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Assessment of Medicinal Plants Used to Treat Human Diseases in Mille District, Afar Regional State, North-eastern Ethiopia

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ABSTRACT

Ethnobotanical study of medicinal plants was conducted in Mille district, Afar regional state, Ethiopia. The aim of the study was to assess medicinal plants used to heal human diseases by traditional healers. Among twelve (12) Kebelles of the district four (4) Kebelles were selected purposefully. The data were collected using semi-structure interview and focused group discussion. Thirty (30) informants were selected purposively by the help of district administration and elders. A total of 21 plants species were documented. Most claimed plants are trees (52.6%), leaf part was also widely used (41.6%) than others. The frequently used route of administration is oral which accounts 62.5%. Aloe was the most important plant species to treat different human disease and the species was ranked first. The traditional knowledge transfer mechanism for generations is very important experience. As per the informants, wild growing medicinal plants are the most efficacious. Further exploration of traditional knowledge and conservation of dry wood forest is vital.

Keywords: Ethnobotany, Medicinal plants, traditional healer, Mille, Afar

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INTRODUCTION

Peoples have been utilizing plants for basic preventive and curative health care for long time. In most developing countries common use of medicinal plants to maintain good health, has been widely observed (UNESCO, 1996) and the concern and knowledge varies from region

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to region, and from community to community (Fekadu Fullas, 2010). Currently more than 800 (eight hundred) species of plants are used in traditional health care system to treat nearly 300 (three hundred) mental, physical and other disorders. In Africa, traditional medicine is the oldest therapeutic system and the practices are varied forms and holistic. The traditional healers typically diagnose and treat psychological basic of illness before prescribing medicines (Van Wyk., 1999).

In Ethiopia about 800 plants are used in traditional health to treat nearly 300 disorders. The wide spread use of traditional medicine could be attributed to cultural acceptability efficiency against certain types of disease, physical acceptability and economic affordability. Ethiopian traditional medicinal system is characterized by variation and shaped by ecological diversities, socio-cultural background as well as historical development. The existence of traditional medical pluralism in the country, either the knowledge from herbalists was passed secretively from one generation to the next through world of mouths or their descendants the medico-spiritual man scripts (Asfaw Debela et al, 1999).

Nearly 80% of the Ethiopian population is still dependent on traditional medicine, which largely involves the use of plants (Tesfaye Hailemariam, et al, 2009; Mirutse Giday et al, 2003). However, little effort has so far been made to documented medicinal plant and associated knowledge despite ongoing deforestation, environmental degradation and accumulation in the country (Mirutse Giday et al, 2003). In Afar region, people have also traditional practices which they put in to effect for generation to take care of themselves (AWAO, 2009) and it have important contribution in the primary health care system of local communities (Sibhatu Gebrehiwot et al, 2019), but enormous knowledge is still being lost before it is recognized and properly documented. Thus, the objective of the study was to document traditional medicinal practices and plants used.

MATERIALS AND METHODS

Description of the study area

Mille is one of 39 districts of the Afar region of Ethiopia which located in the administration Awsi rasu of Afar region. There are 12 kebelles in Mille district both in rural and urban areas. Mille bordered on the west by Chifra, on south Yangudi district, on east Logia and north Teru. Mille district far from the country capital city of Addis Ababa around 480 km.

The average temperature of the district is 23^0c - 44^0c throughout the year in the district. The climatic condition of the district is characterized by arid and semi-arid with low and short

rain fall pattern. The rain fall is bi-modal throughout the year with mean annual rain fall ranges bellow 200 mm. This indicates the district is highly prone area to concurrent drought. Based on the statistics report, Mille district has estimated total population of 92,778 out of this 50, 996 are males and 41, 782 are females (CSA, 2008).

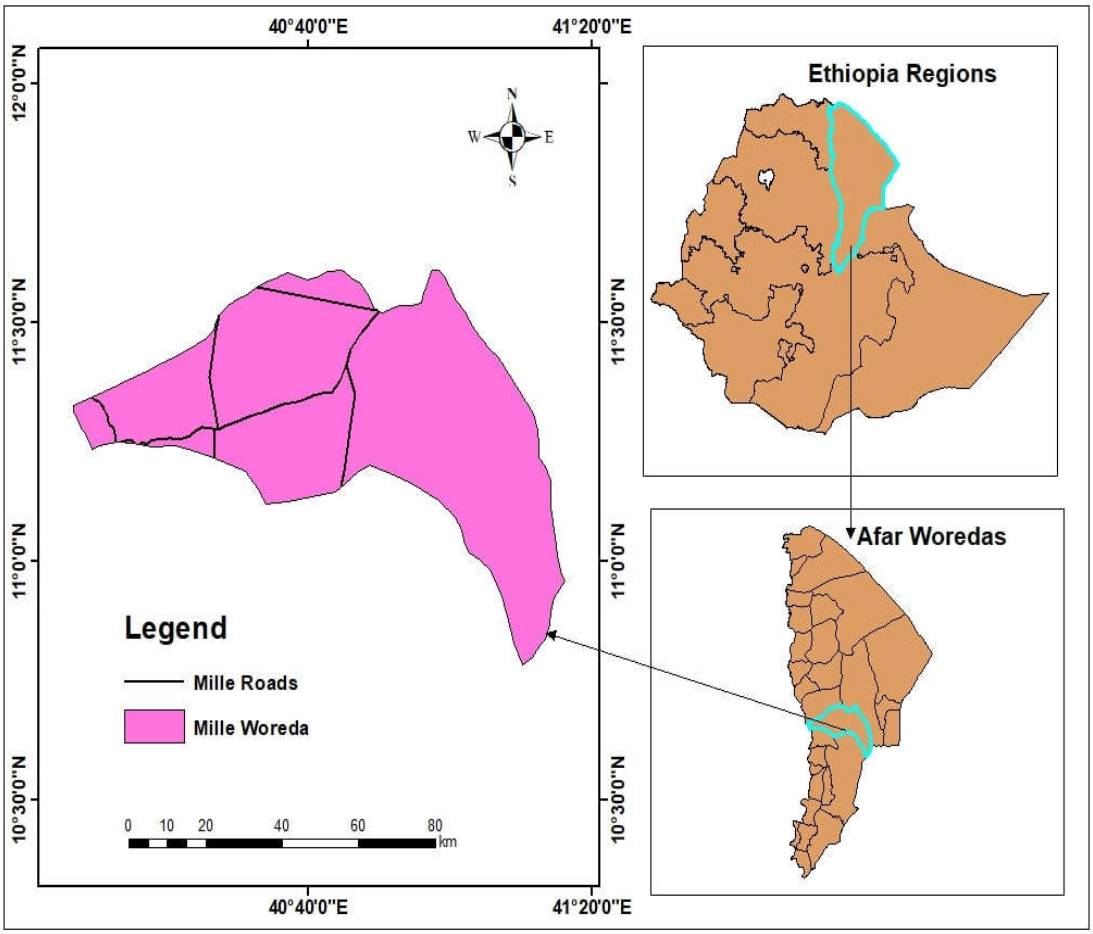


Fig. 1: Map of the study area

Survey and site selection

Primarily, permission was obtained from Mille administration. Following this, survey and site selection were accomplished. A total of 4 kebelles located at varying distance from the main center namely 01 kebelle, Harsis, Bekedar and Hantimegatan were selected.

Selection of informants

Informants age of 18 and above were involved in the study. The identification was employed with the help of Mille administration. Finally, 30 informants were selected in which 90 % male and 10 % female.

Data collection techniques and data type

Both primary and secondary data are used. The secondary data was collected from published and unpublished material and documented. Primary data was collected using semi-structured interview, focus group discussion. The interview was list of question prepare in English and translate to local language (Afar af).The traditional healers were asked to provide information on plant used against any kind of illness in human and particular plant type and part used, method of preparation and routes of administration. The age range of the informants was between 18-80 and both male and female were participated. Interview was conducted with 30 informants in Afar af language. Focus group discussion was employed with 5 key informants whom selected based on their knowledge and use of medicinal plant. The fidelity level and ranking of each claimed medicinal plant was accomplished based on these informants.

Data analysis

The data were transferred in to Microsoft excel and summarized. Preference ranking Matrix ranking was employed to rank up medicinal plant with various ethnobotanical roles. The fidelity level also been employed to rate the comparative curative capacity of the plant and it was calculated by applying the following formula.

$$\mathbf{FL = [SF/TF] * 100}$$

Where: SF refers to frequency of citation for specific aliment.TF – refers to total number of citation of that species.

Relative importance (RI) of the medicinal plants was calculated.

$$\mathbf{RI = NBS + NPP}$$

Where: RI = relative importance, NBS = number of body systems and NPP = number of pharmacological properties. NBS is obtained by dividing the number of properties (reported specific ailments) attributed to a species divided by the total number of properties attributed to the most versatile species. NPP is the number of body system treated by a given species divided by the total number of body systems treated by the most versatile species. Species with RI value of 2.0 (the highest possible value) are the ones with the highest diversity of medicinal application.

RESULTS

Medicinal plants reported

A total of 21 medicinal plants of different growth habit used to treat human ailments were documented (Table 1, appendix I) of these 52.4% of trees, 38.1% tree, 4.75% climber and 4.75% of herbs. Most of the claimed plants are trees.

Table 1. Medicinal plants growth habits

S. No.	Growth habit	Frequency	Percentage
1	Tree	11	52.4%
2	Shrub	9	38.1%
3	Climber	1	4.75
4	Herb	1	4.75%
	Total	21	100%

Plant parts commonly used to treat human health problems include- leave, root, steam and all plant parts (Table 2). The preparation of traditional healers used plant leaves (41.6%), root (33.4%), steam (8.4%) and all plants parts (16.6%) to prepare medicines. The leaf part of the plants was frequently used part. There are some plants in which two plant parts used for medicine preparation and this why the total is 24.

Table 2. Parts of plant used to prepare the medicine

S. No	Parts of plant	Frequency	Percentage
1	Leaf	10	41.6%
2	Root	8	33.4%
3	Stem	2	8.4%
4	All plant part	4	16.6%
Total		24	100

Mode of preparation

Traditional medicinal plants was prepared in various ways by different traditional knowledgeable local healers in the area were vary as the type of disease.

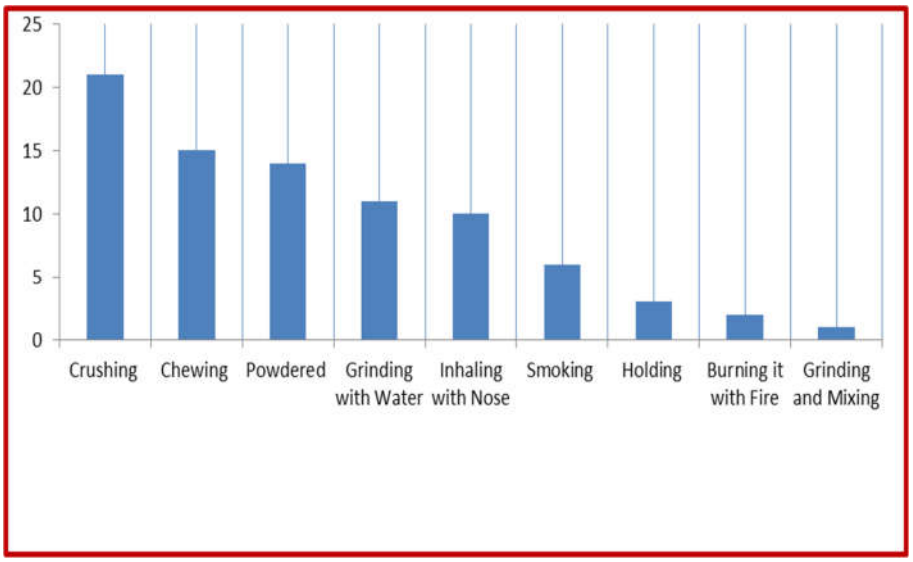


Fig. 2: Mode of Preparation

Fidelity level

Table 3. Fidelity level of the medicinal plants

S.No.	Medicinal plant species	Number of diseases	Rank
1	*Moringa oleifera*	4	2nd
2	*Aloe* spp.	5	1st
3	*Senna alexandrina*	3	3rd
4	*Balanites rotundifolia*	2	4th
5	*Acacia nubica*	2	4th

In the above table-3 result of fidelity level for five medicinal plants to treat human illness shoes that *Aloe* species. high number of treating was ranked 1st and *Acacia nubica* with low number treating was list as last/4th rank.

Route of administration

Table 4. Route of administration of the medicinal plants

S.No.	Routes	Frequency	Percentage
1	Oral	15	62.5%
2	Dermal (skin)	4	16.67%
3	Nasal (inhaling in nose)	4	16.67%
4	Other	1	4.16%
	Total	24	100%

Traditional knowledge transfer

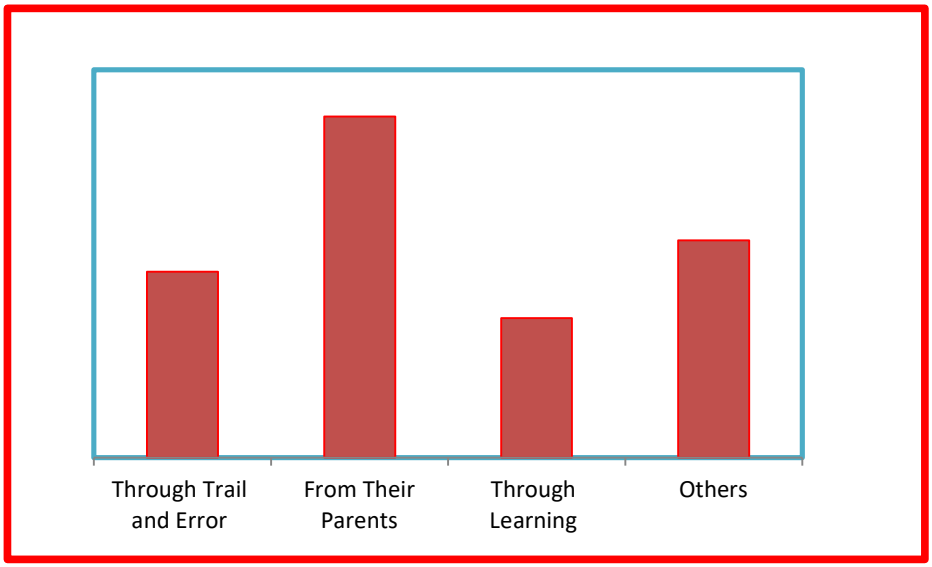


Fig.3. Traditional knowledge transfer

Dosage measuring instruments

The local healers used traditional devices to measured dosage and amount of medicines. The dosage measured by the local healers mostly used by local materials using in different age restriction. The dose was measured in various ways using coffee and tea cup for drink for children and for oldest by water cup and powdered material are measured by hand and spoon.

DISCUSSION

The current study identified 21 medicinal plants that have been used by the local people of Mille district, Afar, Ethiopia. The growth habits of medicinal plants are shrubs and trees. The fresh plant part were claimed the most curable. The leaf and root are widely used parts respectively (Kflay Gebrehiwot and Mohammed Shumbahri, 2015). Previous studies employed in different parts of Ethiopia showed leaf is widely and frequently used plant part (Mirutse Giday et al, 2003). This is in line with the current study and this phenomenon may decrease the destruction of medicinal plants (e.g. tree and shrub). The fidelity level reveals that crushing and chewing were the most frequently used methods of preparation. The highest rank or fidelity level (FL) was given to 5 (five) medicinal plants based on their highest level of value. Accordingly, *Aloe* (Uurayta) shows with highest medicinal value in terms of number of diseases treated (Trotter and Logan, (1986). The knowledge transfer of traditional knowledge from generation to generation in the study area is paramount important to

document the knowledge and further for pharmacological production. The most common indigenous knowledge transfer mechanism of this study revealed that, they obtained from their parents and higher numbers of medicinal plants were reported by informants among 25-30 age groups. This result confirmed that the traditional knowledge declined from elder to younger age group and this is in line with Mirutse Giday et al, (2003), in which 90 % of the elder above 40 year possessed with enough knowledge in medicinal plants. The dosage handling mechanisms of the healer is very impressive. The dosage could vary in relation to type of alignment, client and it ranges from a droplet up to liters but taking highest dose can be toxic (Giday and Teklehaymanot, 2013).

CONCLUSION

The ethnobotanical study of medicinal plants in Mille district was aimed to help local people to take care of their health problems. The wisdom of local community in using plants for medication is continuing from generation to generation. The leaf part was widely used. Thus, they are equipped with how to use without affecting the plant survival. This has to be recognized and documented in proper manner and applies it for different purposes. Finally the investigator recommended the following;

- The knowledge of traditional medicine is not fully explored. Thus further study is required.
- Studying current status of claimed plants is important for further intervention.
- The connection of professional health expert and traditional healer is important for efficacy and clinical trial studies.
- Establishing institutions for indigenous knowledge collection, research and utilization.

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Appendix I. Medicinal plant species composition

Local name	Scientific name	Family name	Growth habit	Plant part	Disease treated	Preparation	Route of application	Dose
Olayto	*Aerva javanica* (Burm.f.) Juss ex Schullt	*Amaranthaceae*	Shrub	All part	Snake disease and wound	Chewing, hold	Oral	Small amount of the plant parts
Uureyta	*Aloe* species	*Aloaceae*	Shrub	Root	Vomiting, Diarrhea, Eye, Fever Abdominal pain	Crushing and mix with water for a few minute then drink	Oral	One coffee cup
Ayrowagit	*Senna italica Mill.*	*Fabaceae*	Tree	Root Leave Leave	Abdominal pain Headache Wound	Chewing and mix water and drink Crushing and mix with water and inhaling in nose Powdered and put in wound	Oral	One cup of coffee
Halbona	*Euphorbia actinoclada Carter*	*Euphorbiaceae*	Climber	Root	Influenza Malaria	Chewing	Oral	One a cup of coffee
Shiferaw	*Moringa oleifera*		Tree	Leave	Influenza Fever Hyper tension	Grinding and mix with boil water then drink	Oral	One a cup of coffee
Gini kusra	Ziziphus mucronata	*Rhamnaceae*	Tree	Root	Headache, skin infection Goiter	Grinding and mix with water then drink	Oral	One a cup of coffee
Bunaytu	*Coffea arabica*	*Rubiaceae*	Tree	Leave	Abdominal pain	Crushing and mix with water then boil and drink	Oral	Tea cup
Leeh amo hara	*Kanahia laniflora* (Forssk.) R.Br.	*Ascepiadaceae*	Shrub	Root	Headache	Mix with water inhale in nose	Nasal	
Kusra	*Ziziphus spinachristi*	*Rhamnaceae*	Tree	Leave	Skin infection	Powdered and smear in skin	Dermal	
Dat hara	*Prosopis juliflora*	*Fabaceae*	Tree	Leave	Wound, Inflammation	Powdered and put in wound then mix with water and drink	Oral	One a cup of coffee
Saaganto	*Tamarix aphylla* (L.) Karst	*Tamaricaceae*	Shrub	Leave	Abdomen pain and Tuberculosis	Chewing of leave	Oral	
Uddayto	*Balanities ejeptica*	*Balanitaceae*	Tree	Leave	Wound,	Crushed leave in water both a	Other	

					Inflammation	few hours and wash as shower		
Galaqto	*Calotropis procerra* (Ait) f.	*Ascelepiadacea*	Shrub	Root	Cough, Common cold, Head ache	Crushed the roots and mix with water for few minutes then drinks	Oral	
Alayto	*Balanites rotundifolia* (van Tieghem) Blatter	*Balanitaceae*	Shrub	Leave	Abdomen pain Malaria	Powdering and mix with water and tea then drink	Oral	One a cup of coffee
Uddayto	*Balanites aegyptiaca* (L.) Del.	*Balanitaceae*	Tree	Roots	Diarrhea	Crushing and mix with water and shaking then drink	Oral	
Dammaho			Tree	Roots	Abdominal pain	The powdered root and mix with honey is eaten	Oral	One spoon
Uddayto	*Acacia nubica*	*Fabaceae*	Shrubs	All part, Root	Children disease, Dental diseases	Boiling whole parts and decanted the solution to drink and washing body	Oral	
Adaylu	*Jatropha glauca*	*Euphorbiaceae*	Shrub	Steam	Mental problem	Burning in fire and in haling its smoke nasally	Nasal	
Hantiululus	*Solanum coagulans* Forssk.	*Solanaceae*	Herb	All part	Skin infection	Powdered and paint	Dermal	
Auriba'la	*Solanum somalense*	*Solanaceae*	Shrubs	Root	Mental problem	Burning in fire and inhaling its smoke.	Nasal	
Elcayto	*Boswellia neglecta*	*Burseraceae*	Small tree	Gum	Evil eye	Burning it inhaling its smoke	Nasal and oral	
Datbarbare	*Schinus mole* L.	*Anacardiaceae*	Tree	All part	Dental diseases, Cough and lung diseases	Brushing teeth by the stem, boiling the leaf and fruit inhaling nasally	Oral and nasal	The amount is not limited