

Assessment of Medicinal Plants and Their Conservation Status in Case of Daligaw Kebela, Gozamen Werda, East Gojjam Zone

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Abstract

This study was conducted at Daligaw Kebela East Gojjam Zone to assess the medicinal plants and their conservational status. The data were collected through questionnaire, key informant interview, and observation. A total of 82 households were selected randomly from the total household. The key informants from the study area were selected purposively. The collected data were analyzed by using Microsoft excel and expressed by using descriptive statistical such as percentage, tables and bar graphs. In the study area a total of 38 medicinal plants were identified. About 55%, 2.63% and 42.11% were used for treatment of human ailments, Animals ailments and were used for both animal and human ailments respectively. Leaves (78%) followed by roots (40%) are the most frequently used plant parts for traditional medicine. However, the conservation status of some of those medicinal plants are nearly too endangered because of overexploitation, overgrazing, mainly due to over harvesting of their roots. Generally, the above-mentioned conservation challenges may be due to lack of awareness among local community and the concerned government and non-government bodies. So, appropriate intervention on awareness creation and parallel conservation works should be facilitated as far as the issue of medicinal plants sustainability is concern.

Keywords: Medicinal plant; Conservation; Treatment

Introduction

Plants are great source of medicines especially in traditional medicine, which are useful in the treatment of various diseases [1]. Traditional medicine has not only played a vital role in proving healing but has also contributed to the discovery of most pharmaceutically active substances in plants [2] which have been used in the commercial production of drugs it has been estimated that, up to 90% of the population in developing countries rely on the use of medicinal plants to meet their primary healthcare needs [3].

According to Schippmann et al. [4] more than 50,000 plant species are used for medicinal purposes world wide of which almost 13% are flowering plants, containing active chemical constituents (alkaloid, glycoside, saponin, essential oil, bitter principle tannins and mucilages) in its parts for example root, stem, leaves, bark, fruit and seeds which produces definite curing physiological response in the treatment of various ailments in humans and other animals [5]. In different civilization the contribution of floral biodiversity to healthcare has been well documented [6]. Because of the accelerated local, national and international interest in recent years, the demand for medicinal and aromatic plants has increased manifolds and pharmaceutical industry view plants wealth as a source of income. Due to easy availability, no side effects and sometimes only source of health care, the demand for medicinal plants is increasing in both developing and developed countries.

Ethiopian traditional medicine is vastly complex and diverse and various greatly among different ethnic groups [7] under the rule of Menelik (1895-1913) western medicine become significantly more incorporated in to the Ethiopian medicinal system.

Ethiopia is the origin and center of diversity for many plant species. There are about 6500 species of plants in Ethiopia that makes the country is one of the most diverse floristic regions in the world [8]. Being the country has diverse climatic and demographic potential several of such indigenous and exotic species and essential oil bearing plants could grow in Ethiopia and provide remarkable benefits to the national economy. About 1000 identified medicinal plant species are reported in the Ethiopia flora; however, many others are not yet identified. About 300 of these species are frequently mentioned in many sources. In various written records of medicinal plants from central north and north eastern parts of Ethiopia are having small fractions of medicinal plants present in the country. But very recent study on the Bale Mountains National Park in there south east Ethiopia revealed that the area, as much as it is biodiversity hotspot [9]. Therefore, the study focuses to identify different medicinal plants in Dalgawi Kebele, Gozamen Woreda.

Materials and Methods

Study site

The study was conducted in Daligaw (04) Kebele Debre Markos distinct and east Gojjam zone located in Amhara Region of Ethiopia. It is far from 3km from Debre Markos town in south west direction. The study area was geographically located at 10017' north latitude and 370 45' East longitudes with an altitudinal range 2450m-2520m above sea level. The mean annual rain fall was ranges from 1300-138 mm and the mean annual temperature is 18.50c with mean annual maximum and minimum temperature of 22oc and 15oc respectively.

Methods

Data for the study was collected from both primary and secondary source of data. The primary data sources were used field visit, key informant interview and structured questionnaires. Where the secondary data was collected from books, journals, and different unpublished materials were used. In the study area from 461 total households 82 sampled households was selected by using simple random sampling strategy. The sample size was determined by using the formula of Yamane 1967 [10].

$$n = \frac{N}{1 + N(e)^2}$$

Where as

N=Total Household of the study area

n=the desired sample size

e=acceptance level of error (10%)

Therefore, the sample size will be determined from this equation

$$n = \frac{461}{1 + 461(0.1)^2} = 82$$

In the study area key informants was selected by using purposive sampling techniques. The key informants were included people who are long lived, have knowledge about medicinal plants, herbalists. The collected data was analyzed by using Microsoft excel tool and expressed in percentage, frequency and interpreted by using tables, graphs and figure.

Results

Demography

The majority of respondents were in the age between (15-25) age group which about 34.1%, the age between (26-35) age group which about 23.2%, the age between (36-45) age group which about 18.3%, the age between (46-55) age group which about 9.8% while the age between (56-65) age group which about 6.1% and above 65 were 8.5%. Households accounted for 37% are illiteracy people. Most of the household heads are married (57.3%), single (37.8%) and divorced (4.9%). More over 92.7% of households are Christian and the rest are Muslim (7.3%).

Diversity of medicinal plants

During the study time 38 medicinal plants were identified which belongs to 33 families. Among the identified medicinal plant species, 21 species (55.26%) were used for treatment of human ailments, only 1 species (2.63%) was used for the treatments of Animals ailments and 16 species (42.11%) were used for the treatment of both humans and animals.

In the Table 1, 38 listed medicinal plants, about 20 of those plants are also discovered by other researcher at different places as a medicinal plant [11]. Some of those plants are *Echinops Kebericho* (Kebricho), *Phytolacca dodecandra* (Endod), *Otostegia integrifolia* (Tunjut), *Hagenia abyssinica* (Kosso), *Allium sativum* (Nechshinkurt), *Croton macrostachyus* (Bisana), *Kalanchoe petitian* (Endawula), *Lepidium sativum*(Feto), *Cordia Africana* (wanza), *Rumex nervosus* (Empacho) etc. The remaining 18 medicinal plants were practiced on

the local community however not common in other study areas of the country.

S.No	Botanical name and family	Local name	Aliments treated	Parts used, method of preparation and routes of administration
1	<i>Rumex nervosus</i> Vahl. (Polygonaceae)	Embacho	Rheumatism	Crushed fresh leaf and mixed with Water and then left for some time, finally washing the body parts
2	<i>Plantago lanceolata</i> (Plantaginaceae)	Gorteb	Wound	Crushed fresh leaf pasted on the wound typically
3	<i>Otostegia integrifolia</i> (Benth,Lamiaceae)	Tinjut	Stomachache	Fresh leaf juice is given typically.
4	<i>Brucea antidysentrica</i> (Simaroubaceae)	Abalo	Wound	Crushed fresh leaf and applied on a wound mostly in child's head typically.
5	<i>Kalanchoe petitian</i> A. Rich., (Crassulaceae)	Endawula	Swelling	Fresh root should be deep into swelling part of the body by simple Surgical operation typically or heated the swelling part by heated fresh leaf typically.
6	<i>Croton acrostachyus</i> (Del.,Euphorbiaceae)	Bisana	Alrgic /A/guagot	Fresh leaf or shoot juice is applying on the inflammation body typically.
			Wound	Applied fresh leaf juice or shoot typically.
			Snake Bite	One cup of juice of fresh leaf is applying typically.
7	<i>Calpurnia aurea</i> (Fabaceae)	Digta	Liver	Fresh leaf boiled with water and applied with vapor typically.
			Stomach-ache	1/3 of cup fresh root juice is given orally.
			Ectoparasite	Fresh leaf juice is applied typically.
8	<i>Stephania abyssinica</i> (Menispermaceae)	Yeayithareg	Swelling	Heated by fresh leaf orally.
			Almazbalchira	Fresh leaf juice is applied typically.
9	<i>Cordia africana</i> (Boraginaceae)	Wanza	Ameba	Swallowing the yellowish (or matured) Wanza fruit after removing its skin, then the

				parasite binds with the fruit and removed with faces.				
10	<i>Datura stramonium</i> L. (Solanaceae)	Asteanagir	Dandruff	Fresh leaf juice is applied typically.				
11	<i>Phytolacca decandra</i> (L. herit, Phytolaceae)	Endod	Rabies	Fresh root or leaf juice is mixed with milk and given orally.				
			Swelling	Fresh leaf juice is given typically				
			Liver	Fresh root juice is given orally.				
12	<i>Premna schimperi</i> (Lamiaceae)	Chocho	Injured eye	Fresh leaf juice is applied typically.				
			Dandruff	Applied with fresh leaf juice typically.				
13	<i>Justicia schimperiana</i> (/ Hochst. Ex Nees/ T. Andrs, Acanthaceae)	Simiza	Liver	Fresh leaf is boiled in water and applied orally.				
			Rabies	Fresh leaf juice is given orally.				
			Stomachache	Fresh leaf or root juice is given orally.				
			Foot fungi	Fresh leaf juice is applied Typically.				
14	<i>Crinum abyssinicum</i> (Amaryllidaceae)	Yejib Shinkurt	Rheumatism	Fresh bud juice is mixed with lemon juice and Applied typically.				
			Earache	Fresh root juice is applied typically.				
15	<i>Ficus species</i> (moraceae)	Shola	For diseased cow	Collecting the liquid obtained by crushing the shola tree and allow the cow to drink and produce more milk.				
16	<i>Allium sativum</i> (Alliaceae)	Nechshinkurt	Astma	Fresh bud crushed and mixed with honey and then given orally.				
			Rabies	Chewing bud continuously until curd, typically.				
			Common cold	Chewing bud or smelling typically.				
			Stomach-ache	Chewing bud or smelling typically.				
			Malaria	Dried bud powder or fresh grind bud mixed with Honey is given orally.				
17	<i>Clutia lanceolata</i> Forssk. (Euphorbiaceae)				Fiyefejeji	Forefor	Fresh leaf Juice is applied on the bold head typically.	
18	<i>Rumex abyssinicus</i> Jacq. (Polygonaceae)				Mekimeko	Malaria	Dried root powder boiled with butter and then given to orally.	
						Stomach ache	Fresh grind root or dried powder boiled with honey or sugar and then given orally.	
19	<i>Echinops kebericho</i> (Assteraceae)				Kebricho	Evil eye	Dried root is applied to smoking orally.	
						Mitat	Dried root is smoking orally.	
20	<i>Silenem acrosolen</i> (Caryophyllaceae)				Wogert	Snake away from	Dried root smoking is applied typically.	
						Evil eye	Smoking dried root is applied orally.	
21	<i>Thymus schimperi</i> (Phytolaccaceae)				Tosgn	Asthma	Fresh or dried leaf is boiled in water and given to drink orally.	
22	<i>Hagenia abyssinica</i> (Bruce) J.F. Gmel Rosaceae				Kosso	Tapeworm	½ cup of dried fruit powder is given orally.	
						Bone fracture	Pasted by the fresh leaf, typically.	
23	<i>Zehneria scabra</i> (Cucurbitaceae)				Aregresa	Mitat	Fresh leaf boiled in water and applied the vapor typically, or after boiled the liquid with sugar is applied orally.	
24	<i>Ruta chalepensis</i> L. (Rutaceae)				Tenadam	Evil eye	Fresh leaf is given to smell in the addition of Nechshinkurt and chikugn typically.	
25	<i>Dodoniaea angusifolia</i> (Sapindaceae)				Kitkita	Stomach ache	Fresh leaf Juice is given to drink orally.	
						Bone fracture	Fresh leaf is applied to paste the body part typically.	
26	<i>Rhamnus prinoides</i> L. (Rhamnaceae)				Gescho	Liver	Fresh root is grinding and mixed with water and left for a few times and then given orally.	
						Stomach-ache	Fresh leaf Juice is given to typically.	
27	<i>Cucumis ficifolius</i> A.Rich. (Cucurbitaceae)				Yemidir Embuay	Stomach-ache	Fresh root Juice with water (1/3 Cup) is given typically.	
						Mekan women	Fresh root Juice is given to orally..	

28	<i>Lepidium sativum</i> (Brassicaceae)	Feto	Wart	Dried root powder or grinding fresh root with fluid of Kulkual is applied typically.
29	<i>Opuntia vulgaris</i> (Cactaceae)	Kulkual	Mental	Some part of epiphytes is pasted on the hand typically.
			Wart	Its fluid with dried root powder or fresh grinding root is applied typically.
			Mitat	Dried stem is smoking is typically.
30	<i>Maringa stenopetala</i>	Shiferaw (Haleko)	Diarrhea	Direct eating of its fresh leave
			Diabetes	Drinking the tea prepared from its leave
			For skin disease	By mixing the grind fruit with water and apply on the damaged part.
			For teeth	Grind the fresh root and put on the affected teeth.
			For common cold	Boiling its flower in hot water for about 5 minutes and then drink.
31	<i>Feoniculum vulgare</i> Miller. (Apiaceae)	Ensillal	Cough	Fresh leaf soaked mixed with milk is given orally.
			Stomach-ache	Fresh fruit grinding mixed with food and given orally.
32	<i>Malva verticillata</i> (Malvaceae)	Lut (Adguar)	Stomach-ache	Fresh root of one lut grind and mixed with One glass of beer and given typically.
33	<i>Vernonia amygdaina</i>	Girawa	Fegnawugat	Fresh leaf juice is given typically.
34		Dama kassie	Dama kassie	Fresh leaf juice is given typically.
35		Enkoko	Enkoko	Fresh leaf boiled with water and applied orally.
36	<i>Coffe arabica</i>	Buna/coffee	Cough	Fresh leaf boiled with water and mixed with sugar is orally.
37	<i>Eculyptus spp.</i>	Nech bahirzaf	Comen cold	Fresh leaf boiled with water and mixed with sugarcane and orange is given orally.

38	<i>Zingiber officinale</i> (zingiberacea)	Zingible	Stomach ache	Fresh fruit is boiled in water or tea to given orally.
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Table 1: Some medicinal plants and their uses.

Plant parts used for the preparation of remedies

Of all the medicinal plants used in herbal practices, leaves were the most utilized plant parties (78.04%). They were followed by roots (40.24%), stem (13.41%), shoot (12.2%) and fruit (15.9%) (Figure 1).

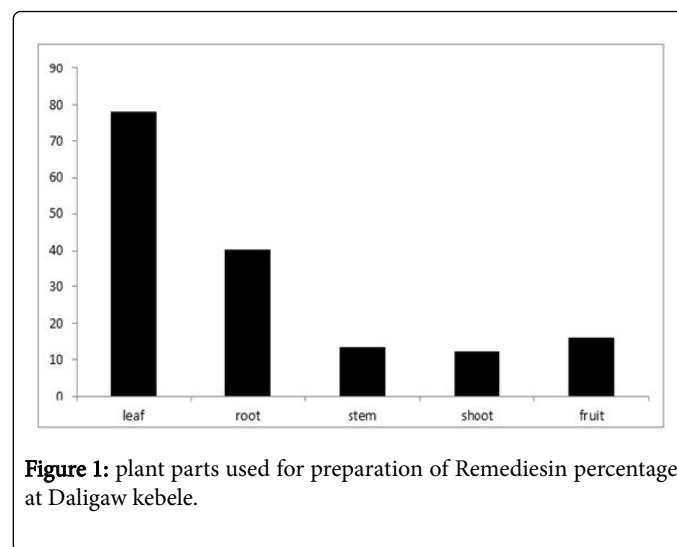


Figure 1: plant parts used for preparation of Remedies in percentage at Daligaw kebele.

The main reason of many traditional medicine practitioners used the leaf part for remedial preparation is due to its accessibility and to prevent the plant from extinction. According to Abiyu Enyew et al. [12] the leaf is easily renewable part of the plant and using plants for medicinal purpose may not affect the survivality of a plant and is not causes a serious challenge or stress factor for plants. Other researchers also proved that leaf is the major source of traditional medicine in many areas of Ethiopia [13].

Remedial preparation methods

The data indicated that most remedies preparation method is squeezing (50%) followed by grinding (18.29%) while chewing (9.76%), crushing (9.76%) and boiling (39.02%) were less frequently used methods (Figure 2).

Getaneh et al. [10] also found similar result at different study areas. The Authors showed that, squeezing is the most common remedies preparation method followed by crushing. However, unlike the present study, Ermiyas et al. [9] proves that, powdering and crushing methods are the most common remedies preparation than squeezing. So, all these all indicates that method of remedial preparation for the traditional medicinal plants are not common throughout the country.

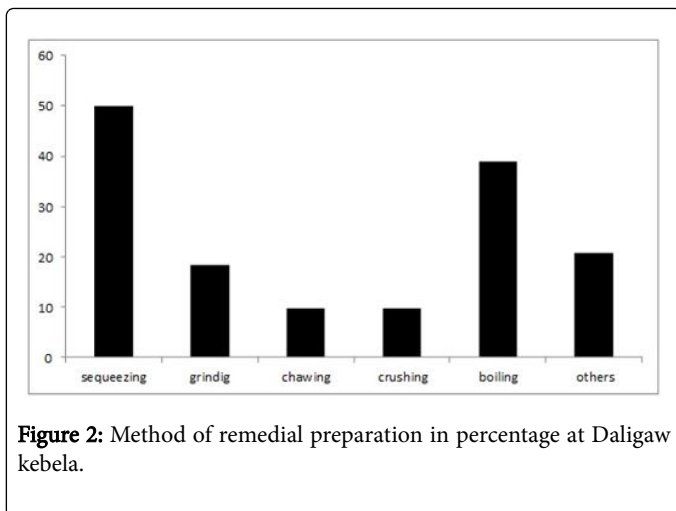


Figure 2: Method of remedial preparation in percentage at Daligaw kebela.

Routes of remedies administration

The result indicated below on the bar graph showed that oral (65.85%) and dermal (48.78%) were frequently used administration methods while others (17.07%) were less frequently used administration methods (Figure 3).

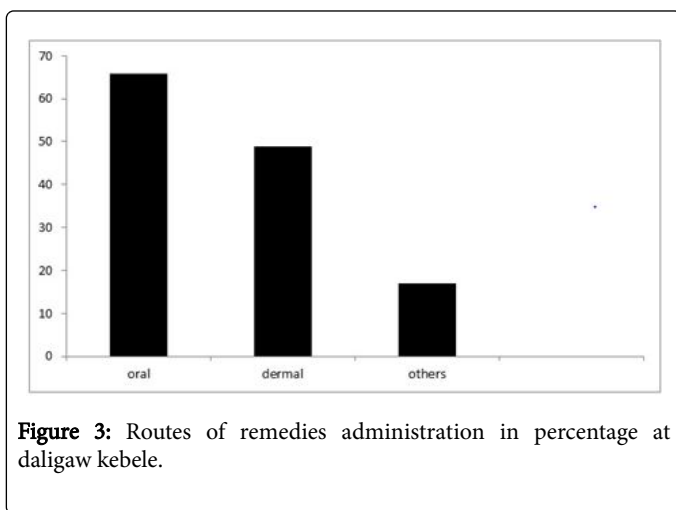


Figure 3: Routes of remedies administration in percentage at daligaw kebele.

Similar to the present study, Getaneh et al. [10] was found that, oral is the most common remedies administration method. The authors also point out that, based on the nature of the disease and to improve the quality of ethno-medicine and acceptability by patients the remedies was mixed with water, tea, milk or honey and administered as a form of drink, the finding is partially similar with the present study. Among the above 38 medicinal plants, 6 species (15.78%) were herbs followed by 22 species (57.9%) shrubs and 11species (28.9%) trees.

Conservation status of traditional medicinal plants

According to the data collected, the availability and accessibility of most medicinal plants in the study area is easily. Of the total 38 medicinal plants only 25 (65.79%) were widely distributed and easily available but 13 (34.21%) plants from the total of 38 were difficultly distributed in the given area of study. Traditional practitioners were

collecting 11 (28.95%) of medicinal plants from home gardens and 27(71.05%) of medicinal plants from the natural habitats.

In addition, some medicinal plants like *Echinops Kebericho* (Kebericho), *Silenema crosolen* (Wogert), *Feoniculum vulgare* (Ensilla), *Ruta chalepensis*(Tenadam), *Rhamnus prinoides* (Gesho), *Allium sativum* (Nech shinkurt), *zingiber officinale* (Zingible) and *Otostegia integrifolia* (Tinjut) were also collected from the local market.

Conclusion

For the medicinal plant investigation 38 plant species were identified that belongs to general human and domestic animal families [14]. The wild areas were the most sources of the medicinal plants than home gardens. This study disclosed the existence of about 38 medicinal plants in the area. The study also discovered that the conservation status of some of those medicinal plants such as Kebericho, Wogert, Yejib-Shinkurt etc. Were nearly too extinct because of over exploitation, overgrazing and urbanization. In addition, the study disclosed that some of these plants such as Lut, Endod, Gorteb, Aregresa, nechebahir zaf, damakassie were widely distributed in the area of study. In the study area, common preparation methods of remedies were extracting juice by squeezing followed by grinding [15]. On the other hand, remedies were administered mostly through oral followed by dermal application, based on the nature of diseases.

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