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Full Length Research Paper
Ethnobotanical aspects of medicinal plants of Mount Furi Forest, Sebeta Awas District, Southwest Oromia, Ethiopia

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Abstract

In Ethiopia, more than 95% of conventional medicinal preparations are made from plant origin. There is an extreme abundance of potential drug candidates that can be discovered in under-studied medicinal plants from sub-Saharan Africa. This study attempts to showcase some of these understudied and underestimated medicinal plants from Mount Furi forest which is located in southwestern Ethiopia. The main purpose of this study was to document medicinal plant species and related knowledge from Mount Furi Forest. Semi-structured interviews, observation, and guided field walk with informants were employed to obtain ethnobotanical data. Materials used include GPS, compass, diameter tape, computer (data entry), etc. Information regarding local names of medicinal plants, methods of preparation, part(s) used, diseases treated, and route of application was recorded. All medicinal plants for both humans and livestock were collected. Finally, 38 medicinal plant species belonging to 34 genera and 27 families were collected, which serve both human beings and their cattle. Most medicinal plants were taken orally while few have nasal and dermal applications. The use of medicinal plants by the community is low due to the access to modern health services and loss of indigenous knowledge. The study revealed the existence of indigenous knowledge of medicinal plants to treat human and livestock ailments. However, agricultural expansion, firewood collection, environmental degradation, and deforestation are the main threats to medicinal plants. Therefore, there should be mentoring for the local people in the study area to conserve their indigenous knowledge resources and prevent the extinction of medicinal plants.



1. Introduction

World Health Organization defines a medicinal plant as a plant in which one or more of its plant parts contains a substance that can be used for healing purposes or precursor for chemopharmaceutical semi-synthesis.' (World Health Organization, 2008). Different communities in the world have different cultures and indigenous knowledge systems that are transferred from generation to generation both orally and in written forms. More than 21,000 medicinal plant species have been used to prevent and treat various health problems in the world (Nigussie & Young-Dong, 2019). African and Asian countries are encouraging traditional medicines as an internal component and support for their public health care programs. Indigenous medicines are relatively inexpensive, locally available, and willingly accepted by the local population (Nigussie & Young-Dong, 2019). Although some of this knowledge has been documented in scripts, books, databases, and online, most of the traditional knowledge and practices in Africa are not well studied and documented.

Medicinal plants from Africa have a wide range of biological properties, which need to be discovered, documented, and explored. While other countries have comprehensive pharmacopeias to use as a guideline when it comes to medicinal plants, Africa has only a number of books that contain basic information. There have been some important strides with the publishing of the African Herbal Pharmacopoeia and indigenous knowledge which is a truly valuable resource. It focuses on the most distinguished, well-known, and well-used medicinal plants from different countries in Africa (Chintamunnee & Mahomoodally, 2012).

In Ethiopia, alternative remedies are the most

important and sometimes the only source of therapeutics for nearly 80% of the population. More than 90% of traditional medicinal preparations used to treat both human and livestock diseases and problems in Ethiopia originate from plant remedies (Abebe, 2001; Gurib, 2006). Ethiopia has an enormous resource of plant species that are used in traditional medicines. Most people depend on traditional medicine for their health care, and more than 95% of conventional medicinal preparations in Ethiopia are made from plant origin (Derbe et al., 2006). Among the 6000 higher plant species that are known to exist, over 1000 plant species are recorded as having medicinal uses for people (Mesfin et al., 2009). The majority of the medicinal plants are herbs, followed by shrubs and trees of which 2.7% of the medicinal plant species are endemic to Ethiopia, and most are found in the wild (Abebe, 2001; Nguta et al., 2010).

There is an extreme abundance of potential drug candidates that can be discovered in understudied medicinal plants from sub-Saharan Africa. This study also attempts to showcase some of these understudied and underestimated medicinal plants from Mount Furi forest which is located in southwestern part of Ethiopia. It combines the general description with traditional usage and photochemistry. Additionally, an effort has been made to incorporate the scientific evaluation of these plants, not only to show what has been done but, more importantly, what still needs to be done.

2. Methods and Materials

Description of the study area

Mount Furi is a stratovolcano near Addis Ababa which is located in the Sebeta Awas District the Special Zone of Oromia, surrounding Addis Ababa. Geographically it is located in the latitude of 8°54'N, 38°41'E and longitude of 8°9'N, 38°68'E (Figure 1) whereas its altitude ranges from 2839-2300 meters above sea level. It covers 180 hectares and is found at 19kms out of Addis Ababa along with Addis to Butajira Road. The forest lies in five kebeles (the smallest administrative unit in Ethiopia) of the Sebeta Awas District namely Furi-Garabulo, Ge-

languda, Migira, Gedamba, and Daletikebeles. Formerly the forest with its natural vegetation was under the agricultural office in the 1960s and established in 1967 as Furi Forest Enterprise. The plantation of the forest was conducted in 1980 during the Derg regime through the coordination of Addis Ababa University students and Government Workers. The plantation was aimed at rehabilitation of the forest land but converted to commercial purposes. So nowadays there are plantations of Eucalyptus which are typical of the area, some indigenous trees like *Juniperus procera*, *Maesa lanceolata*, and *Carissa spinarum* are also available in some

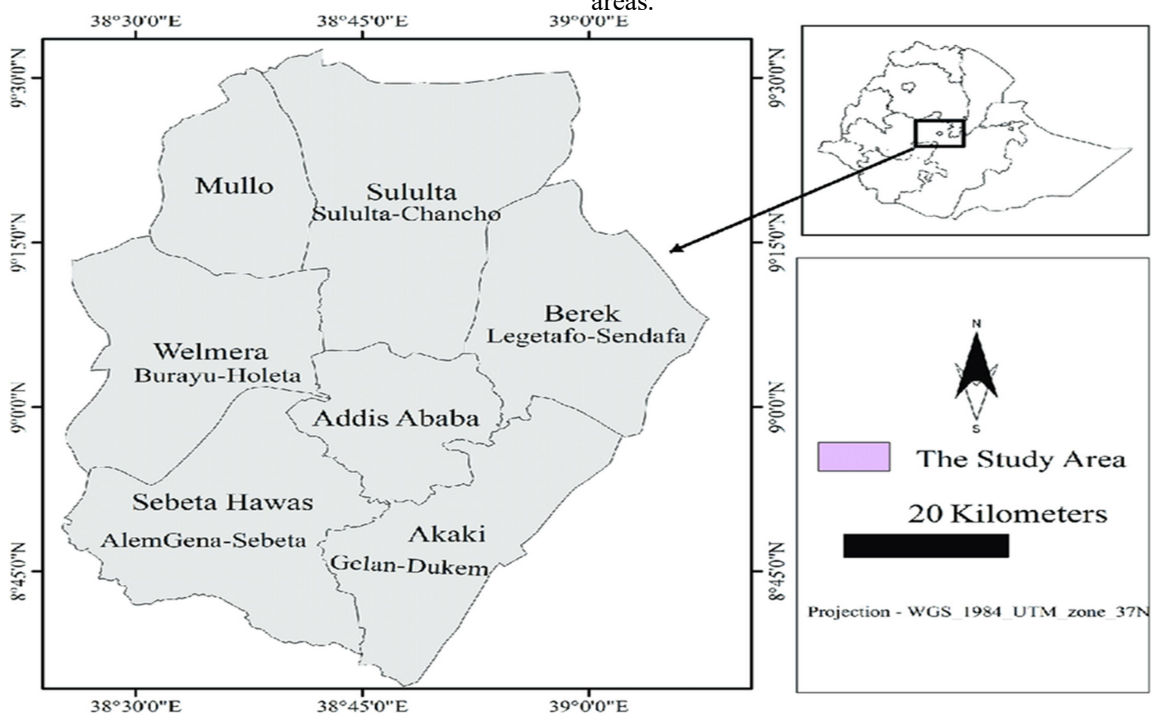


Figure 1 Map of the study area

Methods

Medicinal plant data collected on field trips were made to villages of the five adjacent kebeles. Materials used include GPS, compass, diameter tape, computer (data entry), etc. All plant species including herbs, shrubs, and trees in each kebeles have been recorded. Plant samples were collected following standard herbarium technique and identified at the National Herbarium of Ethiopia (ETH), Department of Plant Biology and Biodiversity Management, Addis Ababa University. Herbarium specimens housed at ETH and volumes 1- 8 of the Flora of Ethiopia and Eritrea (Bekele, 2007) were also used to aid identification. Semi-structured interviews, observation, and guided field walk with informants were employed to obtain ethnobotanical data (Gidey, 2010). For this study, purposive sampling is employed to identify potential informants. Direct survey and semi-structured interviews were also used to identify which medicinal plants are used to treat health problems of the society and samples were collected and identified at the National Herbarium and by using botanical literature.

Information regarding local names of medicinal plants, methods of preparation, part(s) used, diseases treated, and route of application was recorded. Observations were made on the morphological features and habitats of each medicinal plant species in the field. Based on ethnobotanical information provided by informants, specimens were collected, numbered, pressed, and dried for identification. The data were computed using descriptive statistics and a Microsoft Of-

fice Excel spreadsheet using the formula of Mueller-Dombois and Ellenberg, (1974) and Kent and Coker (1992) and SPSS version 23.0.

3. Results

A total of 38 medicinal plant species were collected from Mount Furi forest. They were distributed under 34 genera and 27 families (Table 1). Lamiaceae was the leading family having four species and Rosaceae have 3 species. Family Asteraceae, Anacardiaceae, Celastraceae, Myrsinaceae, Moraceae, Polygonaceae, Rhamnaceae, and Verbenaceae contributed to two species each, and Families like Aloeceae, Apocynaceae, Ericaceae, and Poaceae have one species each as indicated in the Table below.

Table 1: List of medicinal plant species used for the treatment of human and/or livestock diseases from Mount Furi Forest, Oromia Region, Ethiopia.

Local name	Species name	Family	Habit
<i>Areertii</i>	<i>Evolvulus fugacissimus</i> A.Rich.	Convolvulaceae	Cl
<i>Bargamo-adi</i>	<i>Eucalyptus globulus</i> Labill.	Myrtaceae	T
<i>Arenkula</i>	<i>Rubus volkensii</i> Engl.	Rosaceae	Cl
<i>Tosign</i>	<i>Thynmus shimperi</i> Ronniger.	Lamiaceae	H
<i>Abeyi</i>	<i>Maesa lanceolata</i> Forssk. *	Myrsinaceae	Sh
<i>Bisana/ Bekenisa</i>	<i>Croton macrostachyus</i> Huchst.ex Del. *	Euphorbiaceae	T
<i>Sariitii</i>	<i>Asparagus africanus</i> Lam.	Asparagaceae	Cl
<i>Kechemo</i>	<i>Myrsine africana</i> L.	Myrsinaceae	Sh
<i>Bilu</i>	<i>Jasminum grandiflorum</i> L.	Oleaceae	H
<i>Arenkula</i>	<i>Rubus apetalus</i> Poir.	Rosaceae	Cl
<i>Debobesa/ Tatecha/</i>	<i>Rhus natalensis</i> Krauss. *	Anacardiaceae	Sh
<i>Inbuay/ Hidi</i>	<i>Solanum marginatum</i> L.f.	Solanaceae	H
<i>Kededa</i>	<i>Rhamnus staddo</i> A. Rich *	Rhamnaceae	H
<i>Ret</i>	<i>Aloe macrocarpa</i> Tod. *	Aloaceae	H
<i>Suke</i>	<i>Lippia adoensis</i>	Verbanaceae	H
<i>Ulaga</i>	<i>Ehretia cymosa</i> Thonn. *	Boragiaceae	T
<i>Lalesa/ Enchibir</i>	<i>Rubia cordifolia</i> Gand.	Rubiaceae	Cl
<i>Kemo</i>	<i>Rhus vulgaris</i> Meikle. *	Anacardiaceae	Sh
<i>Kulegeb</i>	<i>Plantago albicans</i> L.	Plantaginaceae	H
<i>Gura Hare</i>	<i>Verbascum sinaiticum</i> Benth.	Scrophulariaceae	H
<i>Kobo/Gulo</i>	<i>Ricinus communis</i> L.	Euphorbiaceae	T
<i>Shokoksa</i>	<i>Salvia nilotica</i> Jacq.	Lamiaceae	Cl
<i>Edafiti</i>	<i>Clematis longicauda</i> Steud.ex A.Rich.	Ranunculaceae	Cl
<i>Mekmeko</i>	<i>Rumex abyssinicus</i> Jacq.	Polygonaceae	H
<i>Zegnit</i>	<i>Maytenus addat</i> Loes. Sebsebe.	Celastraceae	Sh
<i>Anujira Gubedhu</i>	<i>Pteris cretica</i> L.	Sipteridaceae	H
<i>Chanchi/ Chikugn</i>	<i>Artemisia abyssinica</i> Sch., Bip. ex A.Rich.	Asteraceae	H
<i>Engicha/ kuni</i>	<i>Cyperus fischerianus</i> A. Rich.	Poaceae	H
<i>Kitkita</i>	<i>Dodonaea angustifolia</i> L.f. *	Spapindaceae	T
<i>Agam / Agemsa</i>	<i>Carissa spinarum</i> L. *	Apocynaceae	Sh
<i>Kinchib</i>	<i>Gomphocarpus purpurascens</i> A. Rich	Asclepiadaceae	Sh
<i>Sokoru/ Kebercho</i>	<i>Echinops kebercho</i> Mesfin *	Asteraceae	H
<i>Asti/ Gedira</i>	<i>Erica arborea</i> L. *	Ericaceae	Sh
<i>Darguu</i>	<i>Ocimum lamiifolium</i> Hochst. Ex Benth.	Lamiaceae	H
<i>Tikur Enchet</i>	<i>Prunus africana</i> (Hook.f.) Kalkm. *	Rosaceae	T
<i>Hulegeb</i>	<i>Ocimum forsholei</i> Benth.	Lamiaceae	H
<i>Tomashimbiro</i>	<i>Lantana camara</i> L.	Verbenaceae	H
<i>Enbuacho</i>	<i>Rumex nervosus</i> Vahl.	Polygonaceae	H

NB. Climbing (Cl), Habit (H), Tree (T), and Shrub (Sh)

About 25% of the respondents were from Daleti kebele and all of them knew more than 10 plant species that were used for medicinal purposes for their cattle and themselves. As per the field observation, this is due to the medicinal plant use having a direct relationship with the indigenous knowledge of the people of the Daleti Kebele. The knowledge of medicinal plants have also a direct relationship with age. About 56.6% of the respondents who are above 40 years of age know 80% of the medicinal plants and their uses. As depicted in Figure 2 and as most informant reports, 78.9% of plant species were used to treat human diseases, 10.5% were used for Veterinary medicines, and 10.5% serve as both human and veterinary medicines.

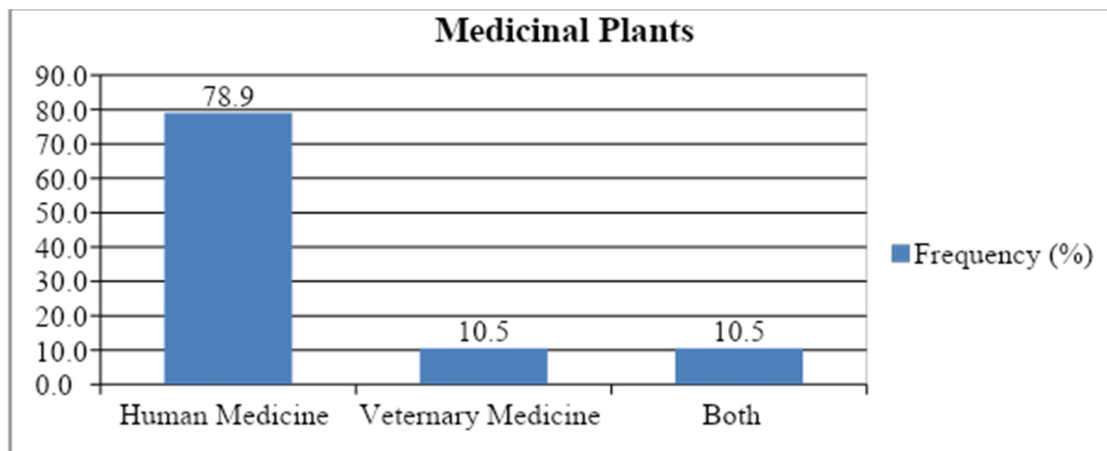


Figure 2: Medicinal Plant distribution of Mount Furi forest, Southwest Oromia, Ethiopia

Medicinal plants that were used to treat cancer, tapeworm, common cold, stomach problems, asmaths, open and closed wounds, and different skin problems were found used by the local community. Most of the medicinal plants (42.5%) were prepared by chewing the plant part while 20 % of them were trough boiling the plant part in water, and 17.5% of the medicinal plants work by tying the plant part to the sick body. Other methods of preparation such as squeezing, grinding, bathing and burning take 5% each (Table 2).

Table 2: Medicinal plants and their use of Mount Furi Forest, Southwest Oromia, Ethiopia

Species name	Used for	Methods of preparation				
		Squeezing	Grinding Charring	Boiling	Tying	Bathing
<i>Aloe macrocarpa</i> Tod.	Skin itching for chattels, heart failure, and malaria for human	x	x		x	
<i>Asparagus africanus</i> Lam.	Religious for evil eye				x	
<i>Buddleja polystachya</i> Fresen.	For teeth ailment		x			
<i>Carissa spinarum</i> L.	Evil eye (roots), Ascaris, food (fruit), headache		x			x
<i>Croton macrostachyus</i> Huchst.ex Del.	For teeth, treat placenta and abortion			x		
<i>Datura stramonium</i> L.	Dandruff	x	x			
<i>Dodonaea angustifolia</i> L.f.	Tape worm	x				
<i>Dovyalis abyssinica</i> (A.Rich.) Warb.	Medicine (leaves)		x			
<i>Echinops kebercho</i> Mesfin	Evil spirit					x
<i>Eucalyptus globules</i> Labill.	Stomach ache		x	x		
<i>Evolvulus alsinoides</i> A.Rich.	For hygiene					x
<i>Ficus sur</i> Forssk.	Medicine for ringworm				x	
<i>Gomphocarpus purpurascens</i> A. Rich	Skin disease				x	
<i>Hypericum revolutum</i> Vahl	Eye disease				x	
<i>Jasminum grandiflorum</i> L.	Treats cancer in human			x		
<i>Maesa lanceolata</i> Forssk.	Religious plant				x	
<i>Maytenus addat</i> Loes. Sebsebe.	Parasite treatment		x			
<i>Monocymbium cerosiiforme</i> (Nees) Stapf.	Poisonous grass for cattle		x			

<i>Myrsine africana</i> L.	Tapeworm and spinal cord problems		X		
<i>Ocimum forsholei</i> Benth.	Stomach ache		X		
<i>Ocimum lamiifolium</i> Hochst. exBenth.	Asthma, tapeworm		X		
<i>Pittosporum viridiflorum</i> Del.	Tooth brushes		X		
<i>Pteris cretica</i> L.	Treat external wound				X
<i>Rhamnus prinordes</i> L'Herit.	Toothbrush, better test		X		
<i>Rhamnus staddo</i> A. Rich	Tapeworm treatment		X		
<i>Rhus natalensis</i> Krauss.	Boiled roots, toothbrushes		X	X	
<i>Rhus vulgaris</i> Meikle.	Toothbrush		X		
<i>Ricinus communis</i> L.	Oil,		X		
<i>Rubia cordifolia</i> Gand.	Bronchi problems			X	X
<i>Rubus apetalus</i> Poir.	Food, for common cold			X	
<i>Rubus volkensii</i> Engl.	Food, for common cold			X	
<i>Rumex abyssinicus</i> Jacq.	Food during drought season		X		
<i>Salvia nilotica</i> Jacq.	Skin Itchy				X
<i>Solanum marginatum</i> L.f.	Treat nasal bleeding	X			
<i>Thymus schimperi</i> Ronniger.	For the common cold, Spice			X	
<i>Verbascum sinaiticum</i> Benth.	For horses and donkeys stomach parasitic problem		X		
<i>Zehneria anomala</i> C. Jeffrey	Common cold, hygiene protection for mothers			X	X

Interviews With The Traditional Healers And The Community Revealed That 62.7% Of The Medicines Were Extracted From The Plant Leaves, Whereas 17.6% Remedy Was Prepared

From Fruits, 9.8% From Roots, 7.8% From The Stem, And 2% Of Medicines Were Extracted From Oil Of Plant As Shown In The Figure Below (Figure 3).

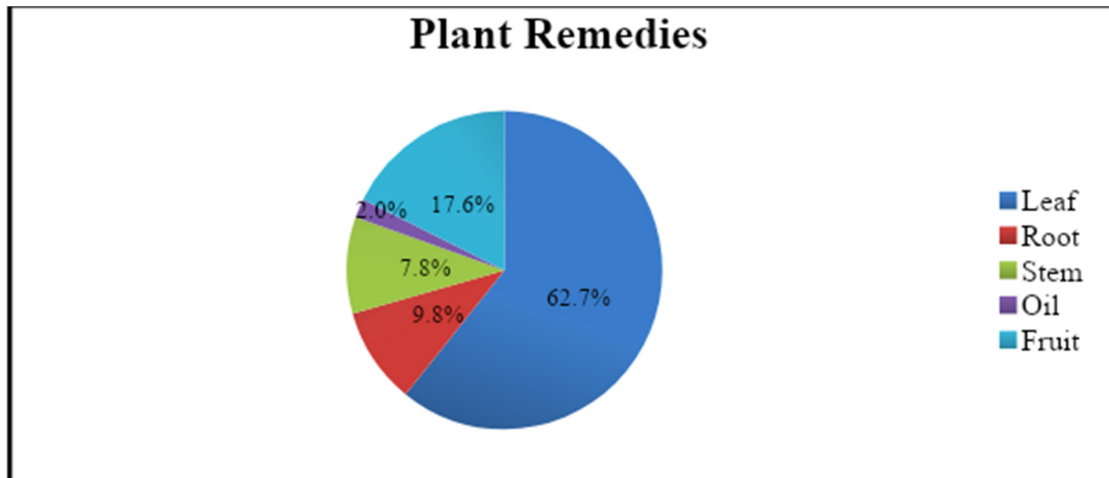


Figure 3: Plant parts used as remedies from medicinal plants of Mount Furi forest\

Other than this, three plants have spiritual value and are used religiously for different purposes through different methods like bathing with leaves and burning. Among the total medicinal plants collected from the study area, 56% of them were taken orally, 34% were used dermal

and 10% were taken nasally. As shown in Figure 4 below, oral application is the leading route of application in the study area while dermal and nasal applications take the next two routes respectively.

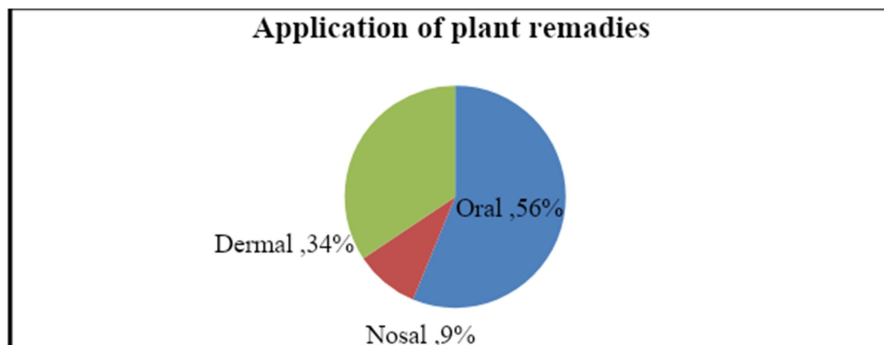


Figure 4:- Application of plant remedies of Mount Furi forest, Southwest Oromia, Ethiopia

Table 3: Medicinal plants use, plant part and application

Species name	Medicine			Parts to be used					Application		
	Human	Veterinary	Both	Leaf	Root	Stem	Oil	Fruit	Oral	Nasal	Dermal
<i>Aloe macrocarpa</i> Tod.	x	x	x	x					x		x
<i>Asparagus africanus</i> Lam.	x			x							x
<i>Buddleja polystachya</i> Fresen.	x					x			x		
<i>Carissa spinarum</i> L.	x				x			x			x
<i>Croton macrostachyus</i> Huchst.ex Del.	x								x		
<i>Datura stramonium</i> L.	x			x							x
<i>Dodonaea angustifolia</i> L.f.	x			x					x		
<i>Doyyalis abyssinica</i> (A.Rich.) Warb.	x	x	x	x					x		
<i>Echinops kebercho</i> Mesfin	x				x					x	
<i>Eucalyptus globulus</i> Labill.	x			x					x		
<i>Evolvulus alsinoides</i> L.	x			x	x	x		x		x	x
<i>Ficus sur</i> Forssk.	x							x	x		
<i>Gomphocarpus purpurascens</i> A. Rich	x			x							x
<i>Hypericum revolutum</i> Vahl	x				x						x
<i>Jasminum grandiflorum</i> L.	x			x					x		
<i>Lippia adoensis</i> Hchest. exWalp.	x			x					x		
<i>Maesa lanceolata</i> Forssk.	x							x	x		
<i>Maytenus addat</i> Loes. Sebsebe.		x		x					x		
<i>Monocymbium cerosiiforme</i> (Nees) Stapf.		x		x					x		
<i>Myrsine africana</i> L.		x		x					x		
<i>Ocimum forskolei</i> Benth.	x			x							x
<i>Ocimum lamifolium</i> Hochst. exBenth.	x			x						x	
<i>Pittosporum viridiflorum</i> Sims.		x		x					x		
<i>Pteris cretica</i> L.	x			x							x
<i>Rhamnus prinordes</i> L'Herit.	x			x		x			x		
<i>Rhamnus staddo</i> A. Rich		x		x					x		
<i>Rhus natalensis</i> Krauss.	x	x	x					x	x		
<i>Rhus vulgaris</i> Meikle.		x		x					x		
<i>Ricinus communis</i> L.	x						x				x
<i>Rubia cordifolia</i> Gand.	x			x							x
<i>Rubus apetalus</i> Poir.	x			x				x	x		
<i>Rubus volkensii</i> Engl.	x			x				x	x		
<i>Rumex abyssinicus</i> Jacq.	x				x				x		
<i>Salvia nilotica</i> Jacq.	x			x							x
<i>Solanum marginatum</i> L.f.	x			x						x	
<i>Thymus schimperi</i> Ronniger.	x			x					x		
<i>Verbascum sinaiticum</i> Benth.		x		x					x		
<i>Zehneria anomala</i> C. Jeffrey	x			x							x

4. Discussion

The accessibility and abundance of the resource increase the magnitude of use and interest of medicinal plants in Ethiopia due to the acceptability and bio-medicinal benefits of the plants which is consistent with the findings by Abebe (2001). Mount Furi forest is also rich in medicinal plants and the nearby society has intact knowledge about these medicinal plants and their use. Similarly in many countries, medicinal plants were collected from the forest areas. Many authors (e.g., Mesfin et al., 2009; Gidey, 2010; Gidey et al., 2011) reported that in many parts of the country medicinal plants are harvested from the wild. As revealed in the interview results, 85% of the informants knew more than 60% of the medicinal plants but they use less than 50% of the plants they know. Even though the medicinal plant distribution is even all over the areas of the forest, most of the medicinal plants were found in the Daleti Kebele. Studies were done in other parts of Ethiopia at different times and authors also indicate that most of the medicinal uses of plants were leaves (Tamene, 2000; Giday and Amani, 2003). Chewing the plant part was the most commonly used application in the area, whereas, grinding, boiling, tying and other methods were used. Similar findings were also reported from researches in Ethiopia which states that chewing, grinding and boiling were most commonly used methods of preparation (Asegid and Tesfaye, 2013; Melese et al., 2015). Leaves were the most harvested plant remedy from the study area which did not affect the sustainability of the plant because collecting leaves did not cause much damage to the survival of the plant unlike

that of the root also reported in different researches in the country (Munishi et al., 2004; Lulekal et al., 2008; Mesfin et al., 2009; Gidey et al., 2011; Eneyew et al., 2014). Many researchers in Ethiopia for example, Hunde (2001), Addis et al. (2001), Balemie et al. (2004), Lulekal (2005), Mesfin (2007), Gidey (2010a), Tolasa (2007), Gidey et al. (2011), and Nigusie and Young-Dong (2019) noted that the leading routes of application of all the reported herbal remedies in Ethiopia were used orally.

5. Conclusions and Recommendations

This study has provided crucial information on the medicinal plants of the area. From the results, it is seen that the area is rich in plant biodiversity. 38 species belong to 38 genera and 30 families were medicinal plants that served both human beings and cattle. The use of medicinal plants by the community was low due to the access to modern health services and loss of indigenous knowledge. Of the total medicinal plants collected from the area, the majority of them were taken orally, a significant percentage were used dermal and few were taken nasally. So the oral application is the leading route of application while dermal and nasal applications took the next two stages respectively. Moreover, traditional medicinal healers used to collect medicinal plants from nearby sub-cities from Akaki Kality Sub-city and Kolfekeranyo Sub-city, and Sebeta District. From the plantation area, medicinal plants which are used to treat cancer, tapeworm, cold, stomach problems, allergies, open and closed wounds, and different skin problems are found used by the local community.

Based on the results of this study the following recommendations are proposed:

- Indigenous knowledge on medicinal plants of the forest needs to be promoted and well recorded.
- The commercial plantation and harvesting is affecting the area especially medicinal plants through road construction and Eucalyptus tree effect. So that, to protect the area stakeholders need to give attention on the way of planting other indigenous trees which can help the forest and the underground water to regenerate.
- To ensure continued ecosystem services including indigenous and endemic species and ecotourism, in-situ conservation of Furi Mountain is recommended.
- The forest area is near to the capital city Addis Ababa, so that there is a need for the carbon sequestration and green area which is out of any type of pollution; in addition to its medicinal plants concentration.

Conflict of Interests

The authors declare that there's no conflict of interest concerning to the publication of this article

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