

Full Length Research Paper

Assessment of indigenous knowledge of medicinal plant practice and mode of service delivery in Hawassa city, southern Ethiopia

Reta Regassa

Department of Biology, Hawassa College of Teacher Education, P.O.Box 115, Hawassa, Ethiopia.
E-mail: retaregassa@yahoo.com. Tel. +251913451730, +251462202268.

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An assessment of indigenous knowledge of medicinal plant was carried out to collect and document information on the use of traditional medicinal plants of local people of Hawassa city, southern Ethiopia. Group discussion, semi-structured interviews, field observations or guided field walks with informants to obtain indigenous knowledge of the local community on health, vegetation of the locality, use, conservation and threats of medicinal plants were carried out. A total of 83 medicinal plants and 11 medicinal animals were collected to treat 53 human and livestock ailments. Among the total traditional medicinal plants, 71 species (85.5%) were used against human ailments, 3 species (3.6%) were used to treat health problems of livestock and 9 (10.84%) species were used to treat both human and livestock ailments. Fabaceae was the most dominant medicinal plant family reported. Leaves were the dominant plant part used to prepare remedies (31.9%), followed by seeds (19%). High degree of informant consensus factor (ICF) was observed among traditional healers in treating gonorrhoea (ICF = 0.77), wound (ICF = 0.76) and stomach ache (0.76). The species with the highest level of fidelity (FL = 100%) in treatment of malaria. Traditional remedies were processed mainly through crushing (28.2%), chewing (12.27%), squeezed (12.27%) and powdered (9.2%).

Key words: Indigenous knowledge, local people, medicinal plant, traditional medicine, Hawassa, Ethiopia.

INTRODUCTION

The use of medicinal plants is as old as human civilization. Ethiopia has glorious tradition of health care system based on plants, which dates back to several millennia. Medicinal plants and traditional medicine play an important role in the health care system of most developing countries. A study showed that nearly 80% of human population and 90% of livestock in Ethiopia rely on traditional medicine.

The traditional health care practice is mainly dependent on medicinal plants collected from the wild. In spite of this, the medicinal plant biodiversity is being depleted due to manmade and natural calamities. Moreover, the indigenous knowledge associated with the conservation and use of medicinal plants is also disappearing at an alarming rate. The widespread use of traditional medicine

among both urban and rural population in Ethiopia could be attributed to cultural acceptability, its attributed efficacy against certain types of diseases, physical accessibility, and economic affordability as compared to modern medicine. In view of this, development and its ultimate integration of traditional medicine with the modern system is believed to have significant impact in the expansion of the health care coverage. There is a traditional distinction between attitudes to knowledge, on the parts of academia and industry. Educators have typically considered knowledge as a public good, and the acquisition and dissemination of knowledge have therefore been encouraged in the same way (Hamilton, 2003). The largest means of acquiring and transferring traditional knowledge is through non formal education

and local communication networks. However, because of the continued acceleration, indigenous traditional knowledge is confronted with irreversible loss. The numerous language that mostly lack written scripts, ageing of the healers, displacement of communities, etc., further compound this situation (Dawit, 2001).

Among natives of various countries, knowledge of medicine has been passed by word of mouth from one generation to the next by priests, witch doctors, or medicine men. This is no less true in Ethiopia where written records in this field are almost absent, even though the country has had a written language for over two thousand years (Amare, 1976). Traditional medicinal knowledge is dynamic and practitioners make every efforts to widen their scope by reciprocal exchange of limited information with each other or through reading either one of the traditional pharmacopeias written in Arabic or Geez that are produced as far back as one hundred or more years (Dawit, 1986).

The knowledge about the identity and to some extent of the use of medicinal plants has been circulating chiefly among practitioners of traditional medicine or the benefactors of such practices. Despite the long recorded history of herbal medicine, it is only very recently that studies into the efficacy of the crude plant parts and products, as well as fine extracts of these, have been seriously considered by various investigators in Ethiopia (Mesfin, 1986). Local experiences which have been gained through generations to solve indigenous problems are disappearing from day to day. According to Tafesse and Mekonnen (2001) report, local experiences which have been gained through generation to solve indigenous problems are disappearing due to lack of written documents, death of elders, migration of people due to drought and social problems, urbanization, influence of modern veterinary medicine and exotic cultures.

Traditional knowledge systems have started to disappear with the passage of time due to insufficiency of written documents and relatively low income in these traditions. However, due to the lesser side effects of medicinal plants with respect to allopathic medicine, medicinal plants regained a wide appreciation (Ahmad et al., 2009). Indigenous knowledge of medicinal plants in Ethiopia is unevenly distributed among community members. The knowledge and social structure is thus intertwined (Fassil, 2001; Zemedu, 2001). The distribution of this knowledge and services are hierarchically placed. Services are obtained from the family, the neighborhood, the village or beyond (Hareya, 2005). In the country, the loss of indigenous knowledge is not too far from developed countries. The vast knowledge on traditional uses of plants is not fully documented and most of the knowledge is conveyed from generation to generation by word of mouth (Fassil, 2001; Berhanemeskel, 2009). Documenting traditional medicinal knowledge is important to facilitate discovery of new sources of drugs and

promote sustainable use of natural resources. On the other hand, the knowledge of the factors involved in the selection of treatment options at household level is important for health service planning and to incorporating herbal medicine in a country's health care delivery system. The study therefore, provides a base line data for planners, social workers, health workers, administrators in the city and sub city to undertake sustainable economic and social developments in line with the 5 years transformational plan of the country, and also to document traditional medicinal plants, their management and conservation associated with the indigenous plant knowledge of traditional practitioners of the study area.

MATERIALS AND METHODS

Study area

The study was conducted in Hawassa city, the capital of southern Nations Nationalities and peoples Regional state, located 275 km from Addis Ababa, capital of Ethiopia. It is surrounded by Lake Hawassa in the west, Hawassa zuria woreda in the south and east part, and Oromiya Region in the north. The town lies between 07° 05' latitude north and 38° 29' longitude east, with an altitude of 1,697 m above sea level, and covers a total area of 50 km² and has a mean annual rainfall and temperature of 997.6 mm and 20.9°C, respectively. Based on figures from the Central statistical agency (CSA) (2007), Hawassa city has an estimated population of 259,803, and is home to more than 46 ethnic groups. Each ethnic group has their own composition of tribes with distinctive language, custom, traditional beliefs and cultural diversity. It is sub divided into 8 sub city, namely Tabor, Hayekdar, Menaharia, Misrak, Bahale adarash, Addis Ketema, Mehale Ketema and Awela Tula in which the present study was carried out (Figure 1). The land form is plain, with reddish volcano soil which is ideal for construction.

Ethnobotanical data collection

The study which was conducted between November, 2011 to August 15, 2012 involved group discussion, semi-structured interviews, field observations or Guided field walks with informants to obtain indigenous knowledge of the local community on health, vegetation of the locality, use, conservation and threats of medicinal plants. The size of the sample does not necessarily depend on the total population, but depends on the available fund, time and other reasons (Storck et al., 1991).

In the present study, a total of 140 individuals in the age range of 20 and above (90 male and 50 female), were randomly selected from eight sub-city and out of these, 40 key informants (32 male and 8 female (medicinal plant practitioners) were systematically selected based on recommendation from elders and local authorities (Kebele administration leaders), considering factors such as gender, a reputable thorough knowledge of wild plants, time availability and willingness to participate. The choice of key informants followed the suggestion made by Martin (1995). The other 100 informants (64 male and 36 female) were selected randomly from the local people of the study area. This was done by tossing a coin and using him/her as informant whenever head of the coin were up if he/she volunteered to participate. Interviews was based on a semi-structured checklist of topics consisting 20

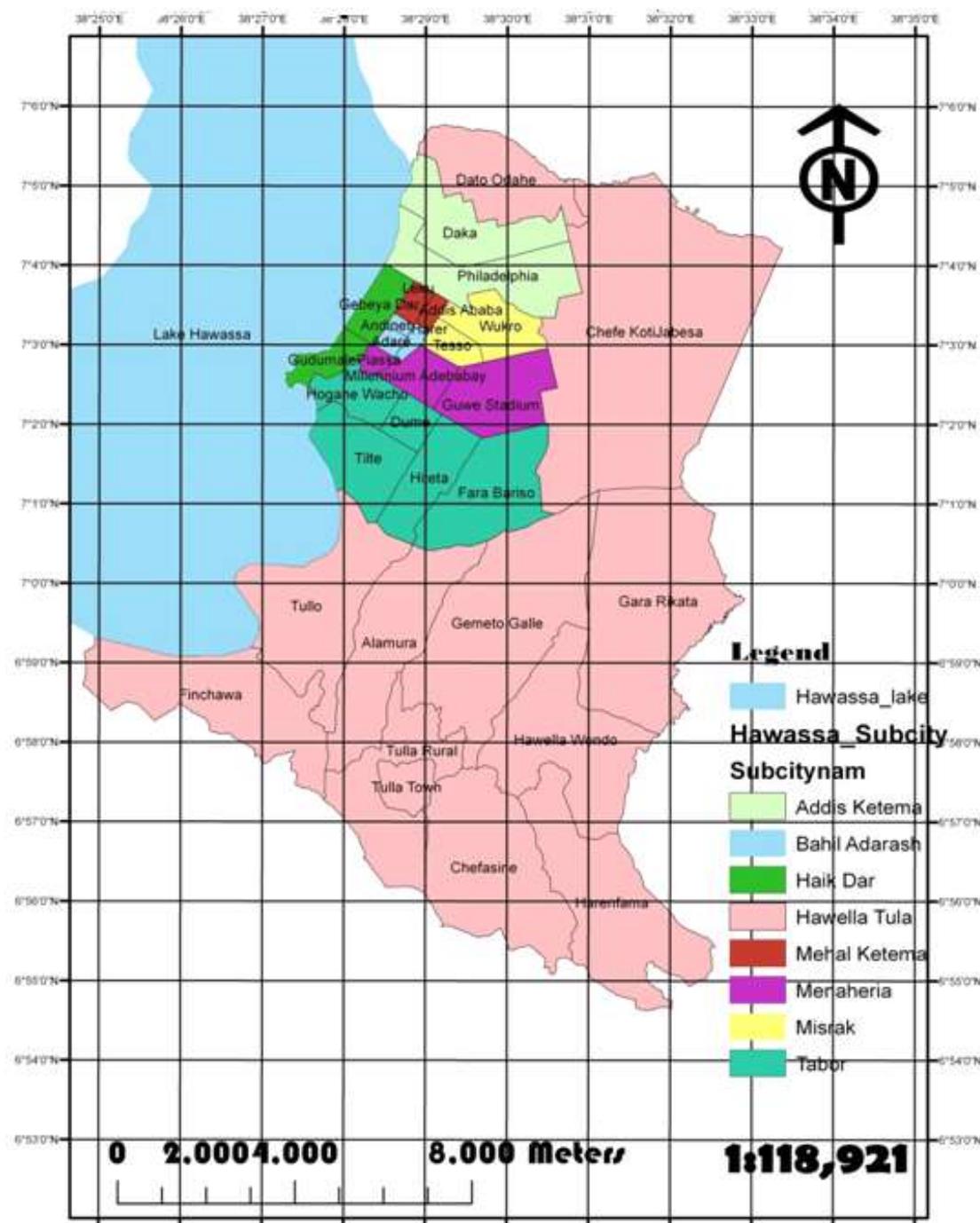


Figure 1. Map of the study area showing the study site. (Source: Hawassa City Admin., 2011).

questions prepared before hand in English, and translated to Amharic, information regarding local names of medicinal plants, part(s) used methods and conditions of gathering and preparation, diseases treated, dosage used, route of application, and adverse effect; uses other than medicinal uses were recorded at the spot. Local names of plants were studied by repeated inquiries at different times, with the same informants, to check the accuracy of information obtained, and the information were recorded. The

collected plant specimens were properly identified by comparison with the specimens of Herbarium of Addis Ababa University/ Ethiopia. The specimens were identified by comparing with already identified specimens and using taxonomic literatures such as Hedberg and Edwards (1989), Azene et al. (1993), Edwards et al., 1995; Edwards et al., 2000, Tewolde and Edwards (1997) and Hedberg et al. (2003, 2004). Identified plant specimens have been deposited at ETH and Hawassa College of Teacher Education.

Data analysis

A descriptive statistical method such as percentage and frequency were employed to analyze and summarize the data on medicinal plants, associated knowledge, management methods, use, and conservation. The most useful information gathered on medicinal plants reported by local people such as medicinal value, application, methods of preparation, route of application, disease treated, dosage, part and habit used were analyzed through descriptive statistical analysis. Preference ranking was made following Martin (1995). ICF values were calculated following Heinrich (1998) to evaluate healer's consensus to cures for the group of ailments. The formula used to calculate ICF was as follows: $ICF = \frac{nur - nt}{nur - 1}$, where nur = number of use citations in each category, nt = the number of species used. Fidelity level (FL) was also used to determine the percentage of informants claiming the use of a certain plants for the same major purpose. $FL (\%) = \frac{NP}{N} \times 100$, where NP = the number of informants that claim a use of a plant species to treat a particular disease and N = the number of informants that use the plants as a medicine to treat any given disease (Alexiades, 1996).

RESULTS

Indigenous knowledge and diversity of medicinal plants

A total of 83 traditional medicinal plant species distributed in 81 genera and 54 botanical families were collected and documented across the study areas, of which 25 (30.1%) were trees, 19 (22.9%) were shrubs, 35 (42.2%) were herbs and 4 (4.8%) were climbers (Figure 3) and 11 medicinal animals were also recorded, among which 9 were mammals, 1 was vertebrates and 1 was insects. Fabaceae was the most dominant medicinal plant family reported (with 5 species), followed by Lamiaceae, Asteraceae, Rutaceae, Cucurbitaceae, Solanaceae (4 species each), Myrtaceae (3 species) and Acanthaceae, Melianthace, Rosaceae, Meliaceae, Malvaceae, Euphorbiaceae, Apiaceae and Verbenaceae (2 species each), whereas most of the families (39) were represented by single species (Table 1).

Among the total traditional medicinal plants, 71 species (85.5%) were used against human ailments, 3 species (3.6%) were used to treat health problems of livestock and 9 (10.84%) species were used to treat both human and livestock ailments (Appendix I, II and III). The majority of plant species reported in the study area (80.41%) were harvested from the wild, 14.59% were collected from home gardens and 5% were harvested both from the wild and home garden. Traditional practitioners reported that 45.45% of plants were very common, 26.7% were less abundant, 18.4% were very rare and 9.35% were endangered. Fifty three (53) different human and livestock health problems were reported in the study area (Table 2). Among 80 plant species used to treat human ailments, 13 (7.26%) species were used to treat stomachache, 12 (6.7%) species were used to treat

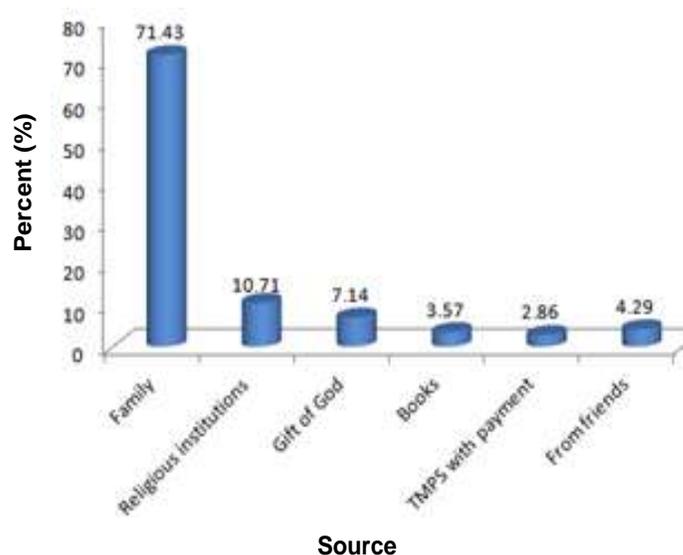


Figure 2. Source of healing wisdom of traditional practitioners.

malaria, 11 (6.15%) species were used to treat wound, and 10 (5.59%) species were used to treat gonorrhoea.

Socio demographic characteristics of respondents

The ages of informants interviewed were in the age class of 20 to 85, but the majority of informants' age ranged between 40 to 75. In the present study, out of 140 informants, 90 (64.29%) males and 50 (35.71%) female were involved in traditional medicinal plant practitioners of which, out of 40 key informants, 32 (80%) were male and 8 (20%) were female practitioners. The majority of the healers were not educated (75%) but only 25% have education below grade 5.

Source of healing knowledge

Most of the traditional practitioners of the study area reported that the highest and the most commonly cited source of healing was from family, which accounts (71.43%), followed by religious institutions (10.71%), gift from God (7.14%), reading books (3.57%), from their friends with payment (2.86%) and from friends without payment (4.29%) (Figure 2). The maximum years of experience of traditional healers of the study area range from 5 to 45 years.

Medicinal plant parts used to treat human ailments

Traditional medicinal plant practitioners of the study area

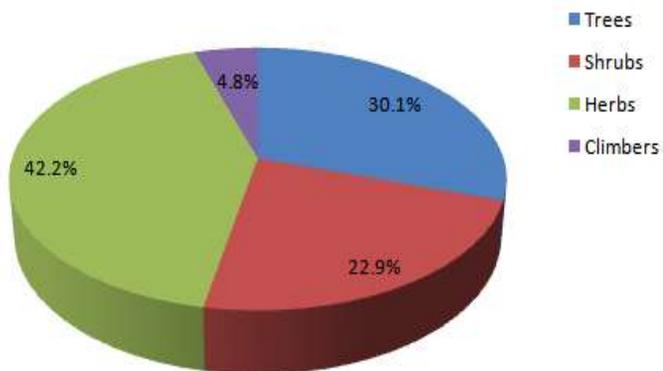


Figure 3. Percentage of habits of medicinal plants.

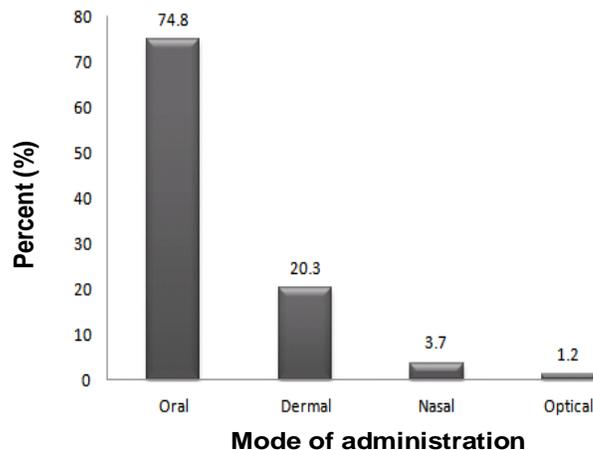


Figure 5. Percentage of mode of administration.

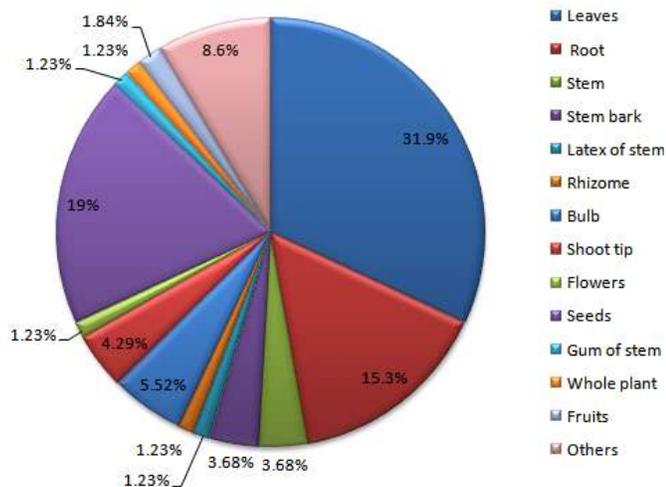


Figure 4. Proportion of plant parts used to prepare remedies for various ailments.

reported that leaves were the dominant plant part used to prepare remedies (31.9%), followed by seeds (19%), roots (15.3%), bulb (5.52%), shoot tip (4.29%), stem and stem bark (3.68%), fruits (1.84%), latex of stem, rhizome, flowers, gum of stem and whole plant (1.23%) and others (8.6%) (Figure 4).

Medicinal animal parts used, mode of preparation and application to treat human ailments

Indigenous people of the study area used different parts of animals to treat human ailments. Meat was most commonly used (35.71%) followed by teeth and faces (14.29%), bile, liver, blood, hair and honey (7.14% each). Drinking the liquid and cooking the meat were the dominant mode of preparation, each accounts (21.43%)

followed by eating fresh meat (14.29%). 71.43% of preparations were taken orally, followed by dermal (21.43 %).

Mode of medicinal plants preparation, route of administration, dosage and application

The result in the conditions of plant part used indicated that 61.96% were used in fresh form, 30.06% in dried form and 7.98% both fresh and dry (Figure 6). As majority of the plants can be used in both forms (fresh or dried), the chance of using the medicinal plants under different seasons of the year is maximized. During group discussion sessions, most informants reported that they preserved the plant material that they could not find in the dry or rainy season by various ways like pounding and saving the powder or hanging the intact plant material in the kitchen. Traditional healers reported to process remedies mainly through crushing (28.2%), chewing (12.27%), squeezing (12.27%), and powdered (9.2%) (Table 3). The administration of remedial preparations was mainly through oral (74.8%), dermal (20.3%), nasal (3.7%) and optical (1.2%) (Figure 5). Traditional medicinal plant practitioners of the study area used different measurement unit and duration to determine the dosage of medicine. Local units for instance, half cup, full cup, finger length for bark, root and stem were employed. Numbers of different parts of plants such as leaves, seeds, and fruits, shoot tip was also used to estimate and fix the amount of dosage. For example, 3 seeds of *Calpurnea aurea* were used for the treatment of hypertension, Jaundice and malaria, 120 leaves of *Carica papaya* were used to treat malaria. The full dose determination varied from healer to healer, and the dose given depends on age, physical strength and health conditions. For example, half cup was used for children

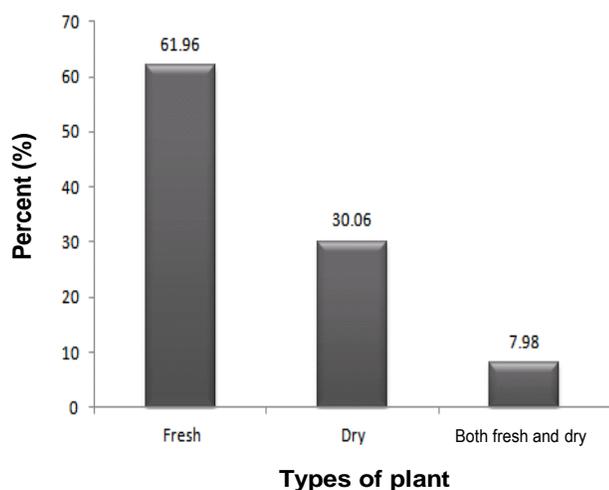


Figure 6. Types of plants used to treat human of traditional medicine ailments.

and full cup was used for adult.

Healers' consensus on treating different human ailments

In the study area, 53 human ailments were treated by traditional healers using various indigenous medicinal plants. High degree of informants consensus (ICF = 0.77) was observed among traditional healers in treating gonorrhoea. This disease was treated by *Chata edulis* (Vahl) Forssk. exEndl., *Dioscoreaalata* L., *Erthrina brucei* Schweinf, *Justicia schimperiana* (Hochst.exNees) T. Anders, *Ruta chalpensis* L., *Phytolacca dodecandra* L. Herit. Traditional healers agreed more in the treatment of hypertension (ICF = 0.61), malaria (ICF = 0.57), stomach ache (ICF = 0.76), toothache (ICF = 0.71), gonorrhoea (ICF = 0.77). The species with the highest level of fidelity (FL = 100%) is in treatment of malaria (Table 4). The highest fidelity level was recorded on the use of *Allium sativum* L., *Persea americana* Mill., *Argemone ochroleuca* L., *Moringa stenopetala* (Bak.) Cuf., *P. dodecandra* L. Herit., *Calpurnea aurea* (Alt.) Benth by traditional healers of the study area to treat malaria, hypertension, wound and gonorrhoea, respectively.

Marketed medicinal plants

The majority of traditional medicinal plants were not on sale in the local markets of Hawassa city, but only a few were reported to be sold, for instance, *Taverniera abyssinica* A. Rich, *Echinops kebericho* Mesfin, *Foeniculum vulgare* Miller, *M. stenopetala* (Bak.) Cuf., *Rosmarinus officinalis* L. *Nicotiana tobaccum* L. and *R.*

chalpensis L., *Eucalyptus globulus* Labill. were all available for sale as medicinal plants. Others such as *A. sativum* L., *Malva verticillata* L., and *Trigonella foenum-graecums* L. were sold as spices, *Cucurbita pepo* L., *C. papaya* L. *Lens esculenta* Medik., *T. dicocoon* Schrank, *Persea americana* Mill. and *Psidium guajava* L. were sold as food and *C. edulis* (Vahl) Forssk. exEndl. was sold as stimulants in the local markets.

Mode of service delivery and interaction with modern health medication

Among 140 informants, 71.43% reported that there is no fixed payment for the services they gave but the payment rate depends on the type of ailments treated and the healing condition of the patients. 20.57% of the healers have fixed payment rate for the service they gave, for instance, 100 birr for snake bite, 200 birr for Jaundice, 150 birr for the treatment of Hemorrhoids and 75 birr for bone fracture. 8.0% have given free charge services. Fourteen (14) practitioners were fulltime traditional medicinal practitioners and used this means for income generation, 20 were as half time practitioners. The majority of traditional healers (85%) reported that they do not have any interaction with modern medication due to the lack of interest, modernization and lack of awareness about traditional medicinal plants. Only five (5%) of traditional practitioners reported that they had assistants in their work from governmental office.

DISCUSSION

The result of the present study showed that among fifty three (53) ailments reported in the study area, 16 ailments (30.2%) were treated using single medicinal plant species and 37 ailments (69.8%) were treated using double and above species. This result is in line with Miruth (1999) and Bayafers (2000) in which combined plant species were reported to have high proportion in herbal preparation and in contrasts with Dawit (1986), Debela (2001) and Etana (2007) in which single plant species preparation were reported to be high. The predominant dosage reported to be used by healers from the study area was found to be the crushing type preparations. This agrees with the report of Etana (2007) and Yinger et al. (2008). Squeezing and chewing was the second mode of preparation reported.

Consistent with other studies (Miruth, 1999; Bayafers, 2000; Gedif and Hahn, 2003; Yinger et al., 2008; Gidey et al., 2011; Mohammed and Berhanu, 2011), leaves were the most commonly used plant parts for herbal medicine preparations. This mode of traditional medicinal plant practice is important for conservation of medicinal plants

Table 1. Diversity of medicinal plant families and their species and genera percentage encountered in Hawassa city, southern Ethiopia.

Family	No. of species	Percentage	No. of Genera	Percentage
Fabaceae	5	6.02	3	3.7
Lamiaceae	4	4.82	4	4.94
Asteraceae	4	4.82	4	4.94
Rutaceae	4	4.82	4	4.91
Cucurbitaceae	4	4.82	4	4.94
Solanaceae	4	4.82	4	4.94
Myrtaceae	3	3.61	3	3.7
Acanthaceae	2	2.41	2	2.5
Meliantaceae	2	2.41	2	2.5
Rosaceae	2	2.41	2	2.5
Meliaceae	2	2.41	2	2.5
Malvaceae	2	2.41	2	2.5
Euphorbiaceae	2	2.41	2	2.5
Apiaceae	2	2.41	2	2.5
Verbenaceae	2	2.41	2	2.5
Sapindaceae	1	1.21	1	1.24
Pittosaceae	1	1.21	1	1.24
Combretaceae	1	1.21	1	1.24
Amaranthaceae	1	1.21	1	1.24
Papaveraceae	1	1.21	1	1.24
Barassicaceae	1	1.21	1	1.24
Balantiaceae	1	1.21	1	1.24
Popilionaceae	1	1.21	1	1.24
Caricaceae	1	1.21	1	1.24
Apoynaceae	1	1.21	1	1.24
Boraginaceae	1	1.21	1	1.24
Amaryllidaceae	1	1.21	1	1.24
Celastraceae	1	1.21	1	1.24
Mimosaceae	1	1.21	1	1.24
Musaceae	1	1.21	1	1.24
Alliaceae	1	1.21	1	1.24
Rubiaceae	1	1.21	1	1.24
Linaceae	1	1.21	1	1.24
Moringaceae	1	1.21	1	1.24
Ranunculaceae	1	1.21	1	1.24
Oleaceae	1	1.21	1	1.24
Oliniaceae	1	1.21	1	1.24
Oxallidaceae	1	1.21	1	1.24
Podocarpaceae	1	1.21	1	1.24
Lauraceae	1	1.21	1	1.24
Phytolaceae	1	1.21	1	1.24
Plantaginaceae	1	1.21	1	1.24
Polygalaceae	1	1.21	1	1.24
Anacardiaceae	1	1.21	1	1.24

Table 1. Contd.

Poaceae	1	1.21	1	1.24
Leguminosaceae	1	1.21	1	1.24
Zingiberaceae	1	1.21	1	1.24
Scrophularaceae	1	1.21	1	1.24
Simaroubaceae	1	1.21	1	1.24
Loranthaceae	1	1.21	1	1.24
Plumbaginaceae	1	1.21	1	1.24
Aloaceae	1	1.21	1	1.24
Agavaceae	1	1.21	1	1.24
Dioscoriaceae	1	1.21	1	1.24

because harvesting leaves does not have great pressure to the survival of individual plants as compared to the whole plant collections. Healers of the study area also reported that meat of animals were the most commonly used parts of animals followed by teeth and faces. Harvesting meats and teeth of animals may have great impact for those endangered and rare animal species. The present study is also in agreement with the result of various ethnobotanical researchers elsewhere in Ethiopia (Ermias, 2005; Etana, 2007; Fisseha, 2007; Gidey, 2010; Mohammed and Berhanu, 2011). Oral route of application were the highest and the most commonly used route of application followed by dermal. Similar to the studies elsewhere (Yinger et al., 2008; Mohammed and Berhanu, 2011), only a few traditional practitioners in the study area kept records of the diseases treated and the plants used for the diseases treated and the plants used for the treatment of various ailments. In the Hawassa city, only a few of the herbalists had garden for cultivation of medicinal plants. The majority of healers reported that even though they have interest to cultivate medicinal plants in their home garden, they do not have the place to cultivate it.

Traditional medicinal plants harvested in the study area by traditional healers were mostly from the wild (85.41%) and only 14.59% were collected from home garden. 74.6% medicinal plants were collected from the wild by Tesfaye et al. (2009) and 85.71% were also collected by Yinger et al. (2007). Indigenous people of the study area reported that medicinal plants were highly treated by urbanization (20.4%), modernization (17.3%), climate change (24.2%), deforestation (25.1%), and firewood (13%). Yinger et al. (2007) reported that medicinal plants of Bale National Park were threatened by deforestation (25%), agricultural expansion (26.5%), climate change (23.1%), overharvesting (7.20%), fire (5.93%) and over grazing (4.66%).

In line with similar studies elsewhere in Ethiopia (Giday and Ameni, 2003; Balemie et al., 2004; Etana, 2007;

Yineger et al., 2007; Tesfaye et al., 2009), Fabaceae is the highest number of species used for medicinal purposes which accounts for 5 species (6.02%), followed by Lamiaceae, Asteraceae, Rutaceae, Cucurbitaceae and Solanaceae [4 species each (4.82%)]. On the other hand, Endalew (2007), Yineger et al. (2008) and Mohammed and Berhanu (2011) reported that Asteraceae has the largest proportion of medicinal plants used in Ejaji area (Chelya wereda), West Shoa, Bale Mountains National Park, South Eastern Ethiopia and Tehuledere district, South Wollo, Ethiopia, respectively. A traditional healer of the study area uses coffee, butter, honey, lemon, tea, cheese, milk and oil as additives to increase the medicinal value of the remedies. Most of the traditional healers in the study area used water for homogenization of medicinal plants preparations like practitioners in other parts of the country (Abebe and Ayehu, 1993; Berhanu, 2002; Tesfaye et al., 2006).

The indigenous people of Hawassa city have a rich knowledge on the use of medicinal and herbal plants as well as medicinal animals. This was evidenced with the result of a total of 53 human and livestock diseases which were reported to be treated using 83 medicinal and herbal plant species and 11 medicinal animal species. The highest number of plant species was reported to treat stomachache followed with malaria, wound and gonorrhoea. The lowest number of medicinal plants were reported to treat anaemia, eye disease, weight loss, ring worm, chifea (eczema), loss of appetite, jardiiasis, fibril illness, lung disease, kidney infection, marasmas, breast pain, impotency, tetanus, placental retardation, abdominal pain, spider poison and trypsis.

In Ethiopia there is rich knowledge of traditional medicinal plants, but the knowledge is transferred from generation to generation verbally. Indigenous knowledge develops and changes with time and space (Alcorn, 1984). Most traditional practitioners of the study area reported that modernization had great effect on the transfer of the indigenous knowledge to generations.

Table 2. List of major diseases treated using 11 medicinal animals and 83 medicinal plants used by indigenous people of Hawassa city.

Disease treated	No. of species	Percentage
Stomachache	13	7.26
Malaria	12	6.70
Wound	11	6.15
Gonorrhea	10	5.59
Tooth ache	9	5.03
Acute sickness	8	4.47
Swelling	7	3.91
Evil spirit	5	2.79
Hypertension	5	2.79
Asthma	5	2.79
Stomach pain	5	2.79
Tonsillitis	5	2.79
Diabetes	4	2.23
Amoeba	4	2.23
Cough	4	2.23
Skin cancer	4	2.23
Cold	4	2.23
Tuberculosis(TB)	4	2.23
Common cold	4	2.23
Urination problem	3	1.68
Jaundice	3	1.68
Headache	3	1.68
Tape worm	3	1.68
Gastritis	3	1.68
Ascariasis	3	1.68
Heart disease	2	1.12
Sunstrick)	2	1.12
Constipation	2	1.12
Snake bite	2	1.12
Mouth smelling	2	1.12
Diarrhea	2	1.12
Hemorrhoids	2	1.12
Bone fracture	2	1.12
Anemia	2	1.12
Eye disease	2	1.12
Typhoid	2	1.12
Weight loss	1	0.56
Ring worm	1	0.56
Chifea (Eczema)	1	0.56
Loss of appetite	1	0.56
Jardiasis	1	0.56
Fibril illness	1	0.56
Lung disease	1	0.56
Kidney infection	1	0.56
Marasmas	1	0.56
Breast pain	1	0.56
Impotency	1	0.56
Tetanus	1	0.56
Placental retardation	1	0.56
Abdominal pain	1	0.56
Spider poison	1	0.56
Trypsis	1	0.56

Table 3. Mode of preparation of medicinal plants.

Methods of preparation	Frequency	Percentage (%)
Liquid	8	4.91
Powdered	15	9.20
Crushed	46	28.2
Squeezed	20	12.27
Chewed	20	12.27
Boiled and drink	12	7.36
Grind	12	7.36
Eating cooked and uncooked	9	5.52
Tied on neck	3	1.84
Holding on teeth	2	1.23
Brushing	3	1.84
Heating	3	1.84
Burning and inhaling	2	1.23
pounded	5	3.1
Attaching hair	1	0.61

Thus the transfer of indigenous knowledge is highly endangered. Anyinam (1995) reported that knowledge and transmission is endangered because transmission between older and younger generation is not always assured. The informant consensus factor analysis indicated that gonorrhea, stomachache and wound have higher informant consensus values. This indicates that there is a high spread of these types of diseases in the study area. The highest fidelity level was recorded in the use of *A. sativum*, *P. americana*, *A. ochroleuca*, *M. stenopetala* and *C. aurea* by traditional healers to treat malaria, wound, hypertension and malaria, respectively.

The medicinal plant species recorded in the present study area are reported to be used in treating different human and livestock ailments in other parts of Ethiopia and Africa. Among the total 83 ethnomedical and ethnoveterinary plant species documented in the present study, 16 species are reported in Yinger et al. (2008); 26 species in Teklehaymanot and Gidey (2007); 13 species in Gidey (2010); 17 species in Yineger et al. (2008); 8 species in Gidey (2010); 34 species in Fisseha et al. (2009); and 15 species in Gidey (2011). 10 medicinal plant species are reported in Ubom (2010) and 8 species in Betti (2004) in Africa. *A. sativum* L. and *C. papaya* L. are the most commonly used medicinal plants to treat malaria in the study area and in other parts of Ethiopia (Endalew, 2007; Fisseha, 2009; Gidey, 2010; Mohammed and Berhanu, 2011). *O. lamiifolium* Hochst.ex Benth is documented to treat febrile illness (Michi) in many parts of Ethiopia (Haile and Delenasaw, 2007; Teklehaymanot and Giday, 2007; Yinger et al., 2008; Gidey, 2010) and in this study. *W. somnifera* Dun and *D. stramonium* L. are

Table 4. Informant consensus factor and fidelity level index on medicinal plants to treat human ailments.

Human disease	ICF	Species	Fidelity level (FL%)
Hypertension	0.61	<i>Calpurnea aurea</i> (Alt.) Benth	80
		<i>Crinum abyssanicum</i> (Hochst) ex A. Rich	42.9
		<i>Moringa stenopetala</i> (Bak.) Cuf.	75
		<i>Citrus aurantifolia</i> (L.)Bur.m.f	45
		<i>Foeniculum Vulgare</i> Miller.	64.28
		<i>Persea americana</i> Mill.	87.55
Wound	0.76	<i>Oxalis corniculata</i> L.	55.6
		<i>Datura stramonium</i> L.	45.5
		<i>Citrus aurantifolia</i> (L.)Bur m.f	50
		<i>Cordia africana</i> Lam.	44.4
		<i>Croton macrostahyus</i> Del.	53.3
		<i>Achyranthes aspera</i> L.	44.4
		<i>Argemone ochroleuca</i> L.	88.9
		<i>Allium sativum</i> L.	61.1
Malaria	0.57	<i>Hagenia abyssinica</i> (Bruce) J. F. Del.	58.8
		<i>Calpurnea aurea</i> (Alt.) Benth	50
		<i>Moringa stenopetala</i> (Bak.) Cuf.	83.3
		<i>Vernonia amaygadalina</i> Del.	58.3
		<i>Aloe macrocarpa</i> Tod.	46.7
		<i>Allium sativum</i> L.	100
		<i>Brassica carinata</i> A.Br.	29.4
		<i>Eucalyptus globules</i> Labill.	28.6
		<i>Justcia schimperiana</i> (Hochst.ex Nees)	33.3
<i>Melia azedarch</i> L.	52.9		
Stomach ache	0.76	<i>Allium sativum</i> L.	60
		<i>Acanthus eminens</i> C.B.Clarke	42.8
		<i>Achyranthes aspera</i> L.	42.1
		<i>Ajuga integrifolia</i> Buch.Ham. ex D.Don.	57.1
		<i>Bersama abyssinica</i> Fresen.	33.3
		<i>Rosmarinus officinalis</i> L.	50
		<i>Tecloa nobilis</i> Del.	70
Gonorrhea	0.77	<i>Chata edulis</i> (Vahl) Forssk. Ex Endl.	25
		<i>Dioscorea alata</i> L.	50
		<i>Erthrina brucei</i> Schweinf.	50
		<i>Justicia schimperiana</i> (Hochst.exNees) T.Anders	43.8
		<i>Ruta chalpensis</i> L.	66.7
		<i>Phytolacca dodecandra</i> L.Herit.	81.8
Toothache	0.71	<i>Balanites aegyptica</i> (L.)Del.	48.3
		<i>Clerodendrum myricoides</i> (Hochst.) vatke	58.3
		<i>Echinops kebericho</i> Mesfin	71.8
		<i>Melia azedarch</i> L.	33.3
		<i>Oleaeuropea</i> L.ssp. <i>Cuspidata</i> (Wall.ex G.Don) Cif.	38.9
		<i>Schinus molle</i> L.	66.6
		<i>Zanthoxylum chalybeum</i> Engl.	42.9

also documented in Haile and Delenasaw (2007); Teklehaymanot and Giday (2007); Yinger et al. (2008) to treat evil eye and toothache ailments, respectively.

Ethiopia has a long history of traditional medicine and has developed ways to compact diseases through it (Negussie, 1988). Most traditional health practitioners believed that the skill of healing is given by God, and knowledge on traditional medicines is passed orally from father to a favorite child, usually a son or acquired by some spiritual procedures (Kebede et al., 2006). Dawit and Ayehu (1993) reported that the real drawback in traditional medicine system mostly arises from lack of precision in dosage.

Herbs were the highest and the most commonly used growth forms of plant species as a source of remedies preparation which accounts 42.2%, followed by trees (30.1%), shrubs (22.9%) and climbers (4.8%). This finding agrees with studies elsewhere in Ethiopia. For instance, Tesfaye et al. (2009) reported that 56.6% of medicinal plant species of Konta people were obtained from herbs. Tesfaye and Sebsebe (2009) and Yinger et al. (2008) also reported that 62.9% of medicinal plant sources of Kafficho people and 54.46% of Bale National Park were, respectively obtained from herbs. Most of the traditional medicinal plants prepared were in the form of fresh materials (61.96%) followed by dry material (30.06%) and both fresh and dry (7.98%).

This is in line with (Gidey, 2010) in which 75.86% of traditional medicinal plant preparations were used in fresh form.

CONCLUSION AND RECOMMENDATIONS

Hawassa is a home for more than 46 ethnic groups which have distinctive language, culture, custom, traditional beliefs and cultural diversity. This shows that there is a rich indigenous knowledge of medicinal plant use however, the indigenous knowledge of medicinal plants was not well documented. There was no written document of traditional medicinal plants. They transfer from elders to the son only by mouth because of this, knowledge and transmission is endangered. The young generation is not well aware about traditional knowledge and does not accept this knowledge due to the influence of modernization. Medicinal plants were highly affected by urbanization, modernization, overgrazing, climate change, deforestation and firewood.

The study indicated that indigenous knowledge of herbal medicine for treatment of various ailments among urban dwellers, particularly low income groups, is a major part of their life and culture. Incorporating indigenous knowledge of using traditional medicinal plants in the school curriculum, and organizing clubs of traditional medicinal plants in the school is also important. Organizing traditional practitioners in association and using their

valuable knowledge, along with modern medications, giving short and long term continuous training on resource use value, management and conservation, recognitions and intellectual property rights and certifying them, is of paramount importance to minimize the loss of indigenous medicinal plant practices.

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Appendix 1. Medicinal plants used to treat livestock diseases in Hawassa city, southern Ethiopia.

Scientific name	Local name	Family	Habit	Disease	Parts used	Type used	Preparation	Mode of administration	Provenance
<i>Albizzia gummifera</i> (J.F.Gmel.)	Matticho	Mimosaceae	T	Tuberculosis	Leaves	Fresh	Crushed, powdered and drink	Oral	Tungamo
<i>Bersama abyssinica</i> Fresen.	xeberako	Melanthaceae	Sh	Trypsis (Gendi)	Leaves	Fresh	Crushed and drink	Oral	Mekibeb
				Sudden illness	Stem	Dry	Burning to the home	Dermal	Tumisso
<i>Allium sativum</i> L.	Dumo shunkurte	Alliaceae	H	Stomach ache	Bulb	Dry/fresh	Crushed and drink	Oral	Zekaryas
<i>Clerodendrum myricoides</i> (Hochst.) Vatke	Misirch	Lamiaceae	Sh	Urination problem	Leaves	Fresh	Crushed and drink	Oral	Siman
<i>Dodonaea angustifolia</i> L.f.	Etancha	Sapindaceae	T	Disorder/acute sickness	Leaves	Fresh/dry	Powdered and drink	Oral	Simon,Geta, Tilahun
<i>Ekebergia capensis</i> Sparm	Oloncho	Meliaceae	T	Stomach problem	Root (inner part)	Fresh	Crushed, powdered, and drink	Oral	Markos,Denbaba
<i>Hagenia abyssinica</i> (Bruce).J. F.Gmel.	Dadako	Rosaceae	T	Wound	Leaves	Dry	Powdered, apply to the wound	Dermal	Siyar,Zekaryas,Simon
<i>Pittosporum abyssinicum</i> Del.	Boncho	Pittosporaceae	T	TB	Leaves	Fresh	Crushed, powdered, and drink	Oral	Deresse,Adule
<i>Vernonia amygdalina</i> Del.	Hecho	Asteraceae	T	Stomach ache	Leaves	Fresh	Crushed, taken oral	Oral	Iyasu,Simon,Borsamo
				Placental retardation	Leaves	Dry/fresh	Powdered, mix with water, drink	Oral	Iyasu,Dinbaba
<i>Zanthoxylum chalybeum</i> Engl.	Ga'da	Rutaceae	T	Breast cancer	Leaves	Dry	Powdered and drank	Oral	Shifera,Biniyam
<i>Combretum molle</i> R.Br.exG.Don.	debeqa	Combretaceae	T	Abdominal pain	Leaves	Fresh	Crushed, powdered, and drink	Oral	Tsegaye
<i>Lagenaria siceraria</i> (Mollina)Standl	Basu baqula	Cucurbitaceae	Cl	Cancer	Root	Dry	Pounded, powdered, and drink	Oral	Bexisso,Iyasu

T = trees, Sh = shrub, H = herb, Cl = climber.

Appendix 2. Medicinal animals used to treat human ailments in Hawassa city, southern Ethiopia.

Scientific name	Common name	Family	Life form	Parts used	Medicinal use	Mode of preparation	Mode of administration	Provenance
<i>Crocuta crocuta</i>	Spotted hyena (Ambooma)	Hyaenidae	Mammals	Teeth	Evil spirt	Heating on fire, smelling	Nasal	Tanebo, Belaynesh
				Faces (dry)	Evil spirit	Grind with <i>Ruta chalepensis</i> and drink	Oral	Tanebo
<i>Nycticeius humeralis</i>	Evening bat (Rarraatte)	Vespertilionidae	Mammals	Meat (dry)	Jaundice	Dry, powdered makes as wat,eating with injera	Oral	Bekelech
<i>Bos taurus</i>	Cows (saa)		Mammals	Bile (fresh)	Malaria, TB	Drink the liquid	Oral	Adule
				Liver (fresh)	Aneamia	Eating fresh	Oral	Adule
<i>Vespa vulgaris</i>	Common wasp (Harridiida)	Vespidae	Insect	Honey	Cough	Eating the honey	Oral	Birtane
<i>Apodemus sylvaticus</i>	Long-tailed mouse	Muridae	Mammals	Teeth (3)	Swelling	Tied on the neck	Dermal	Belaynesh
<i>Oryctolagus cuniculus</i>	Rabbit	Leporidae	Mammals	Hair	Wound	Attaching the hair to the wound	Dermal	Meseret, Deresse
<i>Sus scrofa</i>	Wild pig	Suidae	Mammals	Meat (dry)	Swelling	Cooking the meat& eating	Oral	Tanebo
<i>Capraoegagrus hircus</i>	Domestic goat (male grey color)	Bovidae	Mammals	Blood	Gonorrhea	Drinking the blood	Oral	Adule
<i>Oreochromis niloticus</i>	Tilapia (Qoroso)		Vertebrate	Meat	Heart disease	Cooking and eating	Oral	Solomon
<i>Camelus dromedarius</i>	Camel	Camelidae	Mammals	Faces (dry)	Breast pain	Burning and inhaling	Dermal	Siyar, Jemal
				Milk and meat	Malaria Asthma	Drinking the milk and eating the meat	Oral	Jemal,siyar
<i>Atherurus africanus</i>	African brush- tailed porcupine	Hystricidae	Mammals	Meat	Common cold	Cooked and drink the soup	Oral	Bogalech, Garsamo

Appendix 3. Medicinal plants used to treat human ailments in Hawassa city, southern Ethiopia.

Scientific name	Vernacular name	Family	Disease treated	Parts used	Condition of plant used	Methods of preparation	Route of administration	Provenance
<i>Acacia melanoxylon</i> R.Br.	Omedella (Am)	Fabaceae	Evil eye	Bark	fresh	Grind together with agave sisal, chewing	Oral	Belaynesh
<i>Acacia seyal</i> Del.	Wacho (Sd)	Fabaceae	Swelling	Leaves	fresh	Chewing and swallowing	Oral	Deresse, Adule
<i>Aloe macrocarpa</i> Tod.	Algae (Sd)	Aloaceae	Malaria	Soup	fresh	Squeezed the milk and drink	Oral	Belaynesh, silale
<i>Allium sativum</i> L.	Nechi shinkurt (Am)	Alliaceae	Hemorrhoids	Bulb	dry/fresh	Crushed together with honey, <i>Afromum korarima</i> , fermented, taking one full spoon	Oral	Zekaryas, Silale, Birtane, cherote
			Cold	Bulb	dry/fresh	Crushed, mixed with butter, taking one full spoon per day	Oral	Zekaryas, Tora, Solomon, mengiste
			Sudden illness	Bulb	dry/fresh	Chewing and swallowing	Nasal	Markos, Denbaba, Bekelech
			Gonorrhea	Bulb	dry/fresh	Crushed mixed with <i>Allium cepa</i> , eating, then drink liquid	Oral	Nigatwa
			Asthma	Bulb	dry	Crushed, mixed with cheese, stay for 24 h, take one full spoon for 5 days	Oral	Nigatwa, Zekaryas, Bekelech
			Typhoid	Bulb	dry	Grind together with seeds of <i>Nigella sativa</i> , mixed with milk and butter, boil and drink	Oral	Silale, Mengiste,
			Malaria	Bulb	dry	Powdered together with seed of <i>carica papaya</i> , drink	Oral	Zekaryas, Mengiste, Tora
			Wound	Bulb	dry	Crushed together with leaves of <i>Brucea antidiysenterica</i> , apply to the affected area	Oral	Zelalem, Zekaryas, Bekelech
<i>Acanthus eminens</i> C. B. Clarke	Butticho (Sd)	Acanthaceae	Stomach ache and Constipation	Leaves	Fresh	Boiled and drinking	Oral	Simon, Iyasu
<i>Achyranthes aspera</i> L.	Garbaboo/ciikichoo (Sd)	Amaranthaceae	Stomach ache	Root	Fresh	Chewing and swallowing	Oral	Markos, Denbaba
			Swelling	Root	Fresh	Grind together with root of <i>Pavonia procumbens</i> , apply to the affected area	Dermal	Shifera, Markos, Denbaba, Birtukan
			Swelling	Seeds (3)	Dry	Tied on the neck	Dermal	Tanebo, Bekelech
<i>Agave sisalana</i> Perr.	Qacha xale (Wa)	Agavaceae	Evil eye	Roots	Dry	Squeezed, apply to the wound	Dermal	Birtukan
<i>Ajuga integrifolia</i> Buch.Ham.ex D.Don	Anamuro (Se)	Lamiaceae	Stomach ache	Leaves	Fresh	Squeezed, mixed with butter, drink	Oral	Siman, Jemal, Siyar, Muhiden
			Cold	Whole plants	Fresh	Crushed and drink	Oral	Siman, Jemal, Siyar, Muhiden
<i>Argemone ochroleuca</i> L.	Kokolcho (Sd)	Papaveraceae	Wound	Latex of stem	Fresh	Squeezed and apply to the wound	Dermal	Geta, Tsegaye, Jigu, Iyasu
<i>Artemisia afra</i> Jacq. ex Wild.	Cukkun (Am)	Asteraceae	Evil spirit	Leaves	Dry	Grind, mixed with water and drink	Oral	Belaynesh,
<i>Bersama abyssinica</i> Fresen.	Xeberako (Sd)	Melanthaceae	Stomach ache	Shoot tip	Fresh	Chewing and swallowing	Oral	Iyasu, Tungamo, Shifera
<i>Brassica carinata</i> A.Br	Shaana (Sd)	Brassicaceae	Malaria	Seeds	Dry	Grind, powdered and drink	Oral	Birtukan, Bekelech,
			Common cold	Leaves	Fresh	Cooked mixed with pepper and eating	Oral	Birtukan, Bekelech
<i>Brucea antidiysenterica</i> J.F. Mill.	Aballo (Waginos)	Simaroubaceae	Gonorrhea	Seeds	Fresh/dry	Grind together with leaves of <i>Phytolacca dodecandra</i> and <i>Allium sativum</i> , boiled and drink	Oral	Zelalem

Appendix 3. Contd.

Scientific name	Vernacular name	Family	Disease treated	Parts used	Condition of plant used	Methods of preparation	Route of administration	Provenance
<i>Balanites aegyptica</i> (L.) Del.	Badana (Or)	Balanitaceae	Toothache	Bark	Fresh	Chewing and apply to the pain	Dermal	Tilahun,Mekibeb
<i>Carissa spinarum</i> L.	Agam (Am) Agamsa (Or)	Apocynaceae	Tonsillitis	Shoot tip	Fresh	Holding in the mouth	Dermal	Nigatwa
<i>Calpurnea aurea</i> (Alt.) Benth	Cekkatta (Sd)	Papilionaceae	Hypertension	Seeds (3 or 4)	Dry	Crushed and swallowed by touching nose	Oral	Yeshitila
			Impotency	Seeds	Dry	Crushed, powdered, mixed with water fermented over night, drink	Oral	Yeshitila
			Jaundice	Seeds (3)	Dry	Crushed and swallowed	Oral	Zelalem, Yeshitila
			Ascariasis	Seeds	Dry	Crushed and swallowed	Oral	Siman, Yeshitila
			Jaundice	Leaves	Fresh	Squeezed and drink	Oral	Simon,yeshitila,Siyar
			Malaria	Seeds (3)	Dry	Crushed and swallowed	Oral	
<i>Carica papaya</i> L.	Papaye(Sd)	Caricaceae	Malaria	Leaves (120)	Fresh	Crushed, boiled and drink	Oral	Yeshitila
			Aneamia	Fruits	fresh	Eating the fruits	Oral	Shifera
			Jardiiasis	Seeds	dry	Crushed, powdered, mixed with coffee, boil and drink	Oral	Mekibeb
<i>Crinum abyssinicum</i> (Hochst ex A.Rich)	Yejib shinkurt(Am)	Amaryllidaceae	Hypertension	Shoot tip	fresh	Squeezed the liquid ,mixed with water, drink	Oral	Mengiste,Belaynesh
			Diabetes	Shoot tip	fresh	Squeezed ,mixed with water, drink	Oral	Bertane, Mengiste
<i>Cordia africana</i> Lam.	Waadicho (Sd)	Boraginaceae	Wound	Leaves	Fresh	Heat on fire, crushed, powdered, mixed with butter, rush on the wound	Dermal	Belaynesh
			Stomach problem	Seed	Dry	Making as tella by adding water, fermented for one week, drink	Oral	Simon
			Tooth ache	Stem bark (inner)	Fresh	Chewing and swallowing	Oral	Simon
<i>Croton macrostachyus</i> Del.	Masincho (Sd)	Euphorbiaceae	Skin cancer	Leaves	Fresh	Crushed, inserting to the wound	Dermal	Geta
			Wound	Leaves	Fresh	Grind, apply to the wound	Dermal	Tsegaye
			Ring worm	Leaves	Fresh	Squeezed, apply to the affected area	Dermal	Siyar
<i>Cyphostemma cyphopetalum</i> (Fresen.)Dico.	Yeresa hareg (Am)		Sun strike (mich)	Leaves	Fresh	Squeezed the water and drink with coffee	Oral	Zelalem
<i>Corandrium sativum</i> L.	Dinbilal (Am)	Apiaceae	Loss of appetite	Seeds	Fresh	Eat with food	Oral	Yeshitila
<i>Cucurbita pepo</i> L.	Baaqula (Sd)	Cucurbitaceae	Tape worm	Seeds	Dry	Dried on fire and chewed for pregnancy women, powdered and drank by others	Oral	Yeshitila
<i>Chata edulis</i> (Vahl)Forssk. ex Endl.	Chat (Am)	Celastraceae	Tonsillitis	Shoot tip	Fresh	Chewing and swallowing	Oral	Siya,Jemal,Siman
			Gonorrhea	Stem	Fresh	Boil and drink	Oral	Siya,Jemal,Siman
<i>Citrus aurantifolia</i> (L.)Burm.f	Lemon (Am)	Rutaceae	Stomach ache, body odour, tetanus, wound, hypertension, constipation	Fruit	Fresh	Drinking the liquid Squeeze and apply to the wound	Oral dermal	Zekaryas,

Appendix 3. Contd.

Scientific name	Vernacular name	Family	Disease treated	Parts used	Condition of plant used	Methods of preparation	Route of administration	Provenance
<i>Cucumis ficifolius</i> A.Rich	Yemidir enbuay (Am)	Cucurbitaceae	Tooth ache	Seeds	Fresh	Crush and hold on the pain	Dermal	Tora, Bekelech
			Tuberculosis	Root	Dry	Powdered ,mixed with water, drink	Oral	Borsamo, Tora
			Sudden illness	Root	Dry	Powdered ,mixed with water, drink	Oral	Borsamo
			Snake bite	Seeds	Dry/fresh	Crushed, powdered, add water and paint the affected area	Dermal	Shifera
<i>Combretum molle</i> R.Br. ex G.Don.	Debeqa (Sd)	Combretaceae	Heart disease	Seeds	Fresh	Squeeze the liquid, mix with water and drink	Oral	Siman
			Stomach pain	Leaves	Fresh	Crushed, powdered and drink	Oral	Iyasu, Motso
<i>Clerodendrum myricoides</i> (Hochst.) Vatke	Misrich (Am)	Lamiaceae	Urination problem	Leaves	Fresh	Squeeze the liquid and drink	Oral	Simon, Siyar, Jemal
			Stomach ache	Root	Fresh	Powdered ,mixed with water and drink	Oral	Yeshitila, Dephese
			Tooth ache	Root	Fresh	Cutting into small pieces and holding on the pain	Dermal	Silale, Belaynesh
<i>Dioscorea alata</i> L.	Boyna (Sd)	Dioscoriaceae	Jaundice and Gonorrhea	Stem	Fresh	Cook mixed with <i>Allium sativum</i> and eat	Oral	Iyasu, Bekelech
<i>Dodonia angustifolia</i> L. f.	Etancha (Sd)	Sapindaceae	Jaundice	Leaves	Fresh	Crushed, powdered and drink	Oral	Bergamo
<i>Datura stramonium</i> L.	Asangira (Am)	Solanaceae	Wound	Seeds	Dry	Powdered and apply to the wound	Dermal	Zelalem
			Toothache	Seeds	Dry	Crushed, powdered and hold on the teeth	Dermal	Melkamu, Yonas
<i>Echinops kebericho</i> Mesfin	Kebercho (Or)	Asteraceae	Toothache	Root	Dry	Crushed, powdered and hold on the teeth	Dermal	Nigatwa
			Sunstriik (meganya)	Root	Fresh	Grind together with <i>Lepidium sativum</i> , <i>Ruta chalepensis</i> , <i>Allium sativum</i> and fresh ash, add water and drink	Oral	Nigatwa, Meskerm, Timotwos, Beletech
			Acute sickness (Sudden illness)	Root	Fresh	Chewing and swallowing	Oral	Nigatwa, Sitota, Aselefech
			Tonsillitis	Leaves	Fresh	Squeeze and drink	Oral	Tanebo
			Common cold	Root	Fresh	Boil with <i>Allium sativum</i> , <i>Zingiber officinale</i> and <i>Nigella sativa</i> and drink	Oral	Birtane, Dephese
			Snake bite	Root	Fresh	Squeeze and apply to the wound	Dermal	Delebech, Tanebo
			Stomachache	Root	Fresh	Grind with <i>Ruta chalepensis</i> , add lemon and drink	Oral	Solomon, Gatiso, Shambel, Kasech
<i>Ensete ventricosum</i> (Welw.) Cheesman	Wassa (Kocho)	Musaceae	Diarrhea	Rhizome	Fresh	Fermented, cooked and eaten	Oral	Meseret, Iyasu, Betso
<i>Erthrina brucei</i> Schweinf	Korch (Am)	Fabaceae	Gonorrhea	Stem bark	Fresh	Crushed and powdered and drink	Oral	Zekaryas, Siyar
<i>Eucalyptus globulus</i> Labill.	Nechbahirzaf (Am)	Myrtaceae	Malaria, typhoid , Ascarsis and acute sickness	Leaves	Fresh	Boil and drink before breakfast	Oral	Iyasu, Shiferawu, Bogalech
<i>Foeniculum vulgare</i> Miller	Ensilal (Am)	Apiaceae	Hypertension, diabetes and gonorrhea	Leaves	Fresh	Boil and drink	Oral	Yeshitila, Zelalem, Zekaryas, Siman

Appendix 3. Contd.

Scientific name	Vernacular name	Family	Disease treated	Parts used	Condition of plant used	Methods of preparation	Route of administration	Provenance
<i>Gardenia ternifolia</i> Schumach and Thonn.	Ameessa (Sd) Gambella (Or)	Rubiaceae	Marasmas (Lago), Fintto	Leaves	Fresh	Boil and drink	Oral	Borsamo, Tilahun, Tunga mo
<i>Gossypium barbadense</i> L.	Titu (Am)	Malvaceae	Cough	Seeds	Dry	Pounded, powdered, filtered, boiled and drink	Oral	Mengiste
<i>Hagenia abyssinica</i> (Bruce) J. F. Gmel.	Koso (Am)	Rosaceae	Tapeworm	Leaves	Fresh	Crushed, powdered, add water and drink	Oral	Bezabi, Bekelech,
			Tapeworm	Seeds	Dry	Pounded, powdered, mixed with water stay overnight drink before breakfast	Oral	Tora, Zekaryas
<i>Hordeum vulgare</i> L.	Tikur gebis (Am)	Poaceae	Bone setting	Seeds	Dry	Grind and boil with milk, drink	Oral	Mengiste
<i>Justicia schimperiana</i> (Hochst.exNees) T. Anders.	Sensel (Am)	Acanthaceae	Gonorrhea	Root	Fresh	Crushed, add water and drink	Oral	Markos, Zelalem
			Malaria	Leaves	Fresh	Boil and drink	Oral	Iyasu
<i>Lantana camara</i> L.	Ceate xoxxo (Sd)	Verbenaceae	Fibril illness	Leaves	Fresh	Pound and inhale	Nasal	Tilahun
<i>Lagenaria siceraria</i> (Molina) Standl.	Basu baqula (Sd)	Cucurbitaceae	Lung disease	Root	Fresh	Chew and swallow	Oral	Denbaba
			Cough	Seeds	Dry	Boil and drink	Oral	Tora, Simon
<i>Lens esculenta</i> Medik.	Misiri	Fabaceae	Spider poison	Seeds	Dry	Chew and apply to affected area	Dermal	Mengiste
<i>Leucas martinicensis</i> (Jacq.) R. Br.	Raaskimir (Am)	Lamiaceae	Eye disease and head ache	Leaves	Fresh	Squeeze and apply to the eye	Optical	Nigatwa
<i>Linum usitatissimum</i> L.	Telba (Am)	Linaceae	Gastritis	Seeds	Dry	Add water stay overnight and drink	Oral	Bekelech
<i>Malva verticillata</i> L.	Karficho (Or)		Mouth smelling	Seeds	Dry	Chew and swallow for 3 days	Oral	Yeshitila
<i>Melia azedarch</i> L.	Neem (Sd)	Meliaceae	Malaria	Shoot tip	Fresh	Squeeze and drink	Oral	Tungamo, Iyasu
			Toothache	Stem	Fresh	Brush teeth	Dermal	Zelege, Betso
<i>Moringa stenopetala</i> (Bak.) Cuf.	Shifera (Sd)	Moringaceae	Diabetes	Leaves	Fresh	Boil and drink its soup	Oral	Bekelech, Tumiso, Belay nesh,
			Hypertension	Leaves	Dry	Make as a tea and drink	Oral	Borsamo, Abebech, Biina
			Hypertension, Kideny infection and cold	Leaves	Fresh	Boil with <i>Allium cepa</i> and <i>Capsicum annuum</i> , add oil and take	Oral	Tilahun, Tora, Askale
			Malaria	Root	Fresh	Powdered and drink	Oral	Mekibeb, Mengiste
<i>Nicotiana tobaccum</i> L.	Araddo (Sd)	Solanaceae	Swelling	Leaves	Fresh	Chew and apply to the swelling	Dermal	Adule, Deressa
<i>Nigella sativa</i> L.	Tiqurazmud (Am)	Ranunculaceae	Stomach ache	Seeds	Dry	Powdered with <i>Afromomum cororima</i> , <i>Trigonella foenum-graecum</i> , add lemon and drink	Oral	Dinbaba, Nigawta
			Headache	Seeds	Dry	Pound and inhale	Nasal	Bekelech, Chelote
<i>Ocimum lamiifolium</i> Hochst.ex Benth	Demakase (Sd)	Lamiaceae	Common cold	Leaves	Fresh	Squeeze, mix with coffee and drink	Oral	Birtane, Almaz, Chlote, Zekaryas
			Gastritis	Leaves	Fresh	Squeeze and drink	Oral	Tingamo, Simon

Appendix 3. Contd.

			Wound	Root	Fresh	Crushed, powdered and applied to the place	Dermal	Bogalech
<i>Olea europea</i> L. ssp. <i>Cuspidate</i> (Wall. ex G. Don) Cif.	Ejersu (Sd)	Oleaceae	Eye disease	Leaves	Fresh	Squeeze and apply to the eye	Optical	Iyasu
<i>Olinia rochetiana</i> A.Juss.	Noole (Sd)	Oliniaceae	Tooth ache	Leaves	Fresh	Chew and swallow	Oral	Iyasu
			Head ache	Leaves	Fresh	Heat on fire and inhale	Nasal	Iyasu
			Swelling of stomach	Leaves	Fresh	Crush, add water and drink	Oral	Markos, Iyasu, Denbaba
<i>Oxalis corniculata</i> L.	Sidisa (Or)	Oxalidaceae	Wound	Flowers and leaves	Fresh	Squeeze and apply to the wound	Dermal	Bekelech
<i>Podocarpus falcatus</i> (Thunb.)Mirn.	Dagucho (Sd)	Podocarpaceae	Amoeba	Latex of stem	Fresh	Mix with coffee and drink	Oral	Bekelech
			Urination problem	Shoot tip	Fresh	Crush and drink	Oral	Bekelech
<i>Persea americana</i> Mill.	Abukato (Sd)	Lauraceae	Hypertension & Diarrhea	Fruit	Dry	Crushed, powdered, mixed with coffee and drink	Oral	Bekelech, Nigatwa, Abebech
<i>Psidium guajava</i> L.	Zeyituna (Sd)	Myrtaceae	Amoeba	Leaves	Dry	Crushed, powdered and drink	Oral	Ijigu
			Diabetes	Leaves	Dry	Boil with leaves of <i>Camellia sinensis</i> and drink	Oral	Jemal, Tanebo
<i>Phragmanthera macrosolon</i> (Steud. Ex A. Rich.	Eertoo (Or)	Loranthaceae	Swelling	Stem	Dry/fresh	Cut into small pieces and tie on the neck	Dermal	Belaynesh, Silale, Askale
<i>Phytolacca dodecandra</i> L. Herit.	Endod (Am)	Phytolaccaceae	Gonorrhea	Root	Fresh	Chew and swallow	Oral	Yeshitila, Zelalem
<i>Plantago lanceolata</i> L.	Qorxobi (Or)	Plantaginaceae	Cancer	Seeds	Dry	Crushed, powdered and apply to the wound	Dermal	Bekelech, Nigatwa
<i>Plumbago zeylanicum</i> L.	Amira (Am)	Plumbaginaceae	Asthma	Leaves/root	Dry	Crushed, powdered, boiled and drink	Oral	Siman
<i>Ricinus communis</i> L.	Qenbo'o (Sd)	Euphorbiaceae	Breast cancer	Root	Fresh	Chew and swallow	Oral	Zelege
			Swelling	Root	Fresh	Chew and apply to the place	Dermal	Mekibeb
<i>Rosmarinus officinalis</i> L.	Siga metibesha (Am)	Lamiaceae	Stomach ache	Leaves	Fresh	Crush with leaves of <i>Ruta chalepensis</i> , add water and drink	Oral	Shiferawu
<i>Ruta chalepensis</i> L.	Sunkuruut (Wa)	Rutaceae	Gonorrhea and Ascariasis	Leaves	Fresh	Grind with <i>Zingiber officinale</i> , add water and drink	Oral	Zekaryas, Debese
<i>Rumex abyssinicus</i> Jacq.	Moqmiq (Am)	Polygalaceae	Amoeba	Root	Fresh	Crush, mix with tea and drink	Oral	Yeshitila, Abebe, Lukas
<i>Schinus molle</i> L.	Kundeberbera (Am)	Anacardiaceae	Tonsillitis	Seeds	Fresh	Chew and swallow	Oral	Markos, Denbaba
			Toothache	Stem	Fresh	Brush with the stem	Dermal	Belaynesh
<i>Sida ternata</i> L.F	Firofire (Se), Yemidir hareg (Am)	Malvaceae	Acute sickness	Root	Dry	Powdered, add water and drink	Oral	Simon, Jemal
			Hemorrhoids	Seeds	Dry	Powdered and apply to the wound	Dermal	Simon, Jemal
<i>Solanum incanum</i> L.	Embuay (Am)	Solanaceae	Stomach pain	Root	Fresh	Chew and swallow	Oral	Tora
<i>Syzygium guineense</i> (Willd.) DC.	Duwancho (Sd)	Myrtaceae	Stomach pain	Stem bark	Fresh	Crush, filter and drink	Oral	Bekelech, Simon

Appendix 3. Contd.

<i>Triticum dicocoon</i> Schrank.	Aja (Am)	Poaceae	Bone fracture	Seeds	Dry	Boil and drink	Oral	Mengiste
<i>Tecloa nobilis</i> Del.	Had'essa (Sd)	Rutaceae	Stomachache	Shoot tip	Fresh	Chew and swallowing	Oral	Garsamo, Mikyos
<i>Trigonella foenum-graecum</i> L.	Abish (Am)	Leguminosae	Weight loss and Gastritis	Seeds	Dry	Grind, powdered, add water and drink	Oral	Debesse
<i>Taverniera abyssinica</i> A. Rich.	Dingetegnya (Am)	Fabaceae	Acute sickness	Root	Fresh	Chew and swallow	Oral	Tora, Burtukan, Megiste
<i>Vernonia amygdalina</i> Del.	Hecho (Sd)	Asteraceae	Stomachache and Chifea (Eczema) Malaria, Ascariasis	Leaves	Fresh	Crush, add water and drink	Oral	Belaynesh, Yeshitila, Zelalem, Zekaryas
<i>Verbena officinalis</i> L.	Atuchi (Am)	Verbenaceae	Amoeba	Whole plant	Fresh	Pound, mix with water and drink	Oral	Siman, Jemal, Muhadin
<i>Verbascum sinaiticum</i> Benth.	Yahia jero (Am)	Scrophularaceae	Asthma	Flowers	Fresh	Powdered, mixed with honey and taken for 5 days	Oral	Zelalem
<i>Withania somnifera</i> (L.) Dunal in Dc.	Gizawa (Am)	Solanaceae	Cough and asthma	Seeds	Dry	Crushed, powdered and drink	Oral	Tanebo, Bogalech, Ayane
<i>Zanthoxylum chalybeum</i> Engl.		Rutaceae	Tooth ache	Stem bark	Fresh	Chew and hold on the pain	Dermal	Tumsso, Solomon
<i>Zingiber officinale</i> Roscoe	Jinjibilo (Or)	Zingiberaceae	Tonsilits	Rhizome	Fresh	Crush, add water and drink	Oral	Bekelech, Askale

Or = Afaan Oromo name Sd = Sidama name Am = Amaharic name ,Se = Selte name , Wa = walayta name.