

Full Length Research Paper

Utilization, cultivation practice and economic role of medicinal plants in Debre Markos Town, East Gojjam Zone, Amhara Region, Ethiopia

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Medicinal plants are useful for primary healthcare as a remedy for diseases and injury, while they are also used traditionally as food and beverages. Despite the wide role of medicinal plant, traditional utilization and management practices are not well documented in Debre Markos Town. Thus, this study was conducted to assess utilization and cultivation practice of the medicinal plants and to identify commonly used medicinal plants in Debre Markos Town. Data on medicinal plants production and utilization practice and its role were collected using field observation and semi-structured questioners. The study revealed that total of 55 medicinal plant species belonging to 35 families were used to treat various human diseases. Majority of medicinal plants species (80%) were cultivated. 48% of respondents have medicinal plants in their home garden. Leaf (13.3%) and root parts (13.3%) are widely in drug preparation. Widely used remedy preparation form (46.9%) is liquid, made by boiling. Oral method of administration accounts (36.7%) followed by dermal application (30%). The practice of using medicinal plants in the local people has significant in economic and social sense, save cost and time. Thus, it enhances strong economic capacity of the people through creating healthy, physically and mentally capable people. In general, Debre Markos Town is rich in source of medicinal plants and use of traditional medicine is common. Most of available medicinal plants are found under threats in the study area, which is one of the main reasons for the degradation and *destruction* of habitats is a *major cause* of the loss of medicinal plant. Therefore, documentation medicinal plants provide important data.

Key words: Medicinal plants, cultivation, use.

INTRODUCTION

Medicinal plants are important for health care and remedy for diseases and injury. They are also used traditionally

for foods and drinks (Yirga et al., 2011). Early humans acquired the knowledge on the utilization of plants for

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disease prevention and curative purposes through many years experience, careful observations and trial and error experiments (Sofowora, 1982; Martin, 1985)

According to Bekele (2007), the major reasons why medicinal plants are demanded in Ethiopia are due to culturally linked traditions, the trust the communities have in traditional medicine, and relatively low cost in using them.

According to Bekele (2007) in Ethiopia, except in a few cases where a few food crops with medicinal value are cultivated, there is no organized cultivation of plants species for medicinal purposes. Systematic cultivation and conservation of medicinal plants requires the effort of all stakeholders including the traditional healers, researchers, academicians, farmers and the community at large. Incorporation of medicinal plants in agricultural fields and home gardens will help to increase supply and conservation of important medicinal plants (Oladele et al., 2011). There is little data available for any of medicinal plants for large and small-scale farming. Different studies have been made in different parts of the country, most of them are more general and do not focus on a specific agro-ecology of the country.

Asmamaw and Achamyeleh (2018) assessed available medicinal plants in Gozamen Woreda Daligaw kebele and found 37 for human disease treatment. Nigussie et al. (2018) also conduct assessment on medicinal plants in Gozamen Woreda. However, there is limited study on use and cultivation practice of medicinal plants in Debre Markos Town. Thus, this study was conducted to assess utilization and cultivation practice of the medicinal plants in Debre Markos Town. It is also important to identify commonly used medicinal plants and to document utilization practice of medicinal plants in Debre Markos Town.

MATERIALS AND METHODS

Description of the study area

Debre Markos town was the historical center of administration and commerce of Gojjam for a long period of time. It is located 300 km Northwest of Addis Ababa and 265 km southeast of the *Amhara* National Regional State Capital City-Bahir Dar. The geographical coordinates of the town are 10°20'N 37°43'E. Its total municipal area is about 60 km square. It is situated at 2450 m above sea level. The weather condition, in most of the time is, '*Woina Dega*'. The town receives a mean annual rainfall of 1300-1380 mm and the temperature ranges between 15 and 22°C. According to the 2007 national survey, the total population of Debre Markos Town was 62, 469 with a total of 18, 479 households. The town has seven kebeles. The study was conducted in two kebeles (1 and 3).

Method

The study populations are the households who are living in the two

kebeles of Debre Markos Town. Those persons who owned the houses by rent are not included in the study. Individuals aged greater than 18 years and living for at least six months in the town were involved in the study. Two kebeles were randomly selected from the seven kebeles. Accordingly, 30 informants were purposively selected from each kebele of total of 60 respondents. The household mothers and household head/ husbands were asked about the cultivation and utilization practice of medicinal plants. Informants below 18 years are not believed to have enough indigenous knowledge.

Data were collected by both qualitative and quantitative methods. Data for the study was collected from both primary and secondary source of data. The primary data sources used were field visit, key informant interview and semi-structured questionnaires. The informants were convinced upon the purpose of the research and each informant was requested for permission before the interview. The interview prepared in English was translated into Amharic, the local languages of the informants. After researchers obtained an oral consent from each informant, information concerning the medicinal plant utilizers was collected. Medicinal plants information such as the plant local name, treated disease, and the use plant parts, preparation and route of administration etc. were recorded from the informants. The collected data was analyzed using SPSS software. We employed descriptive statistics and further inferential statistics to predict and indicate the utilization and cultivation practice of medicinal plants in the investigation area.

Ethical consideration

A formal letter was written from Department of Horticulture, College of Agriculture and Natural Resources, Debre Markos University, to get permission for conducting the research in the community. A verbal informed consent was taken from each household owner participants after clearly stating the purpose of the study.

RESULTS AND DISCUSSION

Demography

Regarding educational status of informants, from 60 respondents 10 respondents (16.7 %) are attend college level and above, 18 respondents (30 %) are illiterates, 2 respondents (3.3 %) are on primary school and 30 respondents (50 %) are able to read and write, and when we compare their sex 22 respondents are males. From the total population 14 persons (23.3 %) are government employed, 24 persons (40 %) are merchants, and 22 persons (36.7 %) are Unemployed Table 1.

Diversity of medicinal plants in the study area

A total of 54 medicinal plants (Table 2) were reported by respondents in the study area to treat different human ailments. This plant belongs to 35 families. The largest diversity species are Lamiaceae with 6 (10.91%) species, Solanaceae with 5 (9.09%) species and Asteraceae 4 (7.27%) species. The remaining 4 families had (3.64%)

Table 1. Information about respondents.

Questioners	Options	Frequency	Percentage (%)
Educational Status	College and Above	10	16.7
	Illiterate	18	30.0
	Primary school	2	3.3
	Reading and writing	30	50.0
Sex	Male	22	36.7
	Female	38	63.3
Employment	Government employed	14	23.3
	Merchant	24	40.0
	Unemployed	22	36.7

Table 2. Taxonomic diversity of the medicinal plants in the study area.

S/N	Family name	Number of species	Percentage (%)
1	Lamiaceae	6	10.91
2	Rutaceae	2	3.64
3	Brassicaceae	3	5.45
4	Solanaceae	5	9.09
5	Asteraceae	4	7.27
6	Rosaceae	2	3.64
7	Apiaceae	2	3.64
8	Euphorbiaceae	2	3.64
9	Other 29 families	29	61.72
	Total	55	100

species each and 29 Families had one species each. This result indicates that the study area had widely consists diversity of the plant species found in families Lamiaceae, Solanaceae and Asteraceae. Similar results were reported by Abera (2014) who reported family Asteraceae was represented by 5 species followed by 4 species of Lamiaceae in Ghimbi district. Alemayehu et al. (2015) also reported that Lamiaceae and Solanaceae families was the widely distributed in Minjar Shenkora district. The study of Banjaw et al. (2016) at Wondogent area indicated that Lamiaceae family hold greater number of species followed by Asteraceae family. Giday et al. (2007) also reported similar results.

The present result also showed that peoples in the study area were widely used and provide priority for Medicinal Plants to treat human diseases like mich (fiver illness), Cough, Wound, Stomachache, Diarrhea, Evil eye, Snakebite, Throat infection, etc. The major reason of community to widely depend on medicinal plants is due to

unaffordable price of modern medicine. The result is in line with those of Bekele (2007) that reported that the current demands for herbal remedies in both developed and developing countries are increasing. In developed countries, this may be partly due to the dissatisfaction with conventional medicines while with the developing countries this is due to lack of medical doctors, shortage of pharmaceutical products and their unaffordable prices. In the current study, one ailment can be treated with combination of plant species or single plant species (Table 5). Similar results were reported by Nigussie et al. (2018). The study of Zewdu (2013) at Gonder Zuria District, indicated 42 medicinal plant species representing 41 genera and 31 families to treat diseases (the highest number of uses mentioned for any disease were general health (69), respiratory (51), and gastrointestinal (28). According to Zerabruk and Yirga (2011), a total of 26 species of medicinal plants were collected and identified to treat 36 human ailments at Gindberet district, Western

Table 3. Availability, management practice and utilization of medicinal plants.

Questioners	Number	Frequency (%)	
		Yes	No
Presence of medicinal plants	60	48	12
Care given to medicinal plants	60	44	16
Use of medicinal plants	60	60	0

Ethiopia.

Source of medicinal plants in the study area

The present study revealed that 80, 10, 4, 3 and 3% of respondents explained that medicinal plants for their use was obtained from cultivation in home garden, purchased from market, Traditional healer, neighbors and collected from wild habitat respectively (Figure 1). The present finding is in line with the findings of Feyyesa et al. (2015) who reported that most medicinal plants were obtained from cultivation in Jimma zone and Giday et al. (2007) who reported that major sources of medicinal plants in Agew Awi zone are home gardens or cultivation. According to WHO et al. (1993), the best way to provide the plant material needed for medicine is to cultivate the plants. This is far better than collecting the plant material from the wild since it does not deplete wild stocks, and in many cases, the declining habitats of native plants can no longer supply the expanding market for medicinal plant products. In the case of rare, endangered or over-exploited plants, cultivation is the only way to provide material without further endangering the survival of those species. Cultivation also has pharmacological advantages over wild-collection. Wild-collected plants normally vary in quality and composition, due to environmental and genetic differences. In cultivation, this variation - and the resulting uncertainty of the therapeutic benefit - is much reduced. The plants can be grown in areas of similar climate and soil, they can be irrigated to increase yields and they can be harvested at the right time. Cultivation also greatly reduces the possibility of mis-identification and adulteration.

Availability, management practice and utilization of medicinal plants

The present study indicates that 48% of respondents have medicinal plants in their home garden. Among these respondents, 33.4% respondents have four types of medicinal plants in their home garden, while 12 respondents have not cultivated medicinal plants and

obtained from other sources. On the other hand, 44 respondents explained that they were given care and special management practices (irrigation, cultivation, fertilization and weeding) for medicinal plants whereas the remaining 4 respondents were does that did not give any care, but all respondents used medicinal plants for treatment of many human diseases (Table 3).

Plant parts used

The present finding revealed that in the study area, different plant parts were harvested (for example leaves, roots, seeds, stem and fruit) separately and used by mixing each other for preparation of traditional drugs. In the study area, the informants reported that 13.3% species of medicinal plants were harvested to use their leaves (13.3%) roots and (13.3%) by combining leaves and roots together in drug preparation (Figure 2). In the study area, also respondents explained that 6.7% used seed to treat diseases. Leaves are widely used plant parts for drug preparations than the other parts either individually or by mixing other plant parts. The present result is in line with the finding of Giday, (2001); Amenu (2007); Alemayehu et al. (2015); Banjaw et al. (2016); Asmamaw and Achamyehle (2018). Harvesting leaves are common practice in the study area which results in a threat to rare plants. Although, the equivalent ratio of harvested part in study area was root separately and in combination with leaves; which negatively affects the growth and physiology of the plant results in the destruction of mother plant. Utilization of leaves for drug preparation is important for conservation of medicinal plants since harvesting leaves may not cause detrimental effect on the plants compared to the root or whole plant collections (Megersa et al., 2013). According to Hunde (2006) utilization of roots and whole plants may have negative consequences on the sustainability of the medicinal plant species in the area.

Form used

The major forms of preparation of plant medicines in the

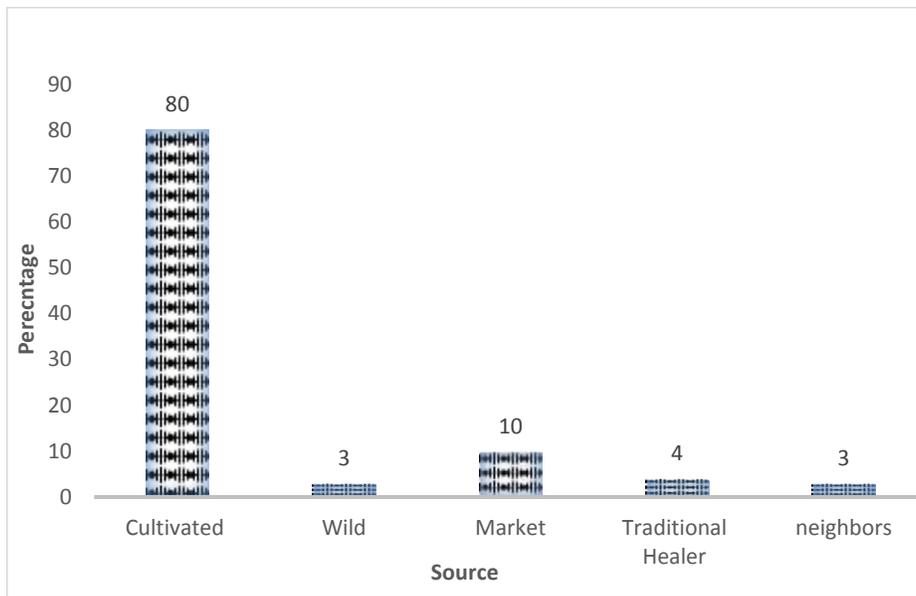


Figure 1. Source of medicinal plants in the study area.

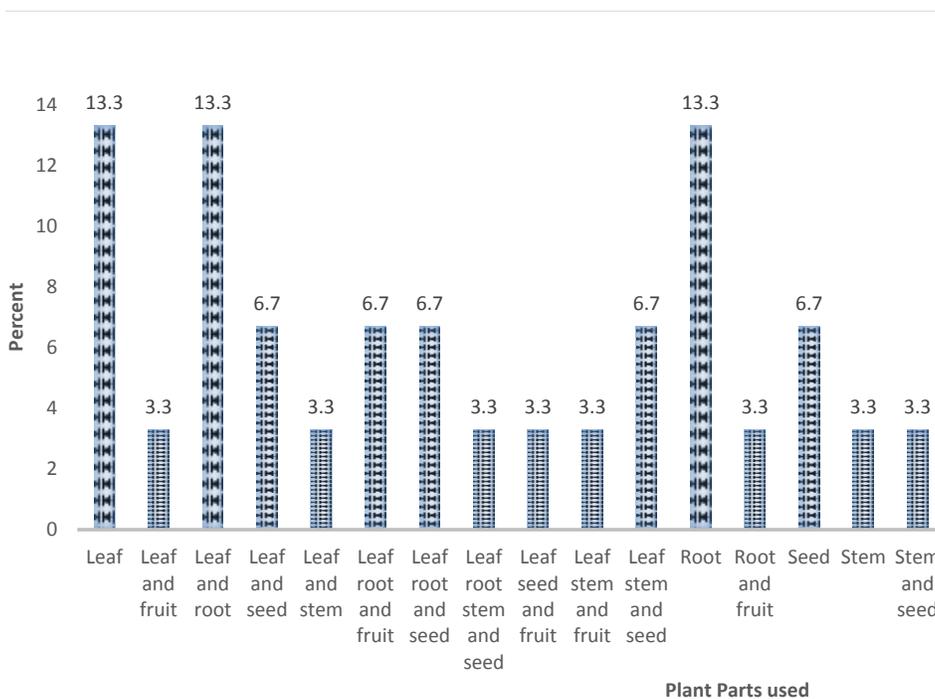


Figure 2. Plant parts used to prepare remedies.

study area (46.9%) included liquid obtained after crushing and chopping forms by means of boiling, and absorbing

the vapor part and drinking like water. 26.7% of respondents explain that they use medicinal plants in

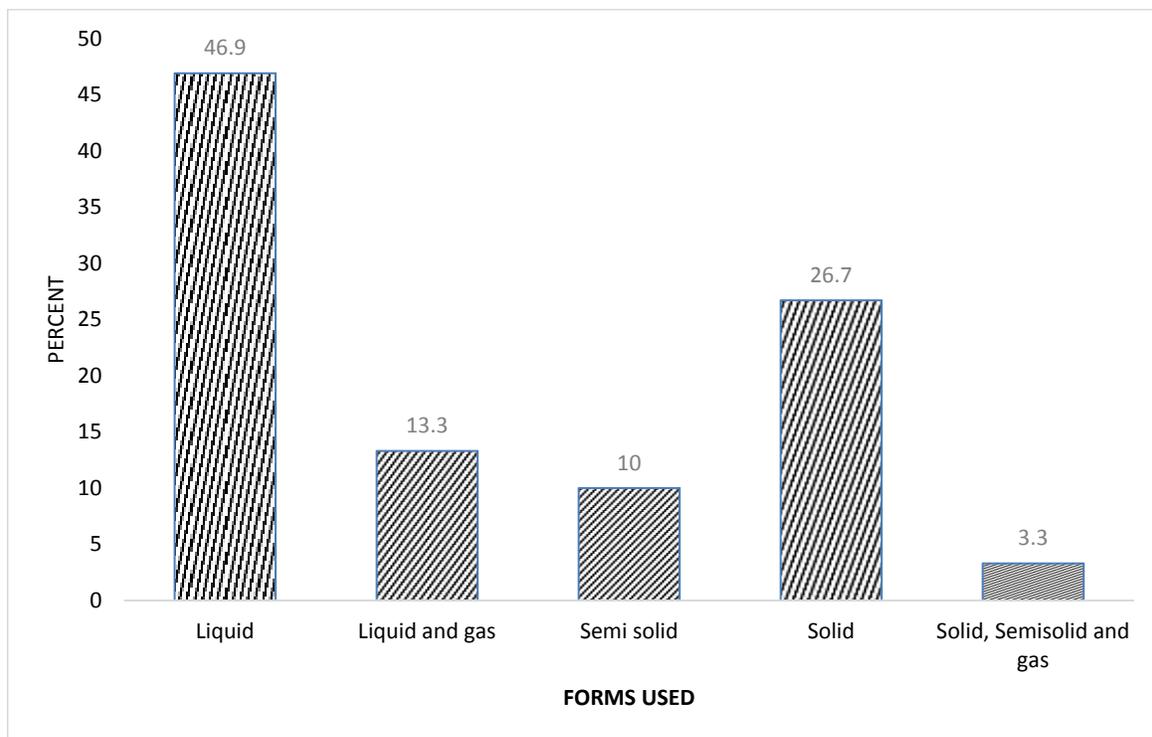


Figure 3. Forms of medicinal plants used.

solid form by inhaling in nasal method. 13.3% respondents used medicinal plants in liquid and gas form in combination (Figure 3). The popularity of the liquid preparations may be due to the easy method of the liquid preparation form and to the property and availability of water as solvent. The common utilization of the liquid preparations forms in the study area is in agreement with findings in other parts of the country reported by Abiyot (2002); Alemayehu et al. (2015) and Asmamaw and Achamyeleh (2018). Utilization of fresh materials of the plants species is more preferable than dried form. This is because fresh materials are harvested directly and used early before deterioration. Nevertheless, communities believe that fresh materials are effective in the treatment as the contents are not lost. This agrees with the findings of Tamene (2000) and Hunde (2001).

Preparation methods

The majority of the medicines (53.3%) in the study area are prepared through boiling only followed by boiling and chewing together (13.3%). Ten percent of respondents explained that they prepare medicinal plants in the form of smoking / fumigation (Figure 4). The present finding is

in line with those of Assegid and Tesfaye (2014) and Birhanu and Ayalew (2018). During the preparations of the remedies, extracted medicines were mixed with honey, milk, water, coffee and tea which might be used to reverse adverse effect of the traditional medicines such as vomiting, itching and diarrhea. The same result was also reported by Assegid and Tesfaye (2014).

Administration method

Peoples in the study area mostly administer traditional medicine orally (Table 4). Oral method of administration only accounts for 36.7% followed by dermal application (30%) and dermal and nasal combination (20%) whereas the least used routes were nasal (10%). These results were similar to the findings of Hunde (2001), Giday (2001), Giday et al. (2007), Amenu (2007), Birhane et al. (2011), Assegid and Tesfaye, (2014), Alemayehu et al. (2015), Asmamaw and Achamyeleh (2018), and Birhanu and Ayalew (2018) who noted that drinking (oral application) was the dominant method of administration. Nigussie et al. (2018) conducted research in Gozamen District and reported that most common route of administration is internal particularly oral that accounted

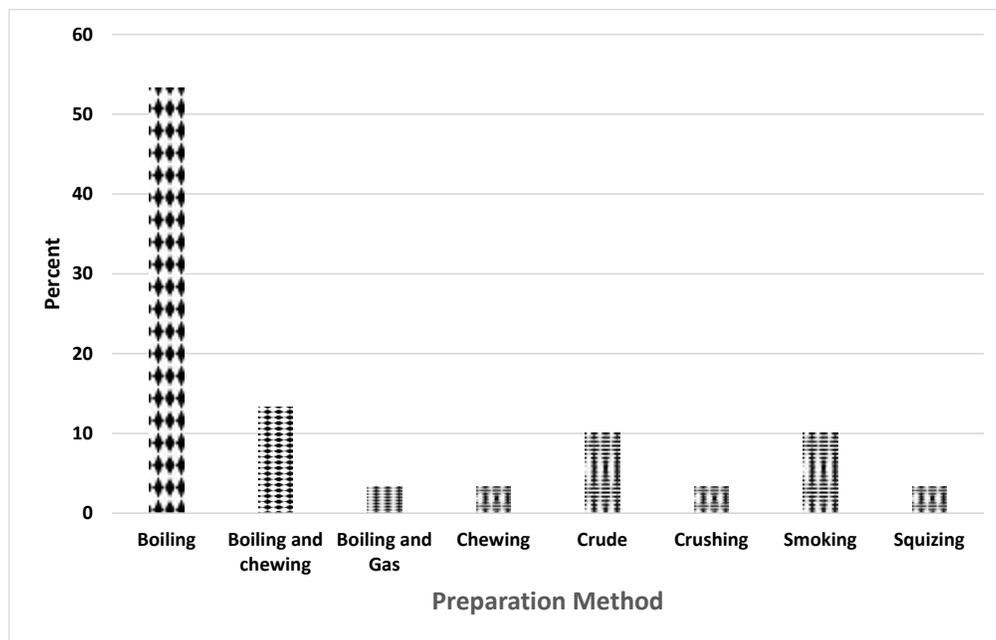


Figure 4. Methods to prepare remedies for medicinal plants.

Table 4. Route of administration.

Route	Frequency	Percentage (%)
Dermal	18	30
Oral	26	36.7
Dermal and Nasal	12	20
Dermal, Nasal and Oral	8	13.3
Nasal	6	10
Total	60	100

for 51.61% followed by dermal (24.73%). Dominant routes of administration are oral and dermal because they perceive rapid physiological reaction of the prepared medicines with the pathogens and increase its curative power. The route of administration of herbal medicines could be related to bioactive agents in the extracts of the plants (Gurib, 2006). For example, herbal medicines whose bioactive agents are alkaloids are easily assimilated when administered orally while terpenoids especially essential oils are best administered through dermal and/nasal routes (Boadu and Asase, 2017).

Economic role of medicinal plants

The practice of using medicinal plants by the local people

has enormous and has paramount significance in economic and social sense. While practicing cultivating medicinal plants, they feel confident that they will cure different diseases by their own timely (Table 5). Especially, there are different infectious diseases and accidental illness that cause psychological and physical damage to the people and are being treated by those medicinal plants available in their surroundings. Moreover, those people who used medicinal plants for the sake of their health can save and reduce frequency of unnecessary waste from transportation and other miscellaneous cost to modern health institutions. Thus, it enhances strong economic capacity of the people through creating healthy, physically and mentally capable people. Furthermore, pre and post treatment practice that cure the disease in the traditional and routine practice in

Table 5. Role and Utilization method of medicinal plants for the treatment of human diseases.

S/N	Scientific name	Family	Local Amharic name/	Disease Treated	Plant used	Part	Method of Preparation	Rout of Administration	Source of the plant
1	<i>Achyranthes aspera</i>	Amaranthaceae	Telegn	Wound and skin cut	leaf		Fresh leaves are crushed and then mashed on infected part	Dermal	Traditional healer
				Body swelling	Leaf		Leaves are powdered, mixed with butter and then mash on infected part	Dermal	
				34Excessive menstruation and retained placenta	Root		The root of is crushed and tie on abdominal part the body	Dermal	
2	<i>Antidysentrica</i>	Simaroubaceae	Avalo	Wound	Leaf		Chopped fresh leaves are mashed on wound mostly in child's head	Dermal	Wild
3	<i>Allium sativum</i> L.	Alliaceae	Nech Shinkurit	Stomachache	Bulb		Its bulb mixed with seed of <i>Lepidium sativum</i> are crushed together and eaten with injera.	Oral	Market
				Asthma	Bulb		Fresh bulbs are chopped mixed with honey and eaten	Oral	
				Influenza	Bulb		Chewing fresh bulb	Oral	
4	<i>Allium cepa</i>	Alliaceae	Keyshinkurit	Cough	Bulb		Raw bulb is chopped and eaten with enjera	Oral	Market
				Hypertension	Bulb		Bulbs are crushed and immersed in little water drunk	Oral	
5	Aloe vera	Alliaceae	Eret	Discourage the baby from Breast suckling	Leaf		Juice of the plant is creamed on the breast	Dermal	Home Garden
				Childbirth	Leaf		juice of the leaf is given to a mother to ease labour	Dermal	
				Cool burns	Leaf		Fresh juice of the plant is smashed on infected part	Dermal	
6	Artemisia abyssinica	Asteraceae	Ariti/chikugn	Intestinal problems	Leaf		Fresh leaves are chopped mixed with water and drunk	Oral	Home garden
				Evil eye	Leaf		Fresh leaves are chopped and smell	Nasal	
				Common cold	Leaf		Fresh leaves are chopped and sniffed	Nasal	
				Fibril illness	Root		The root is crushed and drunk	Oral	
7	<i>Brassica nigra</i> (L.)	(Brassicaceae)	Sinafich	Abdominal pain	Seed		Powder of dried seeds with seeds of <i>Lepidium sativum</i> mixed with water and drunk	Oral	Market
8	<i>Capsicum annum</i> L.	Solanaceae	Kariya	Nausia	Fruit		Its fruits with <i>garlic</i> , <i>ginger</i> , and <i>black cumin</i> are immersed in water and drunk	Oral	Market
9	<i>Carica papaya</i> L.	Caricaceae	Papaya	Anaemia	Fruit		Extracted juice is mixed with sugar, and drunk in the morning	Oral	Market
10	<i>Citrus limon</i>	Rutaceae	Lomi	Stomach ache	Fruit		Its juice added to tea and honey together and drunk	Oral	Market
				Skin rash	Fruit		Its juice is mashed on the infected body	Dermal	
				Nasal bleeding	Fruit		Its juice is added to nose or drunk it	Nasal/oral	
				Athletes foot	Fruit		Extracted juice is mashed on the leg	dermal	

Table 5. Contd.

11	<i>Clerodendrum Myricoides</i>	Lamiaceae	Miserch	Snake poison	Root	Smoking of roots in fire	Nasal	Traditional Healer
				Wounds and Fire burn	Leaf	Dried leaves are grounded, powdered and applied on infected part	Dermal	
12	<i>Coffea arabica</i>	Rubiaceae	Buna	Diarrhea	Seed	The powder is boiled and mixed with droplet of oil and drunk	Oral	Market
				Fire burn	seed	Its powdered is spread over wounded part	Dermal	
13	<i>Coriandrum sativum</i>	Umbellifereae	Dimbilla	Nausea	Seed	Seeds are roasted and boiled in water and drunk	Oral	Market
14	<i>Croton acrostachyus</i>	Euphorbiaceae	Bissana	Alrgic	Leaf	Fresh leaf or shoot juice is mashed on infected body	Dermal	Home Garden
				Wound	Leaf	Fresh leaf sap is drop on infected part	Dermal	
				Snake bite	Leaf	juice extracted from fresh leaf is apply	Dermal	
15	<i>Datura stramonium</i>	Solanaceae	Astenager	Toothache	Seed	Smoke the seed on fire, roasted and fumigated by it smoke	Oral	Wild
				Dandruff	Leaf	Fresh leaves are mashed by hand and applied on head	Head	
				Cough	Leaf	Dried leaves are finely powder and mixed with garlic and water	Mouth	
16	<i>Dodonaea angusifolia</i>	Sapindaceae	Kitkita	Ear disease	Leaf	The leaves are crushed, mixed with little water and t added few amount through ear	Ear	Wild
				Stomach ache	Leaf	Fresh leaf Juice is drunk	Oral	
17	<i>Echinops kebericho</i> Mesfin	Asteraceae	Kebrecho	Fever	Root	Burning the root on fire and fumigate	Nasal	Traditional Healer
				Tapeworm	Stem	Drying stem is crushed mixed with <i>Capsicum annum</i> and salt and drunk	Oral	
				Evil eye	Root	Smoke dried roots on fire the plant is breathe in	Dermal	
18	<i>Embeliaschimperi</i> Vatke	Myrsinaceae	Enkoko	Metet	Root	Dried root is smoking	Dermal	Traditional Healer
				Koso	Fruit	Crushed and drunk	Oral	
19	<i>Eucalyptus globulus</i>	Myrtaceae	Nech Bahirzaf	Influenza	Leaf	Young leaves are chopped and boiled with water and breathe in the vapor,	Nasal	Home Garden
				Asthma	Leaf	The young leaf is boiled with water and breathe in steam/vapor.	Orally/Nasal	
				Foot smile	Leaf	Washing the leg with young shoot	Dermal	
				Fiber illness And bronchitis	Leaf	Young leaves are chopped and boiled with water inhale the vapor	Dermal	
20	<i>Feoniculum vulgare</i>	Apiaceae	Ensilal	Displaced bone	Stem	The stem is tie on the displaced bone	Dermal	Home Garden
				Cough	Leaf	Fresh leaf soaked, mixed with milk and drunk	Oral	
				Diuretic	Leaf	Its leaf chopped, mixed with tomato and coffee powder, boiled and drink	Oral	
21	<i>Ficus sur</i> Forssk.	moraceae	Sholla	Dysentery	Fruit	Fruit juice is taken	Oral	Market
22	<i>Hagenia abyssinica</i>	Rosaceae	Kosso	Tapeworm	Seed	Seed are powdered, mixed with milk, boiled and Drunk	Oral	Traditional Healer
					Leaf	Fresh leaves are powdered, mix with water and Dunk	Oral	

Table 5. Contd.

23	<i>Hordeum vulgare</i>	Poaceae	Gebis	Dandruff	Seed	Seeds are crushed and then mashed on infected part	Dermal	Market
				Wenagfit	Toothache	leaf	Dried leafs are powdered and added on teeth	
24	<i>Inula confertiflora</i> A	Asteraceae		Neqarsa	Root	Roots are dried, powdered and mixed with tea	Oral	Home Garden
				Infected eye	Leaf	Fresh leaves chopped, pressed, and liquid is dropped into eye	Eye	
25	<i>Justicia schimperiana</i>	Acanthaceae	Semiza	Foot fungi	Leaf	Wash the foot with fresh leaf	Dermal	Home garden
				Kuriba	Leaf	The leaves are <i>crushed</i> squeezed and creamed on infected part	Dermal	
				Rheumatism	leaf	The leaves are chopped and boil with water and immerse the infected part	Dermal	
				Dandruff	Leaf	The leaves are <i>crushed</i> squeezed and creamed on infected part	Dermal	
26	<i>Kalancheo Shimperiana</i>	Crassulaceae	Endahula	Body swelling	Leaf	The fresh leaf is heated and spread on the swollen part of the body	Dermal	Traditional Healer
				Swelling Tonsil	Root	Fresh root is put on the nose	Nasal	
27	<i>Linum usitatissimum</i> L.	Lineaceae	Telba	Retained placenta	seed	Seed are powdered and mixed water and salt and eaten with enjera	Oral	Market
				Gastric	seed	The seed are powdered, mixed with water and sugar and drunk	Oral	
				Diarrhea	seed	The seeds are immersed in water and drunk	Oral	
28	<i>Lippia adoensis</i>	Lamiaceae	Kesiye	Mich (fibri lillness) Headache	Leaf	The leaf and immature stem of this plant is ground, pounded and mixed with small amount of coffee and drunk	Oral	Home Garden
				Toothache	Fruit/seed	Smoking the seeds on fire	Oral	
29	<i>Lepidium sativum</i> L.	Brassicaceae	Feto	Diarrhea	Seed	Powdered seeds and garlic are mixed with honey and eaten	Oral	Traditional Healer
				Tonsillities	Seed	Powdered seeds and garlic are mixed with honey	Oral	
				Cough	Seed	Powdered seeds and garlic are mixed with honey	Oral	
				Wound	Seed	Powdered seeds mixed with water and apply in the wounded area	Dermal	
30	<i>Lepidium sativum</i> L.	Brassicaceae	Feto	Diarrhea with blood	Seed	Powder of feto mixed with milk, filter and drunk	Oral	
				Hemorrhoids	Stem	Stem is heated and put on the infected part	Dermal	
31	<i>Lupinus albus</i> L.	Fabaceae	Gibto	Hypertension	Seed	Soaking seeds with water for 5 days, and eating softened seeds and/or preparing Areki(alcohol) by using seeds and drunk.	Oral	Market
32	<i>Moringas tenopetala</i>	Moringacea	Shiferaw	Blood pressure	Leaf	Leaves are crushed and powdered, Mixed with tea and drunk	Oral	Market

Table 5. Contd.

33	<i>Nigella sativa</i> L.	Apiaceae	Tikur azmuid	Headache,	Seed	Seeds are put in boiling water and steam is inhaled	Oral	Market
				Asthma	Seed	Crushed seed drunk	Oral	
34	<i>Ocimum basilicum</i>	Lamiaceae	Besobila/Ziqaqibey	Sudden sickness	Leaf	Chewing the fresh leaf	Oral	Home Garden
35	<i>Ocimum lamifolium</i>	Lamiaceae	Demakessi	Febrile illness (mich)	Leaf	Fresh leaf and stem are boiled in water and inhaled by vapor	Dermal	Home Garden
				Coughs and colds	Leaf	Fresh leaves are squeezed and sniffed the liquid	Nasal	
				Eye Disease	Leaf	Apply droplets leaf juice	Eye	
				Headache	Leaf	Fresh leaf and stem are boiled in water and inhaled by vapor	Oral/Nasal	
36	<i>Olea europaea</i>	Oleaceae	Woyira	Wound	Leaf	Oil extracted from leaf is dropped on the wound area	Dermal	Home Garden
37	<i>Otostegia integrifolia</i>	Lamiaceae	Tenguit	Stomachache	Leaf	Fresh leaf juice is extracted and used	Oral	Home Garden
				Shotelay	Root	The root is tie on neck	Dermal	
				Rabis	Leaf	The leaf is crushed mixed with milk and drunk	Oral	
38	<i>Perisa americana</i>	Lauracea	Avocado	Anemia, blood pressure	Fruit	Extracted juice is taken	Oral	Market
39	<i>Plantago lanceolate</i>	Plantaginaceae	Gorteb	Fresh Wound	Leaf	Fresh leaves are crushed and spread over on wound	Dermal	Home garden
				Snake poison	Leaf	Smoking leafs on fire	Nasal	
40	<i>Plumbago zeylanica</i> L.	Plumbaginaceae	Amera	Wound	Root	Powdered dried roots and applied of infected wound	Dermal	
				Hemorrhoid	Root		Anal	
				Heart disease	Leaf		Oral	
41	<i>Phytolacca dodecandra</i> L'	Phytolacaceae	Endod	Gonorrhea	Leaf	Crushed leaves are filtered and drunk	Oral	Home Garden
				Rabis	Root/Leaf	Fresh root or leaf extract is mixed with milk and taken	Oral	
				Kuriba	root	Fresh root is crushed, squeezed and mixed with little water and drunk	Oral	
42	<i>Ricinus communis</i>	Euphorbiaceae	Chakma/Gulo	Infected wound	Fruit, leaf	Leafs are smashed applied on wound	Dermal	Home Garden
				Skin disease/infection	Leaf	Washing the infected body part by fresh leaves	Dermal	
43	<i>Rhamnus prinoides</i> L.	Rhamnaceae	Gysho	Liver	Root	Fresh root is powdered and mixed with water and drunk	Oral	Home Garden
				Tonsillitis	leaf	Its leaves with the leaves of <i>Ruta chalepensis</i> is chopped together, mixed with drop of <i>Citrus limon</i> , boiled and drunk	Oral	
44	<i>Rosa abyssinica</i>	Rosaceae	Kega	Hypertension ion	Fruit	Its fruit is are ground, powdered, mixed with water and drunk	Oral	Market
45	<i>Ruta chalepensis</i>	Rutaceae	Tena Adam	Evil Eye	Leaf	The fresh leaves mixed with garlic is crushed and Tie by neck and smelled by nose	Nasal	Home Garden

Table 5. Contd.

				Sour throat	Whole part	The whole plant part is smashed, boiled and drunk with coffee/tea	Oral	
				Stomach ache	Leaf	Leaves are chopped and eaten	Oral	
				Nasal bleeding	Seed/leaf	The seed and leaf is crushed and smelled	Nasal	
46	<i>Schinus molle</i>	Anacardiaceae	Kundo Berbery	Tonsillitis	seed	The seeds are powdered, mixed with honey and drunk	Oral	Market
47	<i>Solanum americanum</i>	Solanaceae	Awuit	Allergic	Leaf	Fresh leaves are chopped and applied on infected part	Dermal	Wild
48	<i>Solanum lycopersion</i>	Solanaceae	Timatim	Eye disease	seed	The seed of <i>tomato</i> is eaten	Oral	Market
				Ulcer	fruit	Its fresh fruit is cooked and then eaten with injera	Oral	
49	<i>Thymus schimperi</i>	Lamiaceae	Tosign	Cough	Leaf & Stem	Dried leaves and stem are ground together, mixed with water and coffee to drunk	Oral	Market
				Hypertension	Leaf	The leaf part is mixed with tea and drunk	Oral	
50	<i>Trigonella graecum</i>	foenum- Leguminaceae	Abish	Gastric	Seed	Seeds are powdered, macerated in water, adding sugar and drunk	Oral	Market
				Milk secretion	Seed	Seeds are powdered, macerated in water, adding sugar and drunk	Oral	
51	<i>Vernonia amygdalina</i>	Asteraceae	Grawa	Worms	Leaf	Chopped fresh leaves are mixed with water and drunk	Oral	Home Garden
				Vomiting	Leaf	Chopped fresh leaves are mixed with water and drunk	Oral	
52	<i>Withania somnifera</i>	Solanaceae	Gisawa	Devil disease	Root	The burning root is commonly inhaled	Nasal	Traditional healer
				Evil eye	Leaf	finely crushed leaves are sniffed	Nasal	
53	<i>Zehneria scabra</i>	Cucurbitaceae	Aregressa	Febrile illness (mich)	Leaf	The leaf is boiled and drunk with coffee	Oral	Home Garden
				Chirt	Leaf	Squeezed leaf juice is applied on the infected area	Dermal	
54	<i>Zingiber officinale L.</i>	Zingibracea	Zingibil	Diarrhea	Rhizome	Chopped the rhizomes, squeeze juice and Drunk	Oral	Market
				Sour throat	Rhizome	Chew the Rhizomes	Oral	
				Abdominal Pain	Rhizome	Chewed rhizomes with <i>Lepidium sativum</i> and chopped rhizomes mixed with tea and drunk	Oral	
				Nausea	Rhizome	Chopped rhizomes are mixed with tea and drunk	Oral	
				Carminative (relieves gas)	Rhizome	Chew the rhizomes	Oral	
55			Etsezweye	Snake poison	Root and stem	Stem handling	With hands	Traditional Healer

nearby community are able to create strong bond with the community and trust each other in curing the disease and other social settings.

Conclusion

The study indicated that a total of 55 medicinal

plant species belonging to 35 families were used to treat various human diseases. Majority of medicinal plants (80%) species were obtained by

cultivation in home garden. 48% of respondents have medicinal plants in their home garden. Leaf (13.3%) and root parts (13.3%) are the most widely used plant part for drug preparation.

Liquid (46.9%) is a widely used remedy preparation form. Oral method of administration accounts for 36.7% followed by dermal application (30%) and dermal and nasal in combination (20%). In general, Debre Markos Town is rich in sources. The practice of the use of traditional medicine is common in the study area. Most of the available medicinal plants are found under threats in the study area, which is one of the main reasons for the degradation and destruction of habitats is a major cause of the loss of medicinal plant. Therefore, documentation medicinal plants provide important data. The practice of using medicinal plants by the local people has enormous and paramount significant in economic and social sense. While practicing cultivating medicinal plants, they feel confident that they will cure different diseases within their compound. Especially, there are different infectious diseases and accidental illness that cause psychological and physical damage to the people and its being treated by those medical plants. Moreover, those people who used medicinal plants for the sake of their health can save and reduce frequency of unnecessary waste from transportation and other miscellaneous cost to modern health institutions. Thus, it enhances strong economic capacity of the people through creating healthy, physically and mentally capable people.

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CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

REFERENCES

- Abera B (2014). Medicinal plants used in traditional medicine by Oromo people, Ghimbi District, Southwest Ethiopia. *Journal of Ethnobiology and Ethnomedicine* 10(1):40.
- Abiyot B (2002). Use and conservation of human traditional medicinal plants in Jabitehaan Wereda, west Gojam. Addis Ababa University, MSc.
- Alemayehu G, Asfaw Z, Kelbessa E (2015). Ethnobotanical study of medicinal plants used by local communities of Minjar-Shenkora District, North Shewa Zone of Amhara Region, Ethiopia. *Journal of Medicinal Plants Studies* 3(6):01-11.
- Amenu E (2007). Use and management of medicinal plants by indigenous people of Ejaji Area (Chelya Woreda) West Shoa, Ethiopia: an ethnobotanical approach. MSc Thesis. Addis ababa, Ethiopia
- Asmamaw D, Achamyeleh H (2018). Assessment of Medicinal Plants and Their Conservation Status in Case of Daligaw Kebela, Gozamen Werda, East Gojjam Zone. *J Biodivers Biopros Dev* 5:170. doi:10.4172/2376-0214.1000170 (<https://www.omicsonline.org>).
- Assegid A, Tesfaye A (2014). Ethnobotanical Study of Wild Medicinal Trees and Shrubs in Benna Tsemay District, Southern Ethiopia. *Journal of Science and Development* 2(1):17-33.
- Banjaw DT, Dikir W, Gebre A, Geja W, Tsegaye D (2016) Aromatic and Medicinal Plants in Wondogenet Agricultural Research Center Botanical Garden, South Ethiopia. *Medicinal and Aromatic Plants (Los Angel)* 5(278):2167.
- Bekele E (2007). Study on actual situation of medicinal plants in Ethiopia. Addis Ababa: Prepared for Japan Association for International Collaboration of Agriculture and Forestry.
- Birhanu A, Ayalew S (2018). Indigenous knowledge on medicinal plants used in and around Robe Town, Bale Zone, Oromia Region, Southeast Ethiopia. *Journal of Medicinal Plants Research* 12(16):194-202.
- Boadu AA, Asase A (2017). Documentation of Herbal Medicines Used for the Treatment and Management of Human Diseases by Some Communities in Southern Ghana. *Evidence-Based Complementary and Alternative Medicine*.
- Giday M (2001). An ethnobotanical study of medicinal plants used by the Zay people in Ethiopia. *CBM: sskriftserie* 3:81-99.
- Giday M, Teklehaymanot T, Animut A, Mekonnen Y (2007). Medicinal plants of the Shinasha, Agew-awi and Amhara peoples in northwest Ethiopia. *Journal of Ethnopharmacology* 110(3):516-525.
- Gurib FA (2006). Medicinal plants: traditions of yesterday and drugs of tomorrow. *Molecular aspects of Medicine* 27(1):1-93.
- Hunde D (2001). Use and Management of Traditional Medicinal plants by Indigenous people of Bosat Wereda, Wolenchiti area. An ethnobotanical approach. M.Sc.Thesis, Addis Ababa University, Ethiopia.
- Hunde D, Asfaw Z, Kelbessa E (2006). Use of traditional medicinal plants by people of 'Boosat' sub district, Central Eastern Ethiopia. *Ethiopian Journal of Health Sciences* 16(2).
- Martin GJ (1985). *Ethnobotany: a methods manual* Chapman and hall. New York, EE. UU.
- Megersa M, Asfaw Z, Kelbessa E, Beyene A, Woldeab B (2013). An ethnobotanical study of medicinal plants in Wayu Tuka District, East Welega Zone of Oromia Regional State, West Ethiopia. *Journal of Ethnobiology and Ethnomedicine* 9(1):68.
- Nigussie A, Yilikal B, Mulugeta F, Addisu A, Gashaw A (2018). Use and Conservation of Medicinal Plants by Indigenous People of Gozamin Wereda, East Gojjam Zone of Amhara Region, Ethiopia: An Ethnobotanical Approach. *Evidence-Based Complementary and Alternative Medicine*.
- Oladele AT, Alade GO, Omobuwajo OR (2011). Medicinal plants conservation and cultivation by traditional medicine practitioners (TMPs) in Aiyedaade Local Government Area of Osun State, Nigeria. *Agriculture and Biology Journal of North America* 2(3):476-487.
- World Health Organization (WHO) (1993). IUCN -The World Conservation Union , WWF- World Wide Fund for Nature. *Guidelines on the Conservation of Medicinal Plants* Castel Cary Press, Somerset, UK . ISBN 2-8317-0136-8.
- Zerabruk S, Yirga G (2011). Traditional knowledge of medicinal plants in Gindeberet district, Western Ethiopia. *South African Journal of Botany* 78:165-169.
- Zewdu B (2013). Traditional Use of Medicinal Plants by the Ethnic Groups of Gondar Zuria District, North-western Ethiopia. *Journal of Natural Remedies* 13(1):46-53.