



Traditional Use of Medicinal Plants By the Ethnic Groups of Gondar Zuria District, North-western Ethiopia

Zewdu Birhanu*

Department of Pharmacognosy, School of Pharmacy, PO Box 196, University of Gondar, Ethiopia

Abstract

The aim of the study was to document information on medicinal plants and to describe the traditional health care practices of Gondar Zuria district, North-west Ethiopia. Field trip was made in each village of the district to collect ethnomedicinal information from the traditional healers by using semi-structured questionnaire and field observation. Forty-two plant species representing forty-one genera and thirty-one families were encountered during the study. Results of the study were analysed using two quantitative tools: informant consensus factor for the analysis of general use of medicinal plants and fidelity level for calculating the most frequently occurring diseases for the categories with the highest informant consensus factor. The result of the informant consensus factor showed that the general health category had the greatest agreement followed by the respiratory, malarial, and gastrointestinal categories. The present study has documented curious ethno medicinal facts on the plant therapies currently utilised in Gondar Zuria district. Evaluation of the pharmacological activity for the promising medicinal plant is suggested.

Key words: Medicinal plants, traditional healers, Gondar Zuria district, Ethiopia

1. Introduction

It is estimated that about 25% of all modern medicines are directly or indirectly derived from higher plants. Led by instinct, taste, and experience, primitive men and women treated illness by using plants, animal parts, and minerals that were not part of their usual diet. Indeed, well in to the twentieth century, much of the pharmacopoeia of scientific medicine was derived from the herbal lore of native people^[1].

In Ethiopia, 70% of human and 90% of livestock population depend on traditional medicine; Ethiopian plants have shown very effective medicinal value for some ailments of both human and domestic animals, thus medicinal plants and knowledge of their use

provide a vital contribution to human and livestock health care needs in the country. There are 6,500 species of higher plants in Ethiopia, making the country one of the most diverse floristic regions in the world. Ethiopian traditional life is painted with the hallmark of widespread use of medicinal plants with various levels of sophistication within the indigenous medicinal lore, and the vast knowledge on traditional use of medicinal plants is not fully documented; most of the knowledge is conveyed from generation to generation through word of mouth. Like many other Ethiopians, people in Gondar Zuria district use plants for their primary healthcare. As is happening elsewhere in Ethiopia, the traditional knowledge as well as the plants used by these people is under threat mainly due to deforestation, degradation,

*Corresponding author:

E-mail: zbirhanu@gmail.com, zbirhanu@yahoo.com, zbirhanu@uog.edu.et

and cultural shift^[2-7]. With this background, a survey was conducted to document the indigenous knowledge of traditional healers in Gondar Zuria district.

2. Ethnography

Gondar Zuria is one of the districts in north Gondar administration zone of Amhara regional state in North-western Ethiopia. Gondar Zuria is bordered on the south by the Debub Gondar zone, on the south-west by Lake Tana, on the west by Dmbia, on the north by Lay Armachiho, on the north-east by Wogera, and on the south-east by Mirab Belessa. The district has a total population of 1,91,394 of whom 97,388 are men and 94,006 women, and 18,377 or 9.60% are urban inhabitants. With an area of 1,108.53 square kilometres, with a population density of 172.66 which is greater than the zone average of 63.76 persons per square kilometre. The majority of the inhabitants practised Ethiopian Orthodox Christianity (94.8%) and the rest being Muslim (5.2%). The capital city of the district is Makiseget situated at 40 kilometres from Gondar, the capital city of North Gondar administrative zone in Amhara regional state of Ethiopia. The district has an altitude range of 1,740 to 2,080 metres above sea level. The major part of the district is rounded by hills and gentle slopes and partially surrounded by higher elevation. The official language of the district is Amharic, the official language of the country. The district receives bimodal rainfall, with the short rains from March to May and the long rains from June to September. However, most of the rainfall is received during the months of July and August^[8,9].

3. Methodology

3.1 Data Collection Process

Survey on medicinal plants was conducted from 21 September 2011 to 23 February 2012 to collect ethnomedicinal information from traditional healers by using semi-structured questionnaire^[12]. In each village, the local community leaders and all the informants were informed about the purpose of the survey, and each informant participated in the study with his own full consent. The questionnaire was administered only to people who had knowledge of medicinal plants. During

the interviews, demographic characteristics of the participants and local names, used parts, and preparation methods of each medicinal plant were recorded. In addition, the participants were asked to show the researcher these medicinal plants, and specimen of these plants were pressed in the field and prepared for identification. During the course of the study, each informant was visited three times in order to verify the reliability of data obtained. If what was said during the first visit concerning the use of a particular medicinal plant by an informant did not agree with what was said during the second or third visit, the information was considered unreliable and was rejected. Repeated visits also helped to gather additional information that was not mentioned during earlier interviews. The interview and discussions were conducted in Amharic. The plant specimens implicated were identified and stored in the department of pharmacognosy. Vernacular names for each medicinal plant were given in Amharic. The relative popularity of each medicinal plant species was evaluated based on the proportion of informants who independently reported its medicinal use (informant consensus) in the area. For each species, the proportion of informants who independently reported its use against a particular disease/disease category was also assessed following^[10,11].

3.2 Quantitative Ethnobotany

F_{IC} (informant consensus factor) was used for the analysis of general use of medicinal plants; the illnesses were classified into broad categories as follows: respiratory (asthma, common cold, cough, tonsillitis), gastrointestinal (amebiasis, ascariasis, tapeworm and other intestinal parasites, diarrhoea, PUD, gastritis, colic and cramp in GIT, stomachache), reproductive (impotence, abortion, gonorrhoea, oxytocic), dermatological (wound, skin problem (chirt), wart, dandruff, tick and lice), cardiovascular (hypertension, oedema, bleeding), general health (general well-being, condiment, nutritive, tissue builder), pain (headache, fracture, arthritis, fever, inflammation), anti-venom (snakebite), malaria, rabies, diabetes mellitus, cancer, and evil eye.

The F_{IC} was calculated as the number of use citations in each category (nur) minus the number of species

used (nt) and divided by number of use citations in each category minus one^[11]. Therefore, $F_{IC} = \text{nur} - \text{nt} / \text{nur} - 1$.

The fidelity level (FL), which is the ratio between the number of informants who independently suggested the use of a species for the same major purpose and the total number of informants who mentioned the plant for any use, was calculated for the most frequently occurring diseases or ailments for the categories with the highest F_{IC} .

$$FL (\%) = N_p / N \times 100$$

Here, N_p is the number of informants that claimed a use of a plant species to treat a particular disease and N is the number of informants that used the plant as a medicine to treat any given disease^[12].

These two tools helped to determine illness categories with higher representation (using F_{IC}) and the plants with major fidelity (using the FL).

4. Result and Discussion

The present study has documented forty-two medicinal plant species representing forty-one genera and thirty-one families that are frequently employed in the healthcare delivery system of the people of Gondar Zuria district, North Gondar administrative zone, north-western Ethiopia.

The plants with the highest number of uses mentioned for any disease were general health (sixty-nine), respiratory (fifty-one), and gastrointestinal (twenty-eight). The complete data are presented in Table 1.

4.1 Factor Informant Consensus and Fidelity Level

The result of the F_{IC} showed that the general health category had the greatest agreement with an F_{IC} of 0.91 followed by respiratory disorders (0.88), malaria (0.8), and gastrointestinal (0.63). Within the general health category, the main reported use of plants was condiment (seventy reports); the main reported ailment in the respiratory disorders was febrile conditions and runny nose (twenty-one reports). Similarly, within the gastrointestinal category, there were eight reports of colic and each seven reports of ascaris and tapeworm.

The most important species according to fidelity were *Coriandrum sativum* (fifteen mentions), *Capsicum*

annum (eleven mentions), *Withania somnifera* (seven mentions), and *Triticum aestivum* (three mentions) (FL=100 each) for the general health category. *Zehneria scabra*, *Eucalyptus globules*, *Rhamnus prinoides*, and *Citrus limon* (FL=100 each) for the respiratory category.

The most important species in the gastrointestinal category were *Hagenia abyssinica*, *Bersama abyssinica*, and *Cucurbita pepo* (FL=100 each). *Datura stramonium* and *Catha edulis* were the most important species for the dermatological and reproductive categories, respectively (FL=100 each).

4.2 Correlation between Number of Uses Mentioned and Fidelity Level

The categories of plants with the higher number of uses mentioned (for one purpose) were correlated with their fidelity level (Table 1). The plants with higher number of uses mentioned for all categories were *Zehneria scabra* (twenty-one mentions) for febrile conditions and runny nose for the respiratory category, *Hagenia abyssinica* (four reports) for the gastrointestinal category, *Datura stramonium* (seven reports) for the dermatological category, *Catha edulis* (three reports) for the reproductive category, *Buddleja polystachya* (five reports), *Guizota abyssinica* (two reports), *Rumex nervosus* (three reports) for malaria, rabies, and cardiovascular categories, respectively. *Capparis tomentosa* for impotence, *Carissa spinarum* for snakebite, *Cucumis ficifolius* for arthritis, *Maytenus senegalensis* for cancer, *Nigella sativa* for colic in GIT, *Osyris abyssinica* for wart, *Phytolacca dodecandra* for abortion, and *Taverniera abyssinica* for stomachache were mentioned once that is considered low fidelity.

5. Conclusion

The present study has documented curious ethnomedicinal facts on the plant therapies currently utilised in Gondar Zuria district. Some of these medicinal plants are also widely used elsewhere in the country for their medicinal value (some of them even for the same medicinal purpose). The wide use of these medicinal plants, other than Gondar Zuria district, could be attributed to their effectiveness in their medicinal use. Evaluation of pharmacological activity for the promising medicinal plants is suggested.

Table 1: Medicinal plant species with their Amharic vernacular names, plant parts used, and ailments treated by traditional healers in Gondar Zuria district

Plant name Voucher specimen code Used part	Mode of preparation (application)	Ailment treated/use, (No. of uses mentioned and FL)
<i>Adhathoda schimperiana</i> Hochst.ex. (Acanthaceae), Wild, Sensel, ZE16, L	Powder (topical)	Wound healing (1, 50) Dandruff (1, 50)
<i>Allium sativum</i> L. (Alliaceae), Cultivated, Nech shinkurt, ZE20, B	Chewing fresh bulb after removing external scales The bulb devoid of external scales is crushed and mixed with honey and taken in empty stomach to treat malaria and	Hypertension (1, 3.8) General well-being (3, 11.5) Asthma (10, 38.5) Condliment (11, 42.3) Malaria (1, 3.8) asthmatic conditions
<i>Bersama abyssinica</i> Fresen. (Melianthaceae), Wild, Azamir, ZE17, L	Fresh leaf past taken in empty stomach	Ascariasis (3, 100)
<i>Buddleja polystachya</i> Fresen. (Loganiaceae), Wild, Amfar, ZE4, L	Juice in empty stomach	Malaria (5, 100)
<i>Calpurnia aurea</i> (Alt.) Benth. (Fabaceae), Wild, Zigitta, ZE23, R, L	Root chewed, menstruum swallowed Leaf decoction topically applied to animal	Amoeba (1, 50) Ticks and lice (1, 50)
<i>Capparis tomentosa</i> Lam. (Capparaceae), Wild, Gimero, ZE24, R	Powder paste with butter applied on the penis (glans)	Male impotence (1, 100)
<i>Capsicum annuum</i> L. (Solanaceae), Cultivated, Berberie, ZE35, F	Powder	Condiment (11, 100)
<i>Carica papaya</i> L. (Caricaceae), Cultivated, Papaya, ZE29, S	Powder made to paste followed by sweetening with honey	Ascaris (1, 50) Abortion (1, 50)
<i>Carissa spinarum</i> L. (Apocynaceae), Wild, Agam, ZE27, L	Applied topically on affected area	Snakebite (1, 100)
<i>Catha edulis</i> (Vahl) Forsk. (Celastraceae), Cultivated, Chat, ZE36, L	Decoction	Male impotence (3, 100)

Table 1 contd.

Table 1 contd.

<i>Citrus limon</i> (L.) Burm. f. (Rutaceae), Cultivated, Lomei, ZE37, J	Juice (fruit)	Common cold (3, 100)
<i>Coffea Arabica</i> L. (Rubiaceae) Cultivated, Bunna, ZE38, S	Roasted powder topically Roasted powder with honey in empty stomach	Wound healing (2, 40) Diarrhea (3, 60)
<i>Coriandrum sativum</i> L. (Apiaceae), Cultivated, Dinbilal, ZE39, F	Powder	Condiment (15, 100)
<i>Croton macrostachyus</i> Hochst. (Euphorbiaceae), Wild, Missana, ZE25, L, B, S	Stem and bark chipped and boiled with water, cooled, and filtrate poured on the head for migraine headache Leaf juice topically for skin fungal infection (chirt)	Migraine headache (1, 25) Skin problem/chirt (3, 75)
<i>Cucumis ficifolius</i> A. Rich (Cucurbitaceae), wild Yemidir embuay, ZE3, R	Root paste topically applied over the affected area	Arthritis (1, 100)
<i>Cucurbita pepo</i> L. (Cucurbitaceae), Cultivated, Duba, ZE2, S	Decoction in empty stomach	Tapeworm and ascaris (3, 100)
<i>Datura stramonium</i> L. Astenagir, ZE32, L	Leaf juice applied topically	Fungal infection (Solanaceae), Wild, of the head (7, 100)
<i>Dodonaea angustifolia</i> (L.f.) (Sapindaceae) Kitkita, Wild, ZE8, L	Fresh leaves Decoction Smoke	Fracture (1, 33.3) Gonorrhea (1, 33.3) Antiseptic (1, 33.3)
<i>Eucalyptus globules</i> Labill. Cultivated Nechbahirzaf, ZE18, L	Fresh leaves boiled in water and steam inhaled	Respiratory problems (Myrtaceae), including common cold (1, 1, 100)
<i>Euphorbia tirucalli</i> L. (Euphorbiaceae), Wild, Kinchib, ZE12, Milky Sap	Sap locally applied on the affected area	Wound healing (4, 100)
<i>Guizota abyssinica</i> (L.f.) Cass. (Asteraceae), Cultivated Nug, ZE13, S	Oil (in empty stomach) preventive soon after bitten by a mad dog (within seven days)	Cough (1, 33.3) Rabies (2, 66.6)
<i>Hagenia abyssinica</i> Willd. (Rosaceae), Wild, Kosso,	Dried seed powder mixed with water and taken	Tapeworm (4, 100) orally in empty stomach

Table 1 contd.

Table 1 contd.

<i>Kalanchoe lanceolata</i> (Forssk.) Pers. (Crassulaceae), Wild, Endahula, ZE40, L	Fresh leaf moderately heated and applied topically on the injured part	Edema (1, 50) Inflammation (1, 50)
<i>Linum usitatissimum</i> L. (Linaceae), Cultivated, Telba, ZE31, S	Moderately roasted and boiled in water and cooled, then gelatinous mass taken in empty stomach	PUD and Gastritis (2, 50) Amoeba (1, 25) Oxytotic (to aid delivery) (1, 25)
<i>Lupinus albus</i> Linn. (Fabaceae), Cultivated, Gibito, ZE30, S	Seeds infused in H2O and filtrate is taken orally	Hypertension (2, 100)
<i>Maytenus senegalensis</i> (Lam.) Exell (Celastraceae), Wild, Atat, ZE9, L	Paste	Cancer (1, 100)
<i>Myrtus communis</i> L. (Myrtaceae), Wild, Ades, ZE15, L	Dried leaf powder with butter (paste)	Dandruff (2, 100)
<i>Nigella sativa</i> L. (Ranunculaceae),Cultivated Tikurazmud, ZE7, S	Boiled with water or mixed with honey and taken in empty stomach	Colic in GIT (1,100)
<i>Osyris abyssinica</i> Hochst. Ex A.Rich (Santalaceae), Wild, Qeret,	Ripe fruit juice topically applied on the affectedZE41, RRF	Common wart (1, 100) part
<i>Otostegia integrifolia</i> Benth. (Lamiaceae), Wild, Tingut, ZE14, L	Juice in empty stomach	Colic in GIT (2, 66.6) Diabetes mellitus (1, 33.3)
<i>Phytolacca dodecandra</i> L. (Phytoloccaceae), Wild, Endod, ZE19, L	Leaf juice in empty stomach	Abortion (1, 100)
<i>Rhamnus prinoides</i> L.Her. (Rhamnaceae), Cultivated, Gesho, ZE6, L	Juice (crushed fresh leaf placed between jaws)	Tonsillitis (2, 100)
<i>Rumex abyssinicus</i> Jacq (Polygonaceae), Wild, Mekmoko, ZE10, R	Decoction in empty stomach	Diabetes mellitus (2, 50) Hypertension (2, 50)
<i>Rumex nervosus</i> Vahl. (Polygonaceae), Wild, Enbacho, ZE5, L	Juice	To arrest bleeding during male circumcision (3, 100)

Table 1 contd.

Table 1 contd.

<i>Ruta chalepensis</i> L. (Rutaceae) Cultivated, Tennadam, ZE34, L,F.	Fruit powder Leaf juice	Condiment (11, 61.11) Evil eye (2, 11.11) Colic in GIT (5, 27.7) Wound healer (3,100)
<i>Sida rhombifolia</i> L. (Malvaceae), Wild, Gurgegit, ZE26, L	Leaf paste applied topically on the wound	Stomachache (1, 100)
<i>Taverniera abyssinica</i> A.Rich (Leguminosae), Wild, Dingetegna, ZE42, R	Chewing and swallowing the menstruum (juice)	Nutritive condiment (4, 66.7) PUD and gastritis (1, 16.6) Diabetes mellitus (1, 16.6)
<i>Trigonella foenum-graecum</i> L. (Leguminosae), Cultivated, Abish, ZE21, S	Seed powder mixed with water and sweetened with sugar (empty stomach)	Tissue builder in children Aija, Cultivated, and after delivery (3,100)
<i>Triticum aestivum</i> L. (Poaceae), ZE33, S	Seed powdered to slurry with heat, and sugar (honey) is added to sweeten Leaf decoction	General well-being (7, 100)
<i>Withania somnifera</i> (L.) Duna. (Solanaceae), Cultivated, Gizewa, ZE11, L	Leaves boiled in water and steam inhaled	Febrile conditions and runny nose (21,100)
<i>Zehneria scabra</i> [L.f.] Sond. (Cucurbitaceae), Wild, Haregesa, ZE1, L	Decoction	Common cold (3, 37.5) Condiment (5, 62.5)

B=bulb, F=flower, L=leaf, Rh=rhizome, R=root, S=seed, J=juice, PUD=peptic ulcer disease, GIT=gastrointestinal tract

6. Acknowledgements

The research was funded by a grant from University of Gondar. I am also grateful to all the community leaders of the study area in convincing the traditional healers to give their information overtly by staying by my side until the end of the survey. I am also thankful to pharmacognosy department members for their direct and indirect help in plant identification and herbarium preparation.

References

1. Toma M, Grcioso JS, Hiruma-Lima CA, Andrade FD, Vilegas L, Brito AS. Evaluation of analgesic and antiedematogenic activities of *Quassia amara* bark extract. *J Ethnopharmacol.* 2003 Mar; 85(1):19-23.
2. WHO drug information. Geneva: Proposed INN list; 2002.
3. Okigbo, Anuagasi CL, Amadi JE. Advances in selected medicinal plants and aromatic plants indigenous to Africa. *J Med Plant Res.* 2009 Feb; 3(2):86-95.
4. Gedif T, Hahn HJ. Herbalist in Addis Ababa and Butajira, Central Ethiopia: Mode of service delivery and traditional pharmaceutical practice. *Ethiopian Journal of Health Development.* 2002; 16(2):191-197.
5. Mesfin T, Hunde O, Getachew Y, Tadesse M. Survey of medicinal plants used for treatment of human diseases in Seka Chekorsa. *Ethiop J Health Sci.* 2005; 15(2):90-95.
6. Debela H. Use of traditional medicinal plants by people of Bosa sub district. *J Health Sci.* 2006; 16:141-154.
7. Birhanu Z. Ethnobotanical survey on medicinal plants used by ethnic groups of Denbia district, north-western Ethiopia. *Journal of Natural Remedies.* 2011; 11(2):119-123.
8. Briggs P. *Guide to Ethiopia.* Ethiopia: Bradt Publications; 2009.
9. Improving Productivity and Market Success (IPMS) of Ethiopian Farmers. Metema Pilot Learning Site. 2005.
10. Martin GJJ. *Ethnobotany: A methods manual.* London: Chapman and Hall; 1995.
11. Heineric M, Ankli A, Frei B, Weimann C, Sticher O. Medicinal plants in Mexico: Healers' consensus and cultural importance. *Social Science and Medicine.* 1998; 47(11):1859-1871.
12. Friedman J, Yaniv Z, Dafni A, Palewith D A preliminary classification of the healing potential of medicinal plants, based on a rational analysis of an ethnopharmacological field survey among Bedouins in the Negev desert, Israel. *J Ethnopharmacology.* 1986 June; 16(2-3):275-287.