among the 422,000 plant species documented worldwide, 19% were reported to have medicinal values (Chris *et al.,* 2000). Because of the escalation of the price of synthetic drugs in the last couple of decades, medicinal plants have been playing a vital role in many parts of the world, especially in the developing nations. This is true in Ethiopia where nearly 80% of the population relied on medicinal plants to prevent and cure various health problems (Dawit and Ahadu, 1993). Herbal medicine is also getting a special attention in the Western world to such an extent that it is relevant to raise concern related to sustainability and management of medicinal plants. Indigenous knowledge of medicinal

plants does vary from place to place and transferred through oral communication from one generation to the next generation (Abebe and Ahadu, 1993; Cunningham, 2001).

The people of Ethiopia have used traditional methods to treat both human and animal diseases for generations. Traditional medicine is still widely practiced in rural areas where modern public health and veterinary services are limited (Yayeh *et al.*, 2015). Traditional medicine (TM) describes a group of health care practices and products with a long history of use. It frequently refers to medical knowledge developed by indigenous cultures that incorporate plant, animal and mineral-based medicine, spiritual therapies and manual techniques designed to treat illness or maintain well-being (Engedasew *et al.*, 2015). Traditional medicine tends to be practiced outside of allopathic medicine (also known as biomedicine, conventional or Western medicine), which is the dominant system of medicine in the developed world. In many cultures, traditional medicine functions as a comprehensive system of health care refined over hundreds or even thousands of years. Some of the best-known TM systems include traditional Indian (Ayurveda) medicine, traditional Chinese medicine, and traditional Arabic (Unani) medicine (Endashaw, 2007).

Inventories are important to identify unique and valuable components and such inventories coupled with information from knowledgeable rural people, who have learnt through resource use, rather than formal training can be invaluable sources of information for plant utilization and conservation practices (Bishaw, 1991). In Ethiopia various ethno botanical and ethno medicinal plant studies have been conducted in different parts of the country. However, no investigation and assessment of the use and management of medicinal plants was conducted in Jabitehnan woreda West Gojjam of Amhara region, Ethiopia. This necessitated the design of this study so as to undertake ethno-medicinal investigation in Jabitehnan woreda with the following objectives.

General objective

To investigate the traditional use of plants by indigenous people of Jabitehnan Woreda to treat human and livestock ailments

Specific objectives

- To collect, identify and document traditional medicinal plants that are used by the people of Jabitehnan Woreda for the treatment of human and livestock ailments
- To identify medicinal plant part (s) used in the study area
- To document methods of preparation and ways of administration in the study area
- To document indigenous knowledge on the use of medicinal plants by indigenous people of the study area
- Socio-Demographic factors influencing indigenous medicinal knowledge in the study area
- To document the threat of medicinal plants in the study area

2. LITERATURE REVIEW

2.1. Traditional Medicine

Traditional medicine refers to "the sum total of knowledge, skills and practices based on the theories, beliefs and experiences indigenous to different cultures, whether explicable or not used in the maintenance of health, as well as, in the prevention, diagnosis, improvement or treatment of physical and mental"(WHO, 2013). It comprises of therapeutic practices that have been in existence, for hundreds of years, before the development and spread of modern medicine and are used to day .This practices vary widely, in keeping with social and cultural heritage of different countries (Moa *et al*., 2013).The principle of practices in TM is premised on the belief that human being is both a physical and spiritual entity, and that disease can be due to supernatural causes as well as the invasion of foreign object in to the body. It is therefore not only the symptoms of the disease that are taken in to account in TM, but also physiological and sociological factors. Thus, the holistic nature culture-based approach to traditional health care is an important aspect of the practice, and sets it apart from conventional western approaches (Degene, 2014).

Traditional medicine has a long history of use in health maintenance and in disease prevention and treatment particularly for chronic disease. It is found in almost every country in the world and the demand for its services is increasing. About 80% of African people,70% population in India, 40% of China, 60-70% Asian countries, 70% in Chile, 40% in Columbia, 46% in Australia, 70% in Canada, 40% UK, 42% USA, have been practicing TM (Bussman and Sharon, 2006; WHO, 2013; Abott, 2014). Particularly in many Africans, especially rural people and poor people in urban centers, relay on the use of TM when they are ill. In fact, in many rural communities in Africa, TM is the major and in some cases the only source of health care available (Antiwi-Baffour *et al.*, 2014). Recently, there has been a growing interest in TM to public health in developed and developing countries. This wide spread of use of TM could be attributed to cultural acceptability, economic affordability, accessibility, diversity, flexibility, low levels of technological input, relative low side effects and growing economic importance (WHO, 2002) and its efficacy against certain type of diseases as compared to modern medicines (Ketema *et al*., 2013).TM also stands out as a way of coping with the relentless rise of chronic non communicable diseases (WHO, 2013).

The TM sectors have played a significant role in the economic development of a number of countries. At the same time, with prevailing current global constraints, use of TM for health promotion, self-health care and disease prevention may actually reduce health care costs. Therefore, TM sectors are responsible to ensure that all people have access to preventive, curative and rehabilitative health services (WHO, 2013).

2.1.1. Indigenous Knowledge on Traditional Medicine

Indigenous knowledge refers to the cumulative and complex bodies of know-how, practices, beliefs, and representations that are maintained and developed by local communities, who have long histories of interaction with the natural environment (Ketema *et al*., 2013). Furthermore Abott (2014), described IK as the content or substance of knowledge resulting from intellectual activities in a traditional context, and includes the know-how, skills, innovations, practices and the learning that form part of TK/IK systems, and knowledge embodying traditional life styles of indigenous and local communities, or contained in codified knowledge system passed between generation. An IK/TK of medicine involves collection of raw materials, preparation of remedies, traditional diagnosis and its prescription to patients (Mathewos *et al*., 2013a and b).

The indigenous people of different countries and localities have developed their own specific knowledge of plant resource uses, management and conservation by ’trials and error” (Endalew, 2007; Fisseha *et al*., 2009). This knowledge differed between countries, and within ethnic groups and also among citizens (Berhane *et al*., 2014). Also differs among community member according to gender, age, social standing, profession and intellectual capabilities (Mathewos *et al*., 2013 a and b). Many countries in the world have their own traditional or indigenous form of healing which are firmly rooted in their culture and history (WHO, 2013). Thus indigenous and local communities are immense reservoirs of TK that can benefit to biotechnology, agriculture, pharmaceutical development and health care (CBD, 2008).

2.1.2. Problems Associated with Traditional Medicine and Practitioners

Despite traditional medicine being widely used, it has been viewed with a lot of skepticism by conventional health practitioners and the practice faces some challenges (Antiwi-Baffour *et al*., 2014). The acceptance of western religion, education, urbanization and

globalization phenomena have negatively affected the perception about TM in Africa, usually among the educated elites (Afra and Arazeem, 2011). As a result, especially young generation has not shown much interest in this life long accumulated TMK. This tendency of disinterestedness in TMK is likely to be one of the major causes for losing this wealth of knowledge in the near future (Tesfaye *et al.,* 2009; Gidey, 2010 a and b). In Africa the way in which TMPs obtain their knowledge and skill through mouth or verbally, but not from an official educational training program. This making it difficult to identifying qualified practitioners (WHO, 2013). TMPs also consider their TMK as private property, and hold as secret due to different personal economic and social interest attached to it and other cultural consideration. This refuse to release (disclose) to others (Endashaw, 2007; Tadesse *et al*., 2015). Furthermore, most of TM is not safe. BecauseTMK does not have standard and accurate dosage of medications. Therefore, TMPs prescribed medicines based on "trial and error" method (Abbott, 2014). This indicates that the TMK is not fully conveyed from one generation to the next generation. Now a days, traditional medicinal plants and associated indigenous knowledge are disappearing at an alarming rate; due to natural and anthropogenic factors (Endashaw, 2007; Anteneh *et al*., 2012). As a result, the earth is losing at least one potential drug every two years. For all of these reasons, the study and conservation of medicinal plant and animal species have become increasingly urgent. The accelerating loss of species and habitat worldwide adds to this urgency (CBD, 2008).

2.2. Traditional Medicines in Ethiopia

The people of Ethiopia have been using traditional (TM) from times immemorial to combat and control human and livestock ailments. It continues to play a significant role in the most part of the country (Endashaw, 2007).TM has been used to prevent pests and vectors (Haile *et al*., 2008). From this fact, the use of TM has become an integral part of the different cultures in Ethiopia (Getu, 2009). TM is an integral part of the culture, belief structure and life style of Ethiopian people's (Tesfaye *et al*., 2009). Traditional remedies are sometimes the only source of therapeutics for nearly 80% of human population and 90% live stocks (Yayeh *et al*., 2015) and 95% of the preparation is of plant origin (Endashaw, 2007).

2.2.1. Traditional Medicinal Plants in Ethiopia

Ethiopia is a home for a number of traditional knowledge on traditional medicine (Kennes and Joseph, 2002). Ethiopia is one of the six centers of biodiversity in the world with

several topographies, climatic condition and various ethnic cultures (Endashaw, 2007; Balcha, 2014). Among resources utilized by indigenous knowledge, traditional plants are key resource. Medicinal plants have been used traditionally for treatment, prevention and cure of human and livestock aliments by different ethnic and social group over many centuries (Haile, 2005; Endashaw, 2007). Particularly, traditional herbal healing is widely practiced throughout the rural population as their primary health care system (Balcha, 2014). Ethiopia is endowed with rich flora and fauna, due to its physical and climatic diversity .The total number of vascular plants is estimated to be between 6,500 and 7000 species, of which 12% is considered to be endemic and 14% is used as medicinal plants (Endashaw, 2007; Balcha, 2014; Tadesse *et al*., 2015).The country possesses a wide range of potentially useful medicinal plant, more extensive indeed than available in many other parts of world (Gidey, 2010 b). There is a wide gap in our knowledge about ethnobotanical data and information from various part of Ethiopia; although we have rich and diverse ethnobotanical work have not yet been made in all parts of the country (Fisseha *et al*., 2009; Mirutse *et al*., 2009).

2.2.2. Indigenous Knowledge of Medicinal Plants in Ethiopia

Indigenous knowledge refers to accumulation of knowledge, rule, standards, skills, and mental sets, which are possessed by local people in particular area (Balcha, 2014). The immediate and intimate dependency of local people on natural resources resulted in the accumulation of indigenous knowledge that helped the people to adapt and survive in the environment in which they live. It is local knowledge that is unique to a given culture or society and the base for agriculture, health care, food preparation, education, environmental protection and host of other activities (Thomas, 1995). The status of phytomedicine preparation of crude extracts and the isolation of active ingredients is very minimal. Derogatory attitude towards traditional medicine practitioners had forced healers to keep their knowledge and practice to themselves. Moreover, the indigenous knowledge associated with the conservation and use of medicinal plants is also disappearing at an alarming rate (Endashaw, 2007).Indigenous knowledge develops and changes with space. Ethnobotanical knowledge involves traditional diagnosis, collections of raw materials and preparation of the indigenous knowledge on plant remedies in many countries including Ethiopia; pass from generation to generation verbally with great secrecy. Such secret verbal transfer makes the indigenous knowledge or ethnomedicinal knowledge vulnerable to distortion and in most cases, some of the lore is lost at each point of transfer (Amare,

1976).Similar to other forms of traditional knowledge, the ethno-veterinary medicinal plant knowledge, is not well documented in Ethiopia and information(knowledge) can be lost whenever a traditional medicinal practitioner passes away without conveying this traditional medicinal plant knowledge, and the younger generation is not interested in living the traditional way of life (Yibrah, 2014).

2.3. Threats and Conservation of Medicinal Plants and Associated Knowledge

Medicinal plant and associated indigenous knowledge of their uses provide vital contribution to human and livestock health care needs throughout Ethiopia (Mulugeta, 2014; Assegid; Tesfaye, 2014. Despite the fact that indigenous knowledge is associated with the conservation and use of medicinal plant is disappearing at an alarming rate (Endashaw, 2007; Tesfaye *et al*., 2009). This is due to lack of systematic conservation, research, improper utilization and documentation (Endashaw, 2007).From the fact of this Ethiopian's traditional medicine is faced with problem of continuity and sustainability (Sintayehu, 2011). This implies botanical collection and documentation of the associated ethnobotanical knowledge should be carried out before such rich heritages are lost due to various threats (Tesfaye *et al*., 2009).

2.3.1. Threats and Challenges of Traditional Medicinal Plants in Ethiopia

The people of Ethiopia utilized traditional medicinal plant as the major of health care especially before biomedicine turns to become another option and it remain popular even in the presence of biomedicine. It continues to play a significant role in the health care service (Degene, 2014). However, there was a loss of plant biodiversity, especially a dramatic decrease in number of medicinal plants in the last 25 years (Mathewos *et al*., 2013). Several studies in different part of Ethiopia have shown that wild plant resources including medicinal plants are subjected to a number of anthropogenic and natural factors (Tesfaye *et al*., 2009; Anteneh *et al*., 2012). Anthropogenic factors were recorded as the main threats to plant species in general and medicinal plants in particular (Endashaw, 2007; Tesfaye *et al*., 2009).The main factors to loss of plant species are agricultural expansion in relation to population growth, overharvesting, destructive harvesting, the need for fuel, timber production, overgrazing, encouraging the new varieties and cultural shifts. Likewise natural cause includes recurrent drought, bush fire, disease and pest out breaks (Endashaw, 2007; Fisseha *et al*., 2009). Also other problems of medicinal plants are

lack of awareness, secrecy and oral based knowledge transfer, unwilling of young generation, and influence of modern education (Tesfaye *et al*., 2009).

2.3.2. Threats and challenges of IK of medicinal plants in Ethiopia

Indigenous knowledge associated with the conservation and use of medicinal plants also disappearing at an alarming rate with the loss of medicinal plants (Reta, 2013); because the loss of medicinal plants causes the loss of traditional knowledge (Mathewos *et al*., 2015).Most studies conducted so far in Ethiopia have shown that the major mechanism for transfer of ethno- medical knowledge is oral with great secrecy. This method is crude and highly susceptible to distortion and in most cases, some of the knowledge is lost at each point of transfer (Gidey and Samuel, 2012). This standing lost at each point to transfer or otherwise modified and they became mistaken and dangerous to use (Habtamu *et al*., 2014). The local indigenous medicinal plant knowledge and transfer of knowledge to the young generation have been affected by modernization such as having access to modern education and modern health care system (Tesfaye *et al*., 2009; Ketema *et al*., 2013). Because of this the young generations have not shown interest in this life long accumulated knowledge. This tendency of disinterestedness in traditional medicinal practices is likely to be one of the major causes for losing this wealth of knowledge in the near future (Ketema *et al*., 2013). In addition, introduction of new religion, and increased business work are the main threats of indigenous knowledge of medicinal plants (Mersha, 2011).

In general, several studies in different part of Ethiopia have been widely reported that in addition to natural and anthropogenic factors; oral and secrecy transmission of knowledge, influence of modernization, unwillingness of young generation to gain the knowledge and awareness factors are the major threats of indigenous knowledge of medicinal plants (Mersha, 2011; Sintayehu, 2011; Anteneh *et al*., 2012; Gidey and Samuel, 2012). Furthermore the young members of traditional communities are reluctant to carry forward tradition practices that may demise an entire tradition and knowledge system (Gizachew, 2011). This implies Ethiopian IK of medicinal plant is being rapidly lost, and preservation of IK may be of key importance, So that, it could be able to transfer to the future generation (Gidey and Samuel, 2012; Ketema *et al*., 2013).

2.3.3. Conservation of Medicinal Plants and Associated Knowledge

Currently, Ethiopian biodiversity especially medicinal plants are under various threats of man-made and natural factors linked with the missing of valuable indigenous knowledge associated with the plants (Endashaw, 2007; Ermias *et al*., 2008). To mitigate this problem, documenting, identifying and applying appropriate conservation strategies are mandatory (Assegid and Tesfaye, 2014). The issue of conservation of medicinal plants in Ethiopia today calls for aggressive studies and documentation before the accelerated ecological and cultural transformation distort the physical entities and the associated knowledge base (Endashaw, 2007). Medicinal plants from the basis of traditional or indigenous health system used, in the estimate of world health organization, by the majority of the population of most developing countries. Training of practitioners and preservation of ecological and medical knowledge lies at the core of future prospect for ancient but challenge traditions (Bodeker, 2002). Many types of action can be taken in favor of the conservation and sustainable uses of medicinal plants. Some of these are undertaken directly at the place where the plants are found, while others are less direct, such as some of those related to commercial system, ex-situ conservation and bio prospecting (Behrens, 2001). According to Tesfaye and Sebsebe (2009), among many medicinal plants in Ethiopia, about 26 species are endemic to and they are becoming increasingly rare at the verge of extinction. Ethiopia has policies and strategies to support the development utilization of plant resources in suitable manner. The policies are reflected under various sections including environmental protection, development of natural resources and diversification of the domestic and export commodities. The country has also developed policy and guide line for intellectual property rights protection of traditional medicine (Endashaw, 2007).

4.4. Ethno-Pharmacology Medicinal Plants

Ethno-Pharmacology is defined as an interdisciplinary area of research that deals with the identification, description, observation and investigation of ingredients used in various recipes of traditional medicine and their effect on animal models. It is also the study of the relevant forms of knowledge, practice and cultures implementing them (Janardhanan and George**,** 2006). Lefèvre (2008) proposed three approaches to study traditional medicine, corresponding to three operational views of traditional medicine. These are: selection of pharmacologically interesting plants; the plants used in traditional medicine against a

particular illness were selected by the population precisely because they were effective against it, pre-selection of pharmacologically interesting plants; the plants can have a use in pharmacy even though the latter may not correspond to their local use and an anti-selection of pharmacologically interesting plants; the plants have been identified as being toxic. Plants have formed the basis of traditional medicine (TM) systems which have been used for thousands of years (WHO, 2003). According to the literature, the first record on medicinal plants, written on a hundred clay tablets in cuneiform are from Mesopotamia, and dates from about 2600 B.C. Amongst the approximately 1000 plant-derived substances used, were oils of *Cedrus* species (cedar) and *Cypressus sempevirens* (cypress), *Glycyrrhizza glabra* (licorice), *Commiphora* species (myrrh), and *Papaver somniferum* (poppy). All these plants are still used today for the treatment of ailments ranging from cough and cold to parasitic infections and inflammations (Newman *et al.*, 2000). It is also reported that Egyptian medicine dates back to about 2900 B.C., but their best known pharmaceutical record is "Ebers Papyrus" written in about 1500 B.C which includes over 700 drugs (mostly plants, animal organs and some minerals) and formulae such as gargles, snuffs, poultices infusions, pills and ointments, with beers, milk, wine, and honey being commonly used as vehicles (Karou *et al.*, 2007). In addition to this, the Chinese *Materia Medica* (CMM) has been extensively documented over centuries with the first record dating from about 1100 BC, reporting the uses of over 600 medicinal plants. The philosopher and the natural scientist Theophrastus (372-288 B.C.) in the "History of Plants" began the scientific classification of plants and dealt with the medicinal qualities of herbs. Ibn Al Baita (1197-1248) listed over 1400 drugs and medicinal plants in *Corpus of Simples* (Karou *et al.*, 2007).

Despite this historical background, ethno-pharmacology was initiated by the missionaries in the colonial period interested in the use of pharmacologically active plants, like the Jesuits in the 16th century Latin America (Anagnostou, 2005

2.5. Ethno-Veterinary Medicinal Plants

Ethno-Veterinary medicine deals with people's knowledge, skills, methods, practices and beliefs about the care of their animals and ethno-veterinary knowledge is acquired through practical experience and has traditionally been passed down orally from generation to generation (McCorkle 1986). Millions of people around the world have an intimate relationship with their livestock as animals provide them with food, clothing, labor,

fertilizers and cash, and act as a store of wealth and a medium of exchange. These traditional healing practices are called 'ethno-veterinary medicine'. Worldwide interest in documenting and validating ethno-veterinary practices arose in the early 1980s, as people started to realize that ethno-veterinary knowledge was disappearing.

Plants are the most commonly used ingredients in the preparation of ethno- veterinary medicines. All parts of the plants, including leaves, bark, fruits, flowers, seeds are used in medicinal preparations; at present over 35,000 plants are known to have healing properties.

Livestock in sub- Sahara Africa is a fundamental resource in enhancing development as it provides 20 to 30% of the gross domestic products (GDP) and as much as 70% of the cash income at the farm level (Ndikimara *et al.*, 2000). It plays a substantial role in the macro and micro economy of Ethiopia such as production of food, industrial raw materials, inputs for crop production and export earnings (Gizachew, 2007).

Ethiopia is leading in livestock population in Africa, with an estimated population of 43 million cattle, 23.6 million sheep, 18.6 million goats, 1.7 million horses, 4.5 million donkeys, 0.36 million mules, 0.6 million camels, and 34.2 million poultry (CSA, 2006/7). However, livestock productivity is relatively poor owing to inadequate availability of feed, wide spread disease, poor health care services and insufficient knowledge on the dynamics of the different farming systems existing in the country (Yirga and Hassen, 2000).

Ethno-veterinary medicine is frequently used for treating of livestock diseases by many different ethnic groups in Ethiopia. Nearly 90% of livestock population in the country use plant based traditional medicines as their major health care system (Endashaw, 2007). Ethno-veterinary medicine plays an important role in animal production and livelihood development. It provides valuable alternatives to and complements western-style veterinary medicine (Shen et al., 2010) and is accessible and easy to prepare and administer, at little or no cost to the farmer (Jabbarm et al., 2005). Because of the higher price of modern medicines and lack of accessibility to a modern veterinarian in the rural areas, farmers rely on traditional veterinary medicinal healers for treatment of livestock ailments (Harun-or-Rashid et al., 2010). In addition they believe that the medicinal plants are more efficacious for treating of livestock ailments than modern medicine (Harun-or-Rashid et al., 2010). Various researchers in Ethiopia have reported the loss of valuable medical plants due to population pressure, agricultural expansion and deforestation (Abebe, 2001)

2.6.Ethno-Ecology of Medicinal Plants

Medicinal species like *Acacia nilotica* are common in arid and semi-arid regions of Africa on wooded grassland, woodland and open bush land from coastal areas to altitudes of 2300m (Dharani and Yenesew, 2010) while species like *Balanites aegyptiaca* are common in dry bush land, bushed grassland, wooded grassland or woodland, but also grows along rivers, at altitudes of 250 – 2000m. Some species like *Boscia coriacea* are commonly found in *Acacia-Commiphora* bush land and semi-desert scrub, often in rocky areas, at altitudes of 150 – 1,500m. A widely distributed acacia, *Acacia mellifera*, widespread in all arid and semiarid areas, may be dominant in dry *Acacia-Commiphora* bush land. It thrives in a variety of soils including rocky, loamy, volcanic and sandy conditions and growing between 300 m and 1,800 m altitude ((Dharani and Yenesew, 2010))

Ethiopia's boundaries encompass the major part of the eastern African highland massif. On the northern and western boundaries lie the foothills of the main massif. Thus, there is great variation of altitude from 116 meters below sea level to 4620 meters above sea level. Rainfall also varies widely in amount and distribution. These factors strongly influence Ethiopia's extraordinary range of terrestrial and aquatic ecosystems, and have contributed to a high diversity and rate of endemism (Tesfaye *et al.* 2003). The existence of such diverse ecosystems has endowed Ethiopia with diverse vegetation types.

The present vegetation of Ethiopia is physiognomically divided in to nine major vegetation types: 1) Desert and semi-desert scrubland; 2) Lowland (semi-) evergreen forest; 3) *Acacia-Commiphora* small- leaved, deciduous woodland; 4) *Combretum-Terminalia* broadleaved deciduous woodland and savanna; 5) Evergreen scrub; 6) Moist evergreen montane forest / Afro-montane rainforest; 7) Dry evergreen and montane forest and grassland; 8) Afro-alpine and subafro-alpine zone; and 9. Riparian/riverine and swamp vegetation (Sebsebe, 2001)

3. MATERIALS AND METHODS

3.1. Description of the Study Area

3.1.1. Geographical Location

The study was conducted in Jabitehnan *woreda*, West Gojjam Zone of Amhara Regional state, Ethiopia. It is located at a distance of 414km from Addis Ababa and 939km from Harar and geographically it is found between a latitude and longitude of 10°25′0″ and N 10°5′40″ North and 38°7′30″ and 37°25′50″ East respectively with the of the woreda ranges between 1500 & 2300 meter above sea level (Fig. 1). Jabitehnan *woreda* is bordered on the southeast by Dembecha, on the west by Bure, on the northwest by Sekela, on the north by Kuarit, and on the east by Dega Damot. Its land mass is estimated to be 1,169.54 km2 or 116,954 ha, and sub divided into 39 kebeles of which two are the woreda's urban kebeles and the rest 37 are rural kebeles (Jabitehnan Woreda Agricultural Office, 2015)**.** Jabitehnan woreda has a total population of 277,590, of whom 139,616 are male and 137,974 female; 7.03% are urban inhabitants and the majority of the inhabitants practiced Ethiopian Orthodox Christianity, with 97.98% reporting that as their religion, while 2.02% were Muslim (CSA, 2008).

Some common plant species in this area include *Acacia species*, *Eucalyptus* species, *Podocarpus falcatus*, *Junipers procera*, etc. Some commonly cultivated crop plants in the study area were *Teff (Eragrostis teff)*, bean (*Vicia faba*), *Sorghum bicolor*, Wheat (*Triticum* species), pea (*Pisum sativum*) and *Zea mays* (Jabitehnan Woreda Agricultural Office, 2015).

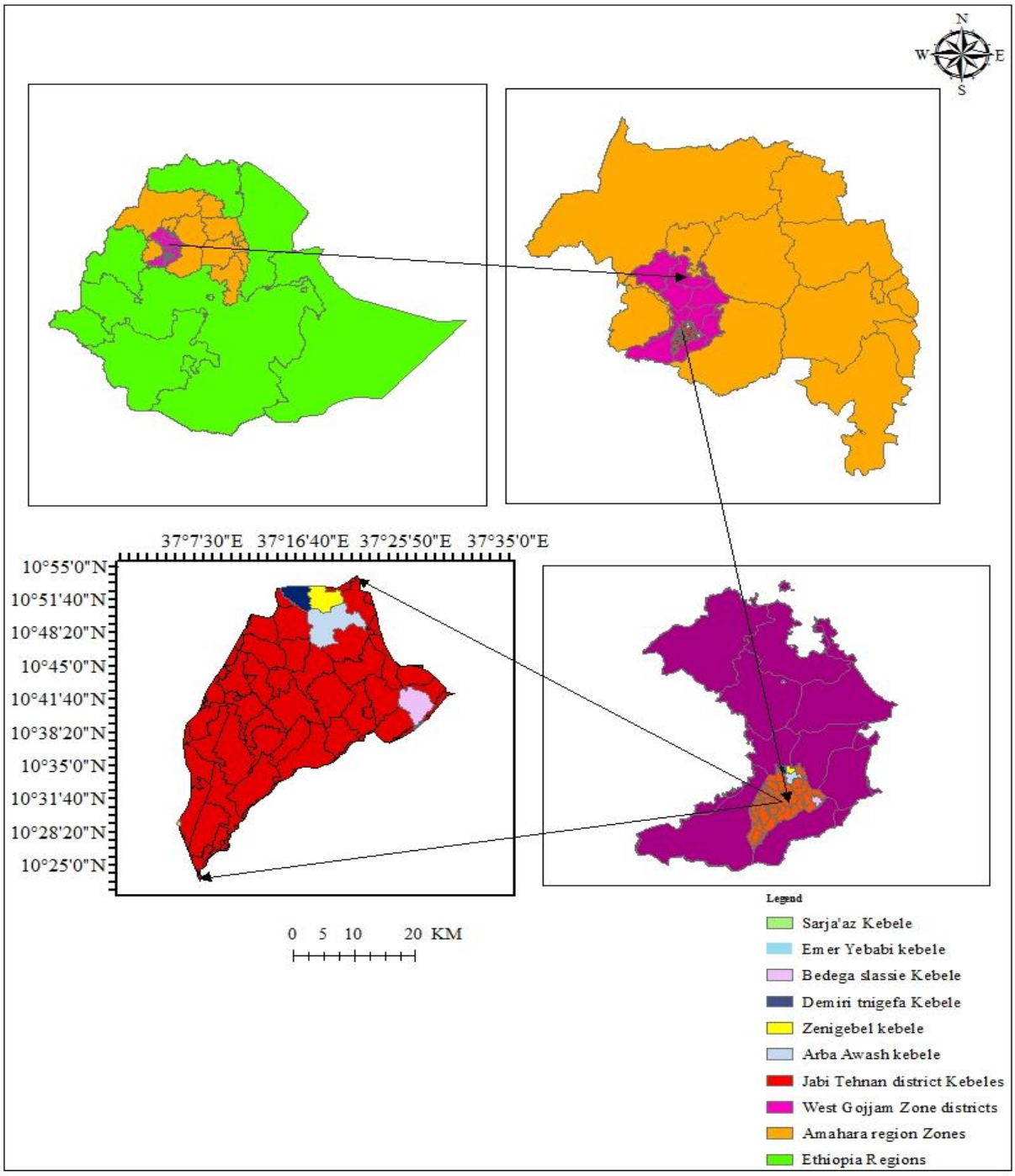

Figure 1: Map of the Study Site; Jabitehnan Woreda

3.1.2. **Agro-Ecology and Climatic Condition**

Based on climatic condition Jabitenanan *woreda* is subdivided into three categories. These are *Dega* covering about 70% of the area, *Woina dega*18% and *Kola* covers about 12% of the area (Mekonnen**,** 2015)**.** The rain fall distribution of the *woreda* is characterized by uni-modal one that lasts for three months from mid-May to mid-September. The average annual rainfall distribution is 1250 mm/annum. The temperature of the *woreda* ranges between 14 c° and 32

c° with the average annual temperature of 23c° (Jabitehnan Woreda Agricultural and Rural Development Office, 2015). The area is characterized by the presence of three major soil classification types in general; leptosols (984.87ha, nitisols (4442ha and vertisols (700.47ha) (Mekonnen, 2015).

3.2. Reconnaissance Survey and Ethnobotanical Data Collection

Reconnaissance survey was made to purposively select three kebeles of the district that have clear altitudinal variation as suggested by Hurni (1998) and traditional medicine use history. Accordingly, of the 39 kebeles of the Woreda, 3 kebeles namely Aswa-Dumry-Tengefa (2000-2300 m.a.s.l.), Zengebal-Bedega (1500-2000 m.a.s.l.) and Azemer-Yebadi, (1990-2060 m.a.s.l.), were selected purposively depending on the availability of medicinal plants and traditional healers. For ethnobotanical data collection, 100 respondents (aged ≥25) were selected. From these 54 respondents were non-healers, which mean community members outside the traditional healers selected randomly in 1:1 sex ratio after Stratified sampling of the population into male and female (see table 1) and traditional healers' respondents (46) were selected purposively from the selected kebeles based on the information gathered from the local people (see Table 1**)**.

Table 1: Total number of informants in the study area in each kebele

Name of Kebele	Agro-ecology	Traditional Healers			Non Traditional Healers			Total Informants		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Aswa-Dumry-Tengefa	Dega	18	2	20	11	11	22	29	13	42
Azemer-Yebadi	Dega	14	3	17	10	10	20	24	13	37
Zengebal-Bedega	Mid-Dega	8	1	9	6	6	12	14	7	21
Total		40	6	46	27	27	54	67	33	100

Ethnobotanical data were collected from November 05, 2016 to January 20, 2017 on two field trips made to the site. Data collection methods were through semi-structured interviews, group discussions, and guided field walks with selected (by their willingness to go with the researcher) traditional healers (appendix 3) for field observations. Traditional healers were first interviewed individually to mention about the local names of the plants they use to treat diseases, diseases treated, part(s) of plants used, methods of preparation of remedies, route of

application of the remedies and dosage. Similar procedures were also applied with randomly selected non-healers for traditional medicine. Further group discussions were made with selected traditional healers (10 from the 46 traditional healers depending on experience and having more knowledge while conducting data collection) on the entire mentioned medicinal plants and field visit was made with them for onsite observation of the plants. Voucher specimens were collected, pressed, and dried for identification. For some species, preliminary identification was done in the field using illustrations. In addition, further identification of all specimens was done by comparison with authentic specimens and with the assistance of experts at Addis Ababa University, National Herbarium. The identified specimens were deposited in Haramaya University Herbarium.

3.3. Ethno-Botanical Data Analysis

A descriptive statistical method (e.g., percentage and/or frequency) was employed to summarize ethno botanical data.

3.3.1. Jaccard's Similarity Index

Jaccard's similarity index is a statistical measure used for comparing the similarity and diversity of sample sets; measures similarity between sample sets and it is defined as the size of the intersection divided by the size of the union of the sample sets. This index uses presence- absence data, which means presence of a given plant species and its utility as medicine or its absence/not considered as medicine in the three kebeles are used as data sets

Jaccard's similarity index was calculated to compare similarity of medicinal plant knowledge between kebeles of different altitudes. For this, presence of a given plant species and its utility as medicine or its absence/not considered as medicine were used as data sets.

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

Where JI is the Jaccard similarity index, 'c' is the number of species shared by the study sites, 'a' is the number of species in study site A only and 'b' is the number of species in study site B only. The JI values range between 0 and 1, whereby a value of 1 indicates complete similarity.

3.3.2. Independent Sample t-Test

Differences in traditional medicinal knowledge due to gender and age group were analyzed using independent t-test using number of medicinal plants reported as a dependent variable (table 10).

3.3.3. Informant Consensus Factor (ICF)

Informant consensus factor (ICF**)** was calculated for categories of ailments to identify the agreements of the informants on the reported cures using the formula used by Rodrigo *et al* (2005) and Tilahun and Giday (2007).

$$ICF = \frac{Nuc - Ns}{Nuc - 1}$$

Where, Nuc is the number of use citations in each illness category and Ns is the total number of species used by all informants for this illness category. The ICF values range from 0 to 1, with high values (i.e. close to 1) indicates a high intracultural consensus i.e., more healers use the same

Species and value close to zero or (< 0.5) indicates a high variation in the use of plant species to be used to treat a category of ailments.

3.3.4. Fidelity Level Index (FL)

Fidelity Level index (FL**)** was calculated using the following formula indicated in Alexiades (1996) as:

$$FL\ (\%) = \frac{IP}{IU} \times 100$$

Where, IP is the number of informants who independently suggested the use of a species to treat a particular disease category and IU is the total number of informants who mentioned

the plant for any major disease. FL is used to quantify the importance of a given species for a particular purpose in a given cultural group (Ermias *et al*., 2013).

3.3.5. Preference Ranking (PR)

Preference ranking (PR) was conducted for those plant species more frequently mentioned to treat most commonly cited diseases. In ranking exercise, 10 key informants were randomly selected and asked to rank plants based on their perceived effectiveness to cure the disease by assigning the highest value (5) for the most efficacious plant and lowest value(1) for the least efficacious plant (Ermias *et al.*, 2013.)

3.3.6. ANALYSIS OF VARIANCE (one way- ANOVA)

Difference in traditional medicinal knowledge due to age group (grouped into three groups; 25-40,41-60 and >60),education level grouped as illiterate, elementary educated and secondary educated was analyzed using one way- ANOVA and number of medicinal plants reported as dependent variable (table 10). SPSS version 20 was used.

4. RESULTS AND DISCUSSION

4.1. Ethno -Medicinal Plants

4.1.1. Medicinal Plant Resources of the Study Area

Eighty two medicinal plant species distributed among 76 genera and 46 families were collected and documented from the study area (Appendix table 4). Of these 82 medicinal plant species, 63 plant species (76.83%) were reported as remedies for human, 10 plant species (12.20%) for livestock medicine, and 9 plant species (10.98%) for both human and livestock remedies.

Totally, these plants were employed to treat 63 diseases of humans and livestock (Appendix table 3). In terms of family distribution**,** Family Asteraceae consisted of 7 species followed by Lamiaceae 5 spp, Fabaceae, Rutaceae, Euphorbiaceae, Cucurbitaceae and Myrsinaceae family each with 4 spp, Acanthaceae, Rosaceae, Solanaceae and Myrtaceae each with 3 spp, Celastraceae, Malvaceae and Polygonaceae and each with 2 spp and all the rest family accounted for 1 sp. each (see appendix table 4). From plant parts used as medicine, leaves were most preferable (see table 4) and ascariasis was the major health problem (see Appendix table 3)

4.1.2. Habitat, Habit and Source of Medicinal Plants

The data collected from the study sites showed that, 48(58.54%) of medicinal plants were wild species, 22(26.83%) were cultivated and 12(14.63%) of them were both as wild and cultivated. This shows that most of the medicinal plants in the study area are not under human management and are exposed to any anthropogenic and natural disturbance. The result also shows that most, 36 (43.90%) species were herbs, followed by shrubs with 23 (28.05%) species and trees with 18 (21.95%) and climbers with 5(6.10%) species (see table 2**)**.

Table 2: Habitat and habit of medicinal plant species that are collected in the study area

№	Habitat	Habit								Total
		Herb		Shrub		Tree		Climber		In №
		№	%	№	%	№	%	№	%	
1	Wild	18	37.5	17	35.42	10	20.83	3	6.25	48
2	Cultivated	14	63.63	3	13.63	4	18.18	1	4.55	22
3	Both wild and cultivated	4	33.33	3	25.00	4	33.33	1	8.33	12
Total		36		23		18		5		82

4.1.3. Plant Parts Used for Preparation of the Remedies in the Study Area

From the data obtained, the most widely used plant parts for the preparation of remedies were leaves, which accounted for 280 (37.69%), followed by roots with 163(21.94%), and then seeds 76 (10.23%). Other parts of plants are also reported (Table 4). This result was in line with the findings of other investigators (e.g. Mengistu, 2010; Mulatu, 2015). Remedy preparations from leaves do not have pronounced negative effect on the survival and continuity of the mother medicinal plants. Roots and seeds were the second and the third most used parts to treat human and livestock ailment. This shows that such harvesting has negative impact on the survival and continuity of useful medicinal plant species in the study area (see Table 3**)**.

Table 3: Plant parts used in preparation of remedies in the studied communities

№	Parts used for remedies preparation	Number of citation	Percentage
1	Leaf	49	28.32
2	Root	30	17.34
3	Fruit	20	11.56
4	Seed	19	10.98
5	Bark	13	7.51
6	Stem	9	5.20
7	Bulb	8	4.62
8	Latex	6	3.47
9	Stem and leaf	5	2.89
10	Root and leaf	4	2.31
11	Leaf and fruit	3	1.73
12	Whole plant	3	1.73
13	Flower	2	1.16
14	Seed and leaf	1	0.58
15	Rhizome	1	0.58
Total		173	100

4.1.4. Methods and Conditions of Preparation of the Remedies

Remedies are mostly (67.90%) prepared when plants are in fresh form followed by dry form (25.31%) and both in fresh and dried form (6.79%).This result is similar to the findings of previous investigator (e.g., Mersha, 2011 in Gujii Agro-Pastoralists, Bule Hora District of Borana Zone, Oromia Region). Medicinal plants in fresh form are most preferred due to the belief that medicinal plants in fresh form have most effective therapeutic potential to the dry forms. With regards to the preparation of remedy, the local people used various methods of preparation of traditional medicines for different types of diseases. The top four popular methods of preparation of traditional remedies were crushing 27(30.00%), boiling 22(24.44%), and chewing 17(18.87%). squeezing 10 (11.11%). The other reported methods were also presented in Table 4. This finding is in line with other investigators (e.g., Moa *et*

al., 2013 in Yayu Tuka District, East Welega Zone of Oromia Regional; Balcha, 2014 in Ghimbi District, Southwest Ethiopia) in which crushing takes the first and pounding the second, but in this research finding boiling took the second place and pounding took the little share 8(8.87%). The result of this study revealed that the majority of remedies 87 (50.88%) were prepared from single plant species with no any additives, whereas about 45(26.32%) remedies were prepared from a single plant species with one or more additives such as salt, sugar, honey etc. are added(see Appendix table 4). On the other hand, some remedies 26(15.20%) were prepared from two or more plant species, but with no any additive, while 13(7.60%) of the remedies were prepared from more than one plants with some additives used (see Appendix table 4). This finding agrees with the result of Sintayehu (2011 in Sidama Zone, SNNP Region). These additive substances are added to improve the flavor, taste, reduce adverse effect, and enhance the efficiency and effectiveness of remedies.

Table 4: Methods of preparation of medicinal plant remedies

№	Method of preparation	Number of citation	Percentage
1	Crushing	27	30.00
2	Boiling	22	24.44
3	Chewing	17	18.87
5	Squeezing	10	11.11
4	Pounding	8	8.87
6	Smoking	6	6.67
Total		90	100

4.1.5. Route of Administration

The local people used various route of administration to take the prepared medicine. Overall, routes of remedy administration were oral, dermal, nasal, optical, auricular and anal, nasal/ or oral, dermal/ or nasal and genital (see appendix table 4). In this study area oral administration is the most leading route of administration by 106 (65.86%), followed by dermal 37(22.98%), nasal 8(4.97%). Similar results were obtained by another investigator (e.g. Mersha, 2011 in Gujii Agro-Pastorialist,Bule Hora District of Borena Zone, Oromia region) who indicated that oral route of administration ranked first in frequency followed by dermal administrations.

4.1.6. Dosage of Remedy Preparation

The finding of this study revealed that there disagreement among traditional healers of the three kebeles concerning the dosage of the remedies used, duration and time at which remedies are to be taken for the same kind of health problem. As a result, traditional medicine administrations are not uniform, precise and standardized. However, traditional medicine practitioners' prescription depends on sex, age, and physical fitness, stage of illness, pregnancy, presence or absence of any additional disease. Especially, traditional healers in the study area used almost the same materials and unit to measure the dosage. These common local materials are spoon of tea, cup of coffee, cup of tea, earthen cup, finger length, thumbful, count number are used to estimate and fix the amount of medicine. The duration and frequency of administration depend on the type of illness and its severity. According to the traditional healers report, in most cases traditional remedies have not serious adverse effects. In order to reduce the effect, they use antidotes for any adverse effect caused by traditional medicine. They recommend milk; curdle milk, coffee, and lemon as antidotes in some special remedy cases and in any adverse effect.

4.2. Ethnomedicinal Plant Importance and Use Knowledge

4.2.1. Jaccard’s Similarity Index

Analysis of Jaccard's similarity index conducted using a number of medicinal plants reported from each kebele to show their traditional medicinal plant knowledge similarity between kebeles revealed that communities in the three kebeles are closer in their knowledge regarding traditional medicine (Table 5). Relatively, however, similarity between Zengebal-Bedega and Aswa-Dumry-Tengefa kebeles was higher followed by the similarity between Azemer- Yebadi and Zengebal-Bedega, suggesting that the traditional medicinal knowledge is almost the same in between the two communities. This e result showed that almost all sites are similar in medicinal plant knowledge as each of them were comparable. This can be explained by the geographical proximity among the three sites and the same ethnic group with the same cultural background inhabiting the three kebeles (see Table 5**)**.

Table 5: Jaccard's similarity index of traditional medicinal plant knowledge among selected sites

Kebeles	Zengebal-Bedega	Aswa-Dumry-Tengefa	Azemer- Yebadi
Zengebal-Bedega	1.00	0.909	0.892
Aswa-Dumry-Tengefa	0.909	1.00	0.783
Azemer- Yebadi	0.892	0.783	1.00

4.2.2. Informant Consensus Factors

All cited human diseases were categorized into 5 categories based on system specific involvement of diseases (Table 6). Informant consent was calculated for all diseases that were common health problems of humans in the study area. There was greater agreement between informants on the treatment of dermatological and respiratory problems each with ICF>0.80(see Table 6).

Table 6: Informant consensus factor (ICF) of major categories of human disease

№	Disease categories	Use citation (N_{uc})	№ of species used (N_s)	Informant consensus factor
1	Dermatological problem	87	17	0.814
2	Organ disease and internal body swelling disease	70	22	0.698
3	Headache and emergency disease	80	32	0.608
4	Gastrointestinal problem	65	29	0.563
5	Respiratory problem	44	9	0.814

4.2.3. Fidelity Level Index

The fidelity level index was calculated for nine most cited medicinal plants and the most frequently reported human diseases (see appendix table 4). The fidelity level index of *Clutia lanceolata, Allium sativum*, *Hagenia abyssinica* and *Otostegia integrifolia* used for the treatment of dysentery, amoebiasis, tapeworm and malaria, respectively ,was the highest

(100%) followed by *Croton macrostachyus*(93.3%) used to treat ring worm, and *Rosa abyssinica* (87.5%) for the treatment of abdominal pain (see Table 7).

Table 7: Fidelity level index of the most frequently reported medicinal plants

№	Disease treated	Botanical name MPs used to treat	IP	IU	FL	FL%	Rank
1	Dysentery	*Clutia lanceolata*	16	16	1	100	1
2	Amoebiasis	*Allium sativum*	40	40	1	100	1
3	Tapeworm	*Hagenia abyssinica*	5	5	1	100	1
4	Malaria	*Otostegia integrifolia*	7	7	1	100	1
6	Ring worm	*Croton macrostachyus*	42	45	0.933	93.3	2
7	Abdominal pain	*Rosa abyssinica*	7	8	0.875	87.5	3
8	Diarrhea	*Ficus vasta*	9	11	0.818	81.8	4
9	Gastritis	*Aloe macrocarpa*	29	41	0.707	70.7	5
10	Ascariasis	*Clausena anisata*	8	12	0.667	66.7	6

4.2.4. Preference Ranking

In this study, most humans and livestock health problems were reported to be treated by multiple medicinal plant species. Among the reported health problems, preference ranking was conducted for the most frequently cited human diseases, which was ascariasis. This disease was reported to be treated by seven different plant species. These plants were given to randomly selected traditional healers to put plants in rank of their preference by giving maximum value 5 for the most preferred one and 1 for the least preferred one. According to preference ranking of randomly selected key informants, *Clematis hirsuta*, *Embelia schimperi*, *Bersama abyssinica and Clausena anisata were* ranked first, second, third and fourth, respectively (see Table 8).

Table 8: PR of the most preferable seven MPs based on the degree of their curative power of ascariasis as perceived by ten randomly selected traditional healers

No	Medicinal plants	Key informants											
		A	B	C	D	E	F	G	H	I	J	Total	Rank
1	*Bersama abyssinica*	2	4	1	2	5	3	3	1	2	5	28	3
2	*Clausena anisata*	2	2	4	1	1	5	2	3	2	2	24	4
3	*Clematis hirsuta*	5	4	3	5	5	5	4	3	3	5	42	1
4	*Embelia schimperi*	4	4	3	3	5	3	2	2	3	4	33	2
6	*Rubus apetalus*	1	1	3	1	1	2	2	3	2	2	18	5
7	*Verbena officinalis*	1	1	1	1	1	1	1	1	2	1	11	6

4.3. Acquisition and Transfer of Indigenous Knowledge of Medicinal Plants

As it could be understood from respondents, the major mechanism for acquisition of ethno-medicinal indigenous knowledge is through oral transfer with secrecy along the family line. This result agrees with reports of most available studies conducted so far in different parts of the country (e.g., Gizachew, 2011; Sintayehu, 2011; Gidey and Samuel, 2012). As key informants pointed out, sons were evaluated to take over the responsibility with great care based on some criteria. Intellectual ability, afflation toward the family and acceptance among other members of the society, faithfulness are some of the criteria they use to select a person to whom indigenous knowledge is to be transferred. Daughters, house wives and relatives are also considered as options to take over the knowledge In addition to traditional medicine practitioners, indigenous knowledge is also in the hands of non-traditional medicine practitioners, and they share the knowledge freely. This confirms that the indigenous knowledge of ethnomedcinal plants of the local people is culturally deep rooted.

4.3.1. Socio-Demographic Factors Influencing Indigenous Medicinal Knowledge

Analyses of gender, age and educational status of respondents were found to influence knowledge of the local people on medicinal plants. Age wise, participants of the study were grouped into three categories and analysis of variance (one-way ANOVA) showed that there was significant ($P<0.05$) difference between the three age groups in the number of medicinal plants reported, which was used as a measure of traditional knowledge on medicinal plants(see Table 9). The results revealed that knowledge on medicinal plants increases with age. This indicates that the elders are rich with indigenous knowledge than the young generation. This could be because of the fact that the elders have accumulated knowledge through their life- long experiences of interactions with their environments, and due to the fact that the young generation are under the influence of modernization and globalization. As informants confirmed young generations, especially educated groups, are disinterested towards traditional practice. The same result was reported by different researchers (e.g., Sintayehu, 2011; Anteneh *et al*., 2012 and Berhane *et al*., 2014).This indicates that indigenous knowledge of medicinal plants differs among the same community members within different age level and educational level. Traditional medicinal knowledge also varied significantly ($P<0.05$, independent samples T-test) between male and female with males reporting higher number of medicinal plants than females (see Table 9). Likewise, educational level had significant impact on traditional medicinal knowledge of the study area. Modern education has contributed to the loss of indigenous knowledge of ethnomedicinal plants in the study area. The same result was reported by different investigators (Sintayehu, 2011; Anteneh *et al*., 2012; Gidey and Samuel, 2012).

Table 9: TMP knowledge difference of the respondents between sex, among age and among education level

Sex of the respondents	Mean value	p- value of t- test
Male	7.58	0.00
Female	4.55	
Age of the respondents		p- value
25-40	5.95	0.002
41-60	6.35	
>60	7.16	
Education level of the respondents		p-value
Illiterate	7.48	0.004
Elementary education	6.55	
Secondary education	6.40	

4.4. Threats of Medicinal Plants

4.4.1. Threats on Medicinal Plants in the Study Area

Respondents were asked on how easily available are medicinal plants currently in relation to past couple of decades. Respondents responded that medicinal plants which were once easily accessible are becoming rare to collect. With respect to the possible factors that threaten medicinal plants, respondents mentioned some anthropogenic factors with varying degree of impact on medicinal plants (Table 10). According to the informants, agricultural expansion was the major threatening factor followed by firewood and charcoal production, over grazing by domestic animals and harvesting for medicinal purpose (Table 10). The present study goes with the result of some studies in different part of country (e.g., Anteneh *et al.*, 2012; Solomon *et al.*, 2015).

Table 10: List of different anthropogenic factors threatening medicinal plant species in the study area

№	Treating factors	Citation of informants		Rank
		In Number	In percentage	
1	Harvesting for medicinal value	35	9.43	6
2	Overgrazing by domestic animals	55	14.82	4
3	Need for fuel (fire wood and charcoal	71	19.14	2
4	Agricultural expansion	79	21.29	1
Total		371	100	

5. SUMMARY, CONCLUSION AND RECOMMENDATION

5.1. SUMMARY

With the objective of documenting traditional medicinal plants and local people's knowledge on medicinal plants use, ethnomedicinal study was conducted in Jabitehnan Woreda, West Gojjam Zone of Amhara Region, Ethiopia. Totally 100 respondents (46 key informants and 54 non-traditional medicine practitioners) of age >25 were participants of the study as respondents. Data were collected using semi-structured interviews, observation, group discussion and guided field walk. Totally 82 medicinal plant species of which most, 36 (43.90%) species were herbs, followed by shrubs with 23 (28.05%) species and trees with 18 (21.95%) species were recorded in Jabitehnan Woreda and of these 82 medicinal plant species, 63 plant species (76.83%) were employed as remedies for human, 10 plant species (12.20%) for livestock medicine, and 9 plant species (10.98%) for both human and livestock remedies. In terms of family distribution**,** Family Asteraceae was with largest species (7 spp) followed by Lamiaceae (5 spp), , Fabaceae, Rutaceae, Euphorbiaceae, Cucurbitaceae and Myrsinaceae family each with 4 spp, Acanthaceae, Rosaceae, Solanaceae and Myrtaceae each with 3 spp, Celastraceae, Malvaceae and Polygonaceae and each with 2 spp. Of mentioned plant parts, leaves were reported most for use in remedy preparation followed by roots. Medicines were reported to be used in fresh mostly form single plants or multiple plants with some additives or alone to be administered mainly through mouth and dermal. The top four popular methods of preparation of traditional medicine remedies were crushing 27(30.00%), boiling 22(24.44%), chewing 17(18.87%) and squeezing 10 (11.11%). Anthropogenic factors such as agricultural expansion, fuel, over grazing by domestic animals, overharvesting are reported to be factors for the declining of medicinal plants.

5.2. CONCLUSION

In conclusion, the study area revealed that people in the study area have substantial amount of indigenous knowledge on traditional medicine, which needs to be further strengthened by all age groups and gender. As this study revealed the knowledge of traditional medicine mainly reside in the hand of illiterate and aged groups. Indigenous people of the study area have their own ways of managing health problems of human and livestock as they are endowed with specific culture, tradition and ethical norms. The present study revealed people of the area have different depth and width of knowledge on medicinal plants in particular in their locality.

5.3. RECOMMENDATION

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

- Traditional healers should be trained to document the knowledge they have on medicinal plants rather than transferring it to the beloved one orally, this is because it can minimize the lore at each point of transfer
- The district health office and health experts should give training to traditional healers on the best way to collect, document, use, and store and conserve the medicinal plants. This training helps practitioners to widen the already existing knowledge of their own and helps to improve the quality of the herbal drugs.
- Traditional healers should encourage and create awareness to the youth to engage and use traditional medicinal plants knowledge and not to lose this immense resource because of globalization and western medication system
- This survey has shown the potential of the wored for ethnomedicinal knowledge about traditional medicine from three kebeles out of thirty nine kebeles. Therefore, further work should be conducted to explore the potential of the rest thirty six kebeles of the woreda to preserve this knowledge and medicinal plants
- In order to use medicinal plants sustainably, the traditional healers should harvest parts other than root, but if using a root is mandatory, he/she should try to plant two or more plants before rooting up the plant

6. REFERENCES

Abbott, R. 2014. Documenting Traditional Medicinal knowledge. World Intellectual Property Organization, Geneva, Switzerland.

Abebe Demssie and Ahadu Ayew.1993.Medicinal Plants And Enigmatic Health Practices of Northern Ethiopia,Berhanina Selam Printing Entereprise,Addis Ababa.

Afra, A and Arazeem, A. 2011.Trends and challenges of traditional medicine in Africa. *Journal of Ethnobiology and Ethnomedicine,* 10: 18.

Alexiades, M. 1996. Collecting ethnobotanical data. An introduction to basic concepts and techniques. In**:** *Selected Guideline for ethno botanical research.* Pp. 58-94. A Field Manual, the New York. Botanical Garden, U.S.A.

Amare Getahun. 1976. Some Common Medicinal Plants and Poisonous Plants used in Ethiopian Folk Medicine. *Journal of Ethnobiology and Ethnomedicine*.3-63.

Anagnostou S (2005). Jesuits in Spanish America: Contributions to the exploration of the American Materia Medica. *Pharmacological History* 47:3-17.

Anteneh Belayneh, Zemede Asfaw, Sebsebe Demissew and Nigussie, Bussa. 2012. Medicinal plants potential and use by pastoral and agro-pastoral communities in Erer Valley of Babile Wereda, Eastern Ethiopia. *Journal of Ethnobiology and Ethnomedicine,* 8: 42.

Antiwi-Baffour, S. S., Ajediran I., David N., Seidu A. and Patrick, F. A. 2014. The place of traditional medicine in the African society: The science, acceptance and support. *American Journal of Health Research,* 2(2): 49-54.

Assegid Assefa and Tesfaye Abebe. 2014. Ethnobotonical study of wild medicinal trees and Shrubs in Benna Tsemay District, Southern Ethiopia. *Journal of Science and Development,* 2 (1): 17-33.

Balcha Abera. 2014. Medicinal plants used in traditional medicine by Oromo People, Ghimbi District, Southwest Ethiopia. *Journal of Ethinobiology and Ethnomedicine,* 10(40).

Behrens J. 2001.Can the Utilization and Conservation of Medicinal Plants Co-Exist? : *European Journal of Herbal Medicin*e, 5**:**18-26.

Berhane Kidane, Tinde, V.A., Laurentius, J. G and Zemede Asfaw. 2014. Use and management of traditional medicinal plants by Male and Ari ethnic communities in Southern Ethiopia. *Journal of Ethnobiology and Ethnomedicine,* 10 (46).

Bishaw Mengistu. 1991. Promoting Traditional Medicines in Ethiopia. A Brief Historical Overview of Government Policy. *Social Science and Medicine,* 33:193-200.

Bodeker, G. 2002. Medicinal Plants towards Sustainability and Security. Green College Oxford.UK.

Bussman, R. W. and Sharon, D. 2006. Traditional medicinal plant use in Northern Peru: tracking two thousand years of healing culture. *Journal of Ethnobiology and Ethno medicine*, 2(47).

CBD (Conservation of Biological Diversity). 2008. Medicinal Plants at Risk: A Native plant conservation campaign Report. Center for Biological Diversity, Arizona, United States.

Chris, K., Alton, B., Kathleen, G., Whitney, C.H. and Peter R. 2000. Dynamics of Life. National Geography Society: Forest Keeping Balance. The McGraw-Hill Company Inc.USA.620. 21.

(CSA) Central statistical Authority (February 2006/2007). Agric sample survey Report on Livestock and Livestock characteristics. Volume II Addis Ababa, Ethiopia.

CSA (Central Statistical Agency of Ethiopia). 2007. Population and Housing Census of Ethiopia: Results for Amhara Region, Vol. 1, part 1.

Cunningham, A.B.2001. African medicinal plants: Setting priorities at the interface between conservation and primary health care**.** People Plants Working Paper 1993, 1**:**50.

Dawit Abebe and Ahadu Ayehu. 1993. Medicinal Plants and enigmatic health Practice on North Ethiopia. Berhanina Selam Printing Enterprise, Addis Ababa, Ethiopia.

Dawit Abebe.2001.The Role of Medicinal Plants in Health Care Coverage in Ethiopia, the Possible Benefit of Integration. Institute of Biodiversity Conservation and Research, Addis Ababa, 6-21.

Degene Teshome. 2014. An overview of the role of traditional medicine in Ethiopia. *Abhinav a Journal of Research in Arts and Education,* 2(4): 34-40.

Dharani, N., and Yenesew, A. (2010). *Medicinal Plants of East Africa*: An illustrated guide. Najma Dharani in association with Drongo Editing and Publishing, Sterling publishers Pvt. Ltd. New Delhi, India.

Endashaw Bekele. 2007. Study on actual situation of medicinal plants of Ethiopia prepared for Japan Association for international collaboration of Agriculture and Forestry, Addis Ababa, Ethiopia.

Engedasew Andarge, Abraham Shonga, Mathewos Agize, and Asfaw Tora. 2015. Utilization and conservation of medicinal plants and their associated indigenous knowledge (IK)

in Dawuro zone: An ethnobotanical approach. *International Scholars Journals,* 4(3): 330-337.

Ermias Lulekal, Ensermu Kelbessa, Tamrat Bekele and Haile Yineger. 2008. An ethnobotanical study of medicinal plants in Mana Angetu District, Southeastern Ethiopia. *Journal of Ethnobiology and Ethno medicine,* 4: 10

Ermias Lulekal, Zemede assfaw, Ensermu Kelbessa and Patrick V. D.2013. Plant Diversity and ethnobotanical study of medicinal plants in Ankober district, North Showa Zone of Amhara Region, Ethiopia

Fisseha Mesfin, Sebsebe Demissew and Tilahun Teklehaymanot. 2009. An ethnobotanical study of medicinal plants in Wango Woreda, SNNPR, and Ethiopia. *Journal of Ethnobiology and Ethno Medicine,* 5(28).

Getu Alemayehu. 2010. Ethnobotanical Study on Medicinal Plants used by Indigenous Local Communities in Minjar-Shenkora Wereda, North Shewa Zone of Amhara Region, Ethiopia.

Giday Yirga and Samuel Zerabruk. 2012. Traditional knowledge of in Gindeberet District, Western Ethiopia. *South Africa Journal of Botany,* 78(1): 165-169.

Gidey Yirga. 2010 a. Assessment of indigenous knowledge of medicinal plants in central Zone of Tigray, North Ethiopia. *African Journal Plant Science,* 4(1): 6-11.

Gidey Yirga. 2010 b. Assessment of traditional medicinal plants in Endrta District, South eastern, Northen Ethiopia. *African Journal of Plant Science,* 4(7): 255-260.

Gizachew Belay. 2007. Major animal health problems of market oriented livestock development in Metema woreda, north Gondar zone, Ethiopia. DVM thesis. Faculty of Veterinary Medicine, Addis Ababa University, Debre Zeit, Ethiopia.

Gizachew Girma. 2011. Protection of traditional knowledge under international and Ethiopian law with a particular reference to traditional medicinal knowledge: current trends, prospects and challenges. M.Sc. Thesis, Addis Ababa University, Addis Ababa, Ethiopia.

Habtamu Agisho, Mulatu Osie and Tsdeke Lambore. 2014. Traditional medicinal plant utilization, management and threat in Hadiya Zone, Ethiopia. *Journal of Medicinal Plants Studies,* 2(2): 94-108.

Haile Yineger, Ensermunn Kelbessa, Tamrat Bekele and Ermias Lulekal.2008. Plant Used in Traditional Management of Human Ailments at Bale Mountain National Park, South Eastern Ethiopia, *Journal of Medicinal Plant Research,*2:132-153. 22

Haile Yineger.2005. The Study of Ethnobotany of Medicinal Plants Floristic Composition of dry Afro Monten Forest at Bale Mountain National Park. M.Sc. Thesis, Department of Biology, Addis Ababa University.

Harun-or-Rashid, MD., Tanzin, R., Ghosh, KC. Jahan, R., Khatun, A. and Rahmatullah, M. 2010. An ethno-veterinary survey of medicinal plants used to treat cattle diseases in Birishiri area, Netrakona district, Bangladesh, Advances in Natural and Applied Sciences, 4(1): 10-13.

Hurni, H. 1998. A multi-level stakeholder approach to sustainable land management. In: Blume HP, Eger H, Fleischhauer E, Hebel A, Reij C, Steiner KG, editors. Towards Sustainable Land Use. Furthering Cooperation between People and Institutions. Advances in Geo-Ecology. Reiskirchen: Catena Verlag, 31: pp. 827–836.

Jabbarm, A., Akhtarm, MS., Muhammad, G. and Lateen, M. 2005. Possible role of ethno-veterinary medicine in poverty reduction in Pakistan: Use of botanical Ant-helminthic as an example. *Journal of Agricultural Society Science*, 1(2): 187-195.

Jabitehnan Woreda Agricultural Office.2015.Annual Report, Bahr-Dar, Ethiopia

Janardhanan, KK.George, V. 2006. Ethno-pharmacology and alternative medicine. *Current Science,* 90:1460-1461.

Karou, D., Wendyame, M., Nadembega1, C., Ouattara, L. 2007. African ethno-pharmacology and new drug discovery. *Medical Aromatic Plant Science Biotechnology* **1**:1-9.

Kelbessa Urga, Assefa Ayele and Getu Merga. 2004. Traditional Medicine in Ethiopia Proceedings of National Workshop Held in Addis Ababa, Ethiopia, 30 June-2 July 2003.

Kenneth, R.S. and Joseph, S.L. 2002. Are Herbal Drugs saved? : Printice Hall, the United State of America, 647.

Ketema Tolosa, Etana Debela, Adunga Tolera and Gebeyehu Ganga. 2013. Ethnomedicinal study of plants used for treatment of human and livestock ailments by traditional healers South Omo, Southern Ethiopia. *Journal of Ethnobiology and Ethnomedicine,* 9(32).

Lefèvre, G. 2008**.** An anthropological approach to therapeutic strategies for ethno-pharmacology: The case of Southwestern Madagascar. *Ethnobotanical Research Application* 6**:**29-34**.**

Mathewos Agize, Sebsebe Demissew and Zemede Asfaw. 2013a. Ethnobotony of medicinal plants in Loma and Gena Boso Districts (Woredas) of Dawro Zone, Southern Ethiopia. *Top Class Journal of Herbal Medicine,* 2(9):194-212.

Mathewos Agize, Sebsebe Demissew, and Zemede Asfaw. 2013b. Indigenous knowledge on management of home gardens and plants in Loma and Gena Bosa Districts (Wereda) of Dawuro Zone, Southern Ethiopia. Plant biodiversity conservation, sustainable utilization and environmental protection. *International Journal of Science: Basic and Applied Research,* 10(1): 63-99.

McCorkle, CM. and Green, EC. 1998. Intersectional health care delivery. Agriculture and Human Values, 15: 105-114.

Mekonnen Getahun**.** 2015. Characterization of agricultural soils in capacity building for scaling up of evidence based best practices in agricultural production in Ethiopia intervention Woredas of Amhara region. PhD dissertation, Bahr-Dar University, Ethiopia

Mengistu G/Hiwot. 2010. An Ethnobotanical Study of Medicinal Plants in Seru Wereda, Arsi Zone of Oromia Region, Ethiopia. M.Sc. Thesis, Addis Ababa University, Addis Ababa, Ethiopia

Mersha Ashagre. 2011. Ethnobotonical study of medicinal plants in Gujii Agro-Pastoralists, Bule Hora District of Borana Zone, Oromia Region, Ethiopia. M. Sc thesis, Addis Ababa University, Addis Ababa, Ethiopia.

Mirutse Giday, Zemede Asfaw and Woldu Zebene. 2009. Medicinal plants of the Meinit ethnic group of Ethiopia: An ethnobotonical study. *Journal Ethnopharmacol,* 124(1): 513-521.

Moa Megersa, Zemede Asfaw, Ensermu kelbessa, Abebe Beyene and Bizuneh Woldeab. 2013. An ethno botanical study of medicinal plants in Yayu Tuka District, East Welega Zone of Oromia Regional State, West Ethiopia. *Journal of Ethnobiology and Ethnomedicine*, 9(68).

Mulatu Ketema. 2015. Assessment of Indigenous Knowledge on Medicinal Plants of Deder *Woreda*, East Hararghe Zone of Oromia, Ethiopia. MSc. Thesis Haramaya University Haramaya Ethiopia

Mulugeta Kuma.2014. Use and Management of Medicinal Plants by the People of Jima Rare District in East Wolega Zone of Oromia Region, Ethiopia, MSc thesis.

Natural Resource and Livestock health Care Agency of Jabitehnan woreda. 2015. Annual report

Ndikimara, G., Suth, J., Kamadi, R., Ossera, S., Marambi, R., Hamlet, P. 2000. Coping Machines and Their Efficiency in Disastering Prone Pastoral System of Greater Horn of Africa. Effects of the 1995-1997 ELNINO Rains and Response of Pastorals and Livestock. *International Livestock Research Institute*, Nairobi, Kenya, pp. 2-4.

Newman, DJ., Cragg, GM. and Snader, KM. 2000. The influence of natural products upon drug discovery. *National Production Representatives* **17**:215-234.

Pankhurt, R.1990. An Introduction to the Medicinal History of Ethiopia. The Red Sea Press Inc. New Jersey, USA.

Reta Regassa. 2013. Assessment of indigenous knowledge of medicinal plants practice and mode of service delivery in Hawasa City, Southern Ethiopia. *Journal of Medicinal Plant Research,* 7(9): 517-535.

Rodringo, S., Reinaldo. F. and Urysses, P. 2005. Knowledge and use of medicinal plants by Local Specialists in a Region of Atlanta Forest in State of Pernanbuco (Northern Eastern Brazil). *Journal of Ethnobiology and Ethnomedicine,* 1:9.

Shen, S. Qian, J., Ren ,J. 2010.Ethno-veterinary plant remedies used by Nu people in NW Yunnan of China, J. Ethnobiology Ethnomedicine doi:10.1186/1746-4269-6-24.

Sintayehu Tamene. 2011. An ethnobotonical study of medicinal plants in Wondo Genet Natural Forest and adjacent kebeles, Sidama Zone, SNNP Region, Ethiopia. M. Sc Thesis, Addis Ababa University, Addis Ababa, Ethiopia.

Solomon Araya, Balcha Abera and Mirutse Gidey. 2015. Study of plants traditionally used in public and animal health management in Seharti-Samre District, Southern Tigray, and Ethiopia. *Journal of Ethnobiology and Ethnomedicine,* 11: 22.

Tadesse Berhanu, Dereje Abera and Eyasu Ejeta. 2015. Ethnobotonical study of medicinal plant in selected Horro Gudurru Woredas, Western Ethiopia. *Journal of Biology, Agriculture and Healthcare, 5*(1): 83-93.

Tesfaye Awas and Sebsebe Demissew. 2009. Ethnobotanical study of medicinal plants in kafficho People, South western Ethiopia. Proceedings of the 16th international conference of Ethiopia Studies. Addis Ababa, Ethiopia.

Tesfaye Awas, Menassie Gashaw, Getachew Tesfaye and Asfaw Tihune. 2003. *Ecosystems of Ethiopia.* National Biodiversity Strategy and Action Plan Project, Addis Ababa, Ethiopia

Tesfaye Haylemariam, Sebsebe Demissew and Zemede Asfaw. 2009. An ethnobotanical study of medicinal plants used by local people in the lowlands of Konta Special Woreda, SNNPR, Ethiopia. *Journal of Ethinobiology and Ethnomedicine,* 4(26).

Thomas, H.1995. Indigenous Knowledge Emancipation and Alienation. *Journal of Knowledge Transfer and Utilization*, 8:63-72.

Tilahun Teklehaymanot and Mirutse Gidey. 2007. Ethnobotanical study of medicinal plants used by people in Zegie Peninsula, Northen Ethiopia. *Journal of Ethnobiology and Ethnomedicine*, 3(12).

WHO (World Health Organization). 2001. Legal Status of Traditional Medicine and Complementary/Alternative Medicine: A Worldwide Review. World Health Organization, Geneva. 189.

WHO (World Health Organization). 2002. World Health organization traditional medicine strategy 2002- 2005. WHO, Geneva, Switzerland.

WHO (World Health Organization). 2013. Traditional Medicine strategy 2014-2023. World Health Organization, Geneva, Switzerland.

Yayeh Limenih, Shemsu Umer and Messay Wolde-Mariam .2015. Ethnobotanical Study on Traditional Medicinal Plants in Dega Damot Woreda, Amhara Region, North Ethiopia, *5*(2), 258–273.

Yibrah Tekle. 2014. An ethno-veterinary botanical survey of medicinal plants in Kochore District of Gedeo Zone, SNNPRS, Ethiopia. *Journal of Scientific and Innovative Research*, 3(4): 433-445.

Yirga Chanyalew and Hassen Mohamed .2000. Crop-Livestock Farming System in the Highland of Ethiopia; Improving The Production of Crop- Livestock Production in Wheat Based Farming System in Ethiopia. Addis Ababa, Ethiopia, 10-20, 2000.

7. APPENDICES

Appendix I: Questionnaires

Appendix table 1: Major Human and Cattle Diseases that can be Treated with Medicinal Plants

1.

NO	Major human and livestock diseases treated		Local name of the plant	Plant parts used
	For human	For cattle		
1				
2				
3				
4				
5				

2. What are the major threats to these medicinal plants?
3. What should be done for medicinal plants in the future for future sustainable use?
4. Are medicinal plants marketable? Yes ☐ No ☐
5. What mechanisms of preparation do you to use to make the medicinal plants available for your local people?
6. How can you diagnose or identify the disease of your patients?
7. How can you determine the dosage of the medicinal plants for your patients?
8. Are there any side effects of plants used for medicinal purpose? Yes ☐ NO ☐
9. What you advise your patients after prescription of your medicine to reduce the side effects of the medicine taken [if you say 'YES' from question 13).
10. From where you get this indigenous knowledge of practicing with medicinal plants?
11. Do you have an interest to transfer this indigenous knowledge to the next generation? Yes ☐ No ☐
12. If your answer for question number 16 above is No, Why?

Note: question 2-12 is part of the table above

Appendix 1 : Questions for Non- Traditional Healers

The following questions are designed to get sufficient information about the use and management of medicinal plants in your area and the way you are using them.

1. Personal information: Name ☐ Sex ☐ Male ☐ Female ☐

Age ☐ Occupation ☐ kebeles ☐ Village ☐
Interview time☐

2. Have you ever used any traditional medicinal plants to treat any disease you have faced? Yes ☐ No☐
3. What are the major medicinal plants used in your area to treat human diseases
4. If you use any medicinal plants before, for what disease (s)?
5. From where you get medicinal plants you are using?
6. Do you have an indigenous knowledge about how to use medicinal plants?

   Yes ☐ No ☐

7. If you have an indigenous knowledge, from whom do you get it?

Parents ☐ Herbs man ☐ Friends ☐ Others ☐

8. Is there any problem behind using medicinal plants? If yes, what are they?
9. How can you get directions to use medicinal plants?
10. Is/are there any medicinal plant(s) used to treat livestocks diseases?

    Yes ☐ No ☐ I don't know☐

11. If you say yes for question 10 above, can you mention the name of those plants?
12. Which plant part(s) are used for medicinal purpose?

    Root ☐ Shoot ☐ Stem ☐ Fruit ☐
    Others☐

13. Are there any threats to medicinal plants in your local area?

    Yes ☐ No ☐ I don't know☐

For question 13, if you say yes, what are they?

14. How do herbs men determine the dosage of medicinal plants prescribed for you?
15. How can you compare traditional medicinal plants in terms of their affordability cost? Expensive ☐ Cheap ☐ Average☐
16. Have you ever compared traditional practitioners available in your local area in terms of their knowledge? Yes ☐ No☐
17. What should be done for medicinal plants for the future?

Appendix 2: Semi- Structured Interview for Healers of Jabitehnan woreda as Focus Group Discussion

1. What are the most common human health problems in your kebeles?

   A) _____

   B) _____

   C) _____

2. Mode of use
   A. Fresh
   B. Dried
   C. Fresh and dry

2. What are the most common livestock health problems in your kebele?

   A) _____

   B) _____

   C) _____

3. Do you use plants to treat those diseases? _____
4. What are those plants used? _____

   A. Name of the plant _____
   B. Habitat of the plant_____
   C. Habit of the plant _____

D. Part (s) of the plant used_____

E. The threat to the above plants

5. How far are the medicinal plants from your residence?_____

6. Preparation for medicinal use: crushed/crushed and powdered, crushed pounded/extract with cold water/boiled/juice/latex: others _____

7. How is the knowledge of traditional medicine passed to family members/younger generation?

_____

8. What should be done for medicinal plants to be used sustainably?

---

9. Is the drug (herb) mixed with another drug (herb) or other additive?

Mention, if any_____

Appendix table 2: Indications, Route of administration, Dose, duration and antidotes

Indication	Stage of illness	Dose and duration	Route of administration	Dose and duration			Antidote, if any
				Adult	Pediatric	Geriatric	
1	Mild						
2	Serious						
3	Chronic						

Appendix II. Raw Data

Appendix table 3: List of disease in the study area

№	Health Problems	Number of citation of the disease by respondent
1	Abdominal pain	49
2	Acne	54
3	Amoebiasis	68
4	Anthrax	20
5	Arthritis	37
6	Ascariasis	89
7	Athlete's foot	17
8	Baldness	8
9	Bloating	41
10	Boils	37
11	Bone fracture	22
12	Circumcision	58
13	Coccidosis	57
14	Common cold	69
15	Conjunctivitis	33
16	Constipation	25
17	Coughing	39
18	Dandruff	45
19	Diabetes	15
20	Diarrhea	51
21	Dysentery	48
22	Dyspepsia	12
23	Eczema	19

Cont…

24	Epiglottitis	10
25	Exo-parasite	41
26	Eye infection	55
27	Febrile illness	29
28	Gastritis	50
29	Halitosis	40
30	Headache	56
31	Hemorrhoid	21
32	Hiccup	13
33	Hypertension	18
34	Intestinal parasite	66
35	Irritating eye	11
36	Jaundice	25
37	Leprosy	11
38	Malaria	39
39	Mumps	37
40	Nasal bleeding	17
41	Outer ear lesion	9
42	Pneumonia	41
43	Rabies	19
44	Retained placenta	55
45	Rheumatism	23

Cont…

46	Ring worm	31
47	Scabies	9
48	Sexual impotency	12
49	Sinusitis	6
50	Skin infection	78
51	Small pox	5
52	Snake bite	4
53	Stomachache	20
54	Sun stroke	35
55	Swelling	37
56	Tape worm	57
57	Tonsillitis	8
58	Toothache	43
59	Trachoma	12
60	Typhoid	23
61	Urine retention	38
62	Ventral disease	25
63	Vomiting	10

Appendix table 4: List of medicinal plants used to treat human and livestock ailments in the study area

Botanical and Family name	Local name	Habit	Ailment (s) treated	Parts used and mode of preparation	Route of administration
Acacia abyssinica Hochst.ex Benth., Fabaceae,(YB30)	Girar	Tree	Hiccup	Fresh root bark is chewed	Oral
			Boils	The root with its bark removed will be dried, crushed and mixed with garlic and honey and applied on the affected area	Dermal
Acacia pilspina Pic-Serm., Fabaceae,(YB20)	Cheba	Tree	Tonsillitis	Stem bark powder will be soaked in water over night and the filtrate will be drunk	Oral
			Headache	The root together with garlic bulb will be pounded, dried and sniffed	Oral or Nasal
Acanthus polystachius Del., Acanthaceae,(YB21)	Kosheshla	Herb	Trachoma	Fresh root and garlic juice is taken	Oral
			Wound	Dried leaf powder is mixed with butter and with bandage the mixture is pasted all over the wound.	Dermal

Table 2: Contd.

Achyranthes aspera L., Amaranthaceae, (YB82)	Telenji	Herb	Hypertension	The stem will be chewed and the juice swallowed	Oral
			Retained placenta	Fresh stem will be crushed mixed with water and given to animal to drink	Oral
			Nasal bleeding	The fresh leaf will be crushed and plugged into the nostrils	Nasal
			Wound	Dried leaf powder with butter is applied and bandaged tightly	Dermal
Allium sativum., Amaryllidaceae,(YB40)	Nech shinkurt	Herb	Sinusitis	Peeled clove or bulb is sniffed	nasal
			Amoebiasis	The garlic cloves or bulb are squeezed, soaked in water over night with finely chopped chili and the juice is consumed	Oral
			Typhoid	Dried cloves or bulb s crushed, soaked in water, filtered and the filtrate is consumed	Oral
Aloe macrocarpa Tod., Aloaceae,(YB42)	Irate	Herb	Baldness	The latex is applied on the affected area of animal body	Dermal
			Gastritis	Fresh latex with honey is consumed	Oral

Table 2: Cont.

Artemisia abyssinica Jack. Ex Wild., Asteraceae ,(YB25)	Chikugn	Herb	Abdominal pain	Fresh leaves are crushed and mixed with powdered *Allium sativum* and *Lepidium sativum* and sniffed as well as rubbed against the abdomen	Nasal or Dermal
			Malaria	Fresh leaf and *Allium sativum* bulb will be squeezed together, soaked in water and the filtrate will be drunk	Oral
			Could	Fresh leaves will be put in the nostrils for sniffing	Nasal
Barleria eranthemoides R. Br. ex C.B. Clarke., Acanthaceae,(YB02)	Yeset tat	Tree	Fire burn	Fresh shoot (bud) will be crushed, mixed with butter and creamed on the wound	Dermal
			Toothache	Fresh root and stem juice are applied on the tooth	Oral
Bersama abyssinica Fresen., Melianthaceae,(YB05)	Azamra	shrub	Ascariasis	Fresh leaf will be squeezed mixed with ground seeds of *Cucurbita pepo* and boiled in milk and drunk	Oral
Brucea antidysenterica J. F. Mill., Simaroubaceae,(YB10)	Abalo	Shrub	Eczema	Dried fruit will be pounded mixed with butter and applied on the affected area	Dermal
			Leprosy	The leaf and fruit are pounded and bandage over the wound.	Dermal
			Retained placenta	Fresh stem and leaf juice is given for animals.	Oral
Buddleja polystachya Fresen., Loganiaceae,(YB72)	Amfar	Tree	Dandruff	Young leaves are cut, crushed, soaked in water and the juice is filtered, the juice is exposed to sun light for some time for the purpose of thickening and applied onto the affected area	Dermal

Table 2: Cont.

Calpurnia aurea (Ait.) Benth., Fabaceae(YB60)	Ligita	Shrub	Rabies	Fresh or dried leaf, fruit and seeds crushed, mixed with food (Gebs enjera) and given to dogs	Oral
			Abdominal pain	Dried fruit powder is homogenized with water and given to human and cattle.	Oral
			Amoebiasis	Seed powder mixed with honey and consumed	Oral
			Exoparasites	The leaf of *Calpurnia aurea* and fruit of lupine are soaked in water for three days and then their juices are used to wash the body of the cattle	Dermal
Capparis tomentosa Lam., Capparidaceae,(YB54)	Gomro	Shrub	Common cold	Dried or fresh root will be fired and inhaled	Nasal
Carica papaya., caricaceae,(YB28)	Papaya	Shrub	Amoebiasis	Leaf is boiled, cooled and the suspension is drunk in empty stomach	Oral
			Constipation	The seed eaten	Oral
Carissa spinarum L., Apocynaceae,(YB62)	Agam	Shrub	Snake bite	Fresh shoot buds will be chewed	Oral
			Bloating	Fresh or dried root bark powder is put on fire and the smoke is inhaled	Nasal
Citrus lemon (L.) Burm.F., Rutaceae,(YB48)	Lomi	Shrub	Amoebiasis	Fresh fruit juice is mixed with tomato salad and consumed	Oral
			Ring worm	Sap of the plant will be creamed onto the affected area	Dermal
			Intestinal parasite	The lemon juice mixed with honey is consumed	Oral

Table 2: Cont.

Citrus× sinensis., Rutaceae,(YB58)	Birtucan	Tree	Hiccup	The internal root bark is boiled in water mixed with salt is and the liquid is consumed	Oral
			Outer ear lesion	Entire fruit is squeezed and applied on the affected area	Dermal
Clausena anisata (Wild.).Benth., Rutaceae,(YB80)	Limch	Shrub	Hiccup	Fresh fruit is pounded together with garlic and sniffed	Nasal
			Coccidosis	Fresh root juice in water is given for drinking to hens.	Oral
Clematis hirsuta perr and Guill., Ranunculaceae,(YB81)	Azo hareg	Herb	Swelling	Fresh stem juice homogenized with honey is applied over the swollen part.	Dermal
			Ascariasis	On Wednesday and Friday leaf is cut, squeezed between palms, collect the juice in cup which is half the size of thump and given for drinking	Oral
			Eye infection of cattle	Leaf and stem will be crushed squeezed and the juice will be put into the diseased eye	Ocular
Clerodendrum myricoides (Hochst.) Vatke., Lamiaceae,(YB09)	Misrch	Herb	Vomiting	Fresh root powder will be mixed with water and the filtrate will be drunk	Oral
			Malaria	Leaf powder and seed powder will be mixed with water and the filtrate will be drunk	Oral
			Hemorrhoid	Stem is squeezed and the juice is given.	Oral

Table 2: Cont.

Clutia lanceolata Jaub. and Spach., Euphorbiaceae,(YB11)	Fyelefej	Herb	Hemorrhoid	Dried leaf powder mixed with water and filtrate is drunk	Oral
			Dysentery	Stem powder mixed with water and drunk	Nasal or Oral
			Arthritis	Fresh leaf is squeezed in water and drunk with goat milk	Oral
			Ecto- parasite	Fresh leaf with that of *Calpurina aurea* will be squeezed in water and used to wash the body of cattle	Dermal
Croton macrostachyus Del., Euphorbiaceae,(YB15)	Bisana	Tree	Ringworm	Fresh shoot sap will be applied onto the skin	Dermal
			Malaria	Stem bark powder mixed with honey and the suspension obtained by soaking pounded seeds of Guizotia abyssinica and drunk	Oral
Cucumis ficifolius A. Rich., Cucurbitaceae,(YB39)	Yemdir embuay	Herb	Coughing sheep	Warm the fruit on fire and enforce the sheep to swallow it.	Oral
			Diarrhea	Whole dried plant powdered mixed with water given to cattle to drink	Oral
			Retained placenta	Crushed fresh root mixed with the seeds of Guizotia abyssinica pounded and dissolved in water and given to cattle to drink	Oral

Table 2: Contd.

Cucurbita pepo L., Cucurbitaceae,(YB79)	Duba	Herb	Tape worm	Seed is dried, roasted, and it is eaten in empty stomach.	Oral
			Outer ear lesion	Fresh flower is crushed between palms and the juice is applied onto the lesion	Dermal
Cynoglossum coerolium Hochst.A.DC., Boraginaceae,(YB69)	Shingug	Herb	Febrile illness	Fresh leaf juice mixed with fermented butter in lukewarm water is consumed	Oral
Datura stramonium L., Solanaceae,(YB49)	Astenagr	Herb	Dandruff	Fresh leaf juice mixed with butter is applied onto the affected area	Dermal
			Toothache	Fresh seed and leaf boiled and while boiling the vapor is fumigated or peeled stalk is given for chewing.	Nasal or Dermal
Dodonea angustifolia., Sapindaceae,(YB29)	Kitkita	Shrub	Wound	Dried leaf powder with butter is applied onto the wound	Dermal
			Bone fracture	Paste of dried leaf powder with water is tied on fractured bone with frames.	Dermal
			Eczema	Fresh leaf paste (that is thick jelly compound prepared from leaf with little water) mixed with butter and applied over the wound.	Dermal

Table 2: Cont.

Echinops kebericho Mesfin., Asteraceae,(YB16)	Kebercho	Herb	Epidemic disease(small pox)	Fresh or dried rhizome is fumigated for human and/equine.	Oral or Nasal
Eleusine floccifolia (Forssk.) Spreng., Poaceae,(YB27)	Akrma	Herb	Mumps	Fresh whole plant juice is filtered and applied through the ear.	Auricular
Eucalyptus saligna. Myrtaceae,(YB52)	Bahrzaf	Tree	Athlete's foot	Fresh leaf is pounded and soaked in warm water and used to wash foot	Dermal
Eucalyptus globulus Labill., Myrtaceae,(YB75)	Nech bahr -zaf	Tree	Febrile illness	Fresh young leaf bud is mixed with *Solanecio gigas* leaf and boiled in water and the vapor is inhaled	Nasal
			Common cold	Fresh leaf boiled vapor is inhaled being in blanket or dried leaf is added on fire and the smoke is fumigated.	Nasal
Euclea racemosa Murr., Ebenaceae,(YB03)	Dedeho	Shrub	Tape worm	Fresh leaf is crushed, ground and soaked in water and the filtered is drunk	Oral
			Toothache	Fresh stem bark is chewed	Oral

Table 2: Contd.

Euphorbia abyssinica G. F. Gmel., Euphorbiaceae,(YB06)	Qulqual	Tree	Venereal disease	Latex is mixed with *Eragrotis teff* powder to prepare bread and eaten	Oral
			Hemorrhoid	The latex is collected and applied on the swelling	Dermal
			Acne	Latex is collected mixed with honey and boiled in goat milk, cooled and applied on the skin	Dermal
			Leprosy	The flower will be powdered mixed with honey and consumed	Oral
Embelia schimperi Vatke., Myrsinaceae,(YB19)	Enqoqo	Shrub	Malaria	The fruits are pounded, soaked in water and the filtrate will be drunk with tella (local beer)	Oral
			Tapeworm	Dried fruit powder will be soaked in tella and drunk	Oral
			Ascariasis	Fresh ripened fruit are given.	Oral
Ficus vasta Forssk., Moraceae,(YB33)	Warka	Tree	Diarrhea	Dried stem bark juice with salt is given for cattle.	Oral
Foeniculum vulgare Miller., Apiaceae,(YB01)	Enslal	Herb	Cough	Fresh leaf is squeezed between palms and the juice is collected in coffee cup, added with milk and drunk	Oral
Gallium aparinoides Forssk., Rubiaceae,(YB04)	Ashikt	Herb	Cough	The root and leaf are boiled in water and the vapor will be inhaled being in blanket during bed time	Oral

Table 2: Contd.

Grewia ferruginea Hochst.ex A.Rich., Tiliaceae,(YB07)	Lenquata	Shrub	Dysentery	Fresh latex soaked in water and consumed with egg and salt by cattle	Oral
			Dandruff	Hair is washed by the internal bark with water.	Dermal
Guizotia abyssinica Caso., Asteraceae,(YB08)	Nug	Herb	Chronic swelling	The seed is pounded, soaked in water with salt and filtered, finally it is consumed	Oral
Hagenia abyssinica (Brace.) J. F. Gmel., Rosaceae,(YB12)	Koso	Tree	Hypertension	Fresh fruit and leaf are boiled with little water and mixed with alcohol (katikala) and drunk	Oral
			Tapeworm	Dried fruit powder is soaked in water and filtrate is drunk	Oral
Helianthus annuus., Asteraceae,(YB18)	Yesuf abeba	Herb	Constipation	The seed is slightly roasted, pounded mixed with water and the filtrate is consumed	Oral
Juniperus procera Hochst. ex. Endl., Cupressaceae,(YB17)	Tsid	Tree	Wound	Fresh leaf is crushed and applied onto the wound	Dermal
Justicia schimperiana (Hochst.ex Nees). T.Anders., Acanthaceae,(YB13)	Sensel/ Smiza	Shrub	Coccidosis	Fresh leaf and shoot bud juice with water is given to hens.	Oral
			Malaria	Dried leaf and shoot boiled with water, salt and fermented butter; decoction is given.	Oral
			Rabies	Fresh leaf with *Salix mucronata* leaf, will be crushed and the juice is consumed by both humans and animals in the morning before food	Oral

Table 2: Contd.

Kalanchoe petitiana, A. Rich., Crassulaceae,(YB14)	Andaula	Herb	Toothache	Fresh root will be chewed with salt	Oral
			Epiglottitis	Fresh leaves are crushed between palms and the juice is drunk	Oral
Lageniaria siceraria., Cucurbitaceae,(YB23)	Kil	Herb	Leprosy	The fruit is crushed and soaked in water for three days and the bitter juice is drunk	Oral
			Anthrax	Water is added into 'difn kil' (*Lageniaria siceraria)* and water in difn kil will be kept for some days. Then, it is filtered with clean *Habesha* clothes and the bitter liquid is drunk for 7 days. This is mainly recommended for cattle and equine	Oral
Lepidium sativum L., Brassicaceae,(YB26)	Feto	Herb	Diarrhea	Dried seed decoction with sugar and salt is given.	Oral
Linum usitatissimum L., Linaceae,(YB24)	Telba	Herb	Gastritis	The seed is boiled in water and the juice is given with sugar.	Oral
			Intestinal parasites	Dried seed decoction is given to animals.	Oral
			Constipation	The seed is boiled in water, then the seed filtered and the juice (decoction) with sugar is given.	Oral

Table: Continued

Lupins albus L., Fabaceae,(YB31)	Gibto	Herb	Ecto-parasite	The seed is slightly roasted and soaked in water for seven days used to wash the body of cattle with leaves of C. aurea	Dermal
			Hypertension	Ethyl alcohol made from its seeds will be drunk	Oral
			Leprosy	Seeds will be roasted and soaked in water in pot for about three to seven days. After that the filtrate will be consumed with honey	Oral
Maesa lanceolata Forssk., Myrsinaceae,(YB41)	Qilaba	Shrub	Leprosy	Dried powder together with that of *Clematis simensis* will applied onto the affected body part	Dermal
			Anthrax	Root and leaves are powdered mixed with crushed fruits of *Lageniaria siceraria* and the filtrate will be drunk by both human and cattle	Oral
Malva verticillata L., Malvaceae,(YB32)	Lit	Herb	Bloat	Fresh stalk is crushed soaked in water and the filtrate is given to cattle to drink	Oral
			Intestinal parasite	The whole plant is boiled with *Allium sativum* bulb and the decoction is given for sheep and goat to consume	Oral

Table 2: continued

Maytenus arbutifolia (A. Rich.) Wilczek., Celastraceae,(YB43)	Atat	Shrub	Repellent	Dried stem bark powder is mixed with food and spread on field to control rats.	Oral
Monordica foetida Schumach., Cucurbitaceae,(YB51)	Yekura-hareg	Herb	Toothache	Fresh root is given for chewing	Oral
			Cough	Fresh whole plant vapor is inhaled	Nasal
Musa x paradisiaca L., Musaceae,(YB55)	Muz	Herb	Constipation	Un ripened banana fruit will be boiled in milk and consumed	Oral
Myrsine Africana L., Myrsinaceae,(YB22)	kechemo	Shrub	toothache	Fresh root is given for chewing in the morning before breakfast	Oral
			Venereal disease	Fresh whole plant decoction prepared with honey is given for the patient	Oral
			Cough	Fresh leaf paste is applied over the wound	Dermal
Mytenus senegalensis (Lam) Exell., Celastraceae,(YB34)	Qoba	Tree	Sexual impotency	Dried stem bark powder is cooked with chicken and consumed	Oral

Table 2: Contd.

Ocimum lamiifolium Hochst. ex Benth., Lamiaceae,(YB36)	Damakese	Shrub	Febrile illness	Fresh or dried leaf is crushed with coffee and consumed	Oral
			Sun stroke	The fresh leaf is pounded in water and the juice is drunk	Oral
Olea europaea subsp. *cuspidata* (Wall. ex G. Don) Cif., Oliaceae,(YB35)	Woira	Tree	Irritating eye	Fresh shoot juice is applied	Ocular
Osyris quadripartita Decn., Santalaceae, (YB38)	Qeret	Shrub	Skin infection	Dried leaf powder with water is applied onto the skin of cattle	Dermal
			Conjunctivitis	Fruit of *Osyris quadripartita* will be finely powdered and applied into the eye with butter	Dermal
			Tonsillitis	Root and fruit are crushed with *Lepidium sativum* seeds, bulbs of *Allium sativum* and the internal bark of *Acacia abyssinica* and consumed	Oral
Otostegia integrifolia Benth., Lamiaceae, (YB37)	Tinjut	Shrub	Malaria	Fresh leaf will be pounded and soaked in water with pounded bulbs of *Allium sativum* and consumed	Oral
			Stomachache	Fresh leaves are given for chewing with salt.	Oral
			Lung diseases	Leaves smoke will be inhaled	Nasal
Phytolacca dodecandara L'Herit., Phytolaccaceae,(YB50)	Endod	Shrub	Scabies	Fresh leaf juice is mixed with water and scabies is washed thoroughly by the juice.	Dermal

Table 2: Contd.

Plantago lanceolata L., Plantaginaceae,(YB47)	Gorteb	Herb	Wound	Fresh crushed leaf juice will be mixed with oat flour dough and applied onto the wound	Dermal
			Coccidosis	Crushed leaves will be mixed with water and drunk	Oral
Psidium guajava L., Myrtaceae,(YB53)	Zeytuna	Small tree	Halitosis	Leaf is washed and given for chewing	Oral
Rhamnus prinoides L' Herit., Rhamnaceae,(YB44)	Gesho	Tree	Scabies	Dried leaf powder with butter is applied.	Dermal
			Snake bite	Fresh root is given for chewing.	Oral
Ricinus communis L., Euphorbiaceae,(YB56)	Gulo	Shrub	Toothache	Fresh root with salt is given for chewing.	Oral
			Scabies	Seed will be crushed and the juice will be applied onto the skin	Dermal
Rosa abyssinica Lindley. , Rosaceae,(YB57)	Qega	Shrub	Abdominal pain	Fresh fruit is given for chewing.	Oral
			Dandruff	Ripened fruit is collected and boiled. Decoction is filtered so as to remove the seed and the filtrate will be applied with butter	Dermal
			Tapeworm	Ripened fruit is collected and boiled. Decoction is filtered so as to remove the seed and the filtrate will be consumed with butter	Oral

Table 2: Contd.

Rosmarinus officinalis L., Lamiaceae, (YB46)	Siga-metbesha	Herb	Toothache	Fresh stalk is given for chewing.	Oral
			Hypertension	Leaf with stem and the leaf of lemon are boiled, and then after cooled and consumed	Oral
Rubus apetalus Poir. Rosaceae,(YB63)	Enjory	Shrub	Gastritis	Dried leaf and fruit powder soaked in small amount of water and the crude juice is consumed	Oral
			Ascariasis	Fresh fruits will be eaten	Oral
Rumex nepalensis Spreng. Polygonaceae,(YB45)	Tult	Herb	Stomachache	Fresh root boiled with ginger is drunk	Oral
			Retained placenta	Fresh root is inserted for some minutes	Genital
Rumex nervosus Vahl. Polygonaceae,(YB59)	Ambacho	Shrub	Eye infection	Fresh leaf juice is dropped into the eye	Ocular
			Circumcision wound	Fresh leaf will be boiled cooled and applied onto circumcised male genital	Genital
Ruta chalepensis L., Rutaceae, (YB71)	Tena adam	Herb	Swelling	Fresh root juice boiled in water is given for cattle to drink	Oral
			Malaria	Dried or fresh shoot boiled in water with ginger and consumed	Oral
			Abdominal pain	Fresh leaf juice crushed with *Allium sativum* bulb and water is given for human and livestock.	Oral

Table 2: Contd.

Schinus molle L., Ancardiaceae,(YB64)	Qundo-Berbere	Tree	Jaundice	Dried fruit with *Solanum nigrum* leaf in water is consumed	Oral
Sida schimperiana Hochst.ex A. Rich., Malvaceae,(YB73)	Chifrg	Herb	Eye infection	Fresh root and leaf juice will be dropped into the eye	Ocular
Solanecio gigas Vatke., Asteraceae,(YB65)	Boz	Herb	Anthrax	Powder of dried leaf and stem bark with garlic bulb is given for cattle to consume	Oral
Solanum incanum L., Solanaceae,(YB74)	Embuay	Herb	Jigger	Fresh root juice is applied onto the affected area	Dermal
Solanum lycopersicum L., Solanaceae,(YB66)	Timatime	Herb	Hemorrhoid	The fruit will be cut and inserted into the anus	Anal
			Urine retention	Dried or fresh leaf is mixed with *Ruta chalepensis* leaves decocted and given to cattle to drink	Oral
Stephania abyssinica (Dillon.and A.Rich.) Walp. , Menispemaceae,(YB61)	Yayt hareg	Herb	Rheumatism	Fresh or dried root powder is mixed with *Eragrotis teff* powder to prepare bread and given to eat	Oral
Syzygium guineense (Wild.) DC., Myrtaceae,(YB67)	Doqma	Tree	Leprosy	Dried leaf powder mixed with honey will be applied onto the skin	Dermal

Table 2: Contd.

Thymus schimperi Ronniger. , Lamiaceae,(YB76)	Tosign	Herb	Diabetes	Dried stem and leaf powder boiled with tea and drunk	Oral
Verbena officinalis L. ,Verbenaceae,(YB68)	Atuch	Herb	Dysentery	Fresh whole plant part is boiled with tea and drunk	Oral
			Stomachache	Fresh root is given for chewing with salt.	Oral
Vernonia amygdalina Del., Asteraceae,(YB70)	Girawa	Shrub	Snake bite	Fresh root is given for chewing with salt	Oral
			Stomachache	Fresh leaf crushed , soaked with water and consumed	Oral
			Abdominal colic	The fresh leaf is squeezed with water and the juice is consumed	Oral
			Retained placenta	Fresh leaf, particularly shoot containing bud is preferentially given for the cow to consume	Oral
Vernonia auriculifera Hien. Asteraceae,(YB77)	Dengerita	Shrub	Eye infection	Juice of fresh leaf and Monordica foetida is applied	Ocular
Zingiber officinale. Zingiberaceae,(YB78)	Zingible	Herb	Sexual impotency	Half a tea spoon of its juice with honey and boiled egg is consumed for a month	Oral
			Couph and common cold	The juice of ginger mixed with honey is consumed three to four tea spoon per day	Oral
			Dyspepsia	Fresh ginger is chewed regularly to relieve the problem	Oral

Note: All local names are in Amharic language and YB is name of the collector and the no in parenthesis is collection number