Traditional medicinal plants used by indigenous people of Deder district, east Hararghe Zone of Oromia, Ethiopia

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Ethnobotany Research and Applications 34:73 (2026) - http://dx.doi.org/10.32859/era.34.73.1-21
Manuscript received: 25/04/2026 - Revised manuscript received: 16/06/2026 - Published: 17/06/2026

Research

Abstract

Background: In Ethiopia, mismanagement of natural ecosystems is jeopardizing traditional medicinal plants and the associated indigenous knowledge. This study reports local us practices of traditional medicinal plants by indigenous people of Deder district, Ethiopia for preservation.

Methods: Data were collected using semi-structured interviews, focus group discussion and field visits. Ethnobotanical indices, t-test, Mann-Whitney U test and one-way ANOVA were data analysis methods used to reveal agreements between respondents and the impacts of socio-demographic factors on respondents' ethnomedicinal knowledge.

Results: Totally, 100 medicinal plant species belonging to 51 families were documented along with their medicinal use practices by the indigenous people. Asteraceae and Lamiaceae were species rich families. Herbs constituted the highest proportion followed by shrubs and trees. Leaves were frequently reported plant parts. Remedy preparation methods were mainly crushing, pounding, or powdering depending on the specific characteristics and conditions of the plant parts to concoct or decoct. The most reported route of remedy administration was oral followed by topical application. Febrile and fever disease category scored highest ICF value. *Senecio hadiensis* and *Hagenia abyssinica* scored 100% FL for treating rheumatism and colds, respectively. *Croton macrostachyus* was the most preferred plant to treat rabies. There was no statistically significant (p=0.196) difference between kebeles in terms of number of medicinal plants reported. Number of medicinal plants reported was significantly (p<0.01) affected by age and educational level.

Conclusions: Alongside modern medication, local community of Deder district depend considerably on traditional medicine. Thus, these plants should be given conservation attention and be evaluated pharmacologically.

Keywords: Ethnobotany; Ethnomedicine; Indigenous knowledge; Medicinal plants

Background

In Ethiopia access to modern medical facilities is very limited (Chaya 2007). As a result, rural people mostly rely on ethnomedicinal knowledge to treat diseases using local plants (Abbasi *et al*. 2013, Murad *et al*. 2013**)**. Even in the presence of modern medicines, most rural communities opt for traditional medicines of plant origin due to the high cost of modern medication and/or traditional belief (Asfaw *et al*. 1999, Addis *et al*. 2001). About 80% of the Ethiopian population depends on traditional medicine for their health care (Aragaw *et al*. 2020), and more than 95% of traditional medicinal preparations are of plant origin (Abebe 1986). Thus, the use of plants as source of remedies has remained the main healthcare system in most rural communities of Ethiopia (Birhanu *et al*. 2015).

Ethiopia is among African countries known for its diverse flora. It is also home to many languages, cultures and beliefs, which have in turn contributed to the high diversity of traditional knowledge and practices of the people on medicinal plants. Thus, people in different parts of Ethiopia have traditional practices, which they accumulated for generations to treat both human and livestock ailments (Wabe *et al*. 2011). This knowledge of traditional medicines is transferred orally from generation to generation. The elders, who know more about medicinal plants, may die without sharing their traditional knowledge to the young generation. As a result, knowledge on traditional medicine is in danger of loss as they are not available in written documents **(**Giday & Teklehymanot 2013**)**. The loss of medicinal plant taxa is also common problem in Ethiopia (Kelbessa et al. 1992).

Ethnobotanical studies have been carried out in many parts of Ethiopia (Teklehaymanot & Giday 2007, Lulekal *et al*. 2013, Megersa *et al*. 2013, Teklay *et al*. 2013). However, given the huge ethnic diversity (~85 diverse ethnolinguistic communities) of Ethiopian people that live in different agro ecological regions harboring different plant communities, ethnobotanical investigations done so far are not considerable with most areas unexplored. Deder district is one of the districts in Oromia regional State in the eastern part of Ethiopia (see materials and methods section for detailed description). Rural communities of this district, which are largely Muslim Oromo ethnic group with their own language (Afaan Oromoo) and cultural background, have less access to modern medical services with only one hospital found in a town (Sagni *et al*. 2023). We hypothesized that communities of this district depend on traditional medicine of plant origin due to shortage of modern medical facilities, and knowledge of traditional medicine varies with demographic characteristics. This study was, therefore, conducted with the objective of documenting traditionally used medicinal plants to treat human ailments along with use practices by the indigenous people of Deder district to help preserve and bioprospect them pharmacologically for human health benefits.

Materials and Methods

Description of the study area

The study was conducted in Deder district, which is one of the districts of Oromia region in east Hararghe zone, Ethiopia. Deder district (9°09'-9º24' N, 41°16'-41º32' E) is located at 432 km to the east of Addis Ababa (Figure 1) at altitudinal range between 1200 and 3188 m.a.s.l. Its administrative center is Deder town with Mekela sub-district nearby to it from which data was collected. The mean annual minimum and maximum temperatures of the district are 14 and 29° C, whereas that of rainfall ranges from 450 to 950 mm (District Agriculture and Rural Development office, Unpublished).

Reconnaissance survey and ethnobotanical data collection

Mekela sub-district has 7 kebeles (6 rural and 1 urban). Kebele is the lowest administrative unit known in Ethiopia. Reconnaissance survey was made and four Kebeles: Calla Nagayaa, Burqaa Nagayaa, Bishan Adii, and Lameen Waltahaa were purposively selected because of the presence of protected forests around them. For ethnobotanical data collection, 366 respondents (age ranging from 24 to 65) were randomly selected using name list of households of each kebele as a sampling frame. Data collection methods were semi-structured interviews, group discussions, and guided field walks with key informants for field observation and specimen collection. Each respondent was independently interviewed to mention about the local names of the plants they use to treat human ailments, part(s) of plants used, methods of preparation of remedies, route of application of the remedies and dosage. Further, group discussions were made with eight knowledgeable informants of each kebele for the triangulation of use practices, and field visit was made with them for observations and collection of plants. Plant specimens were collected, given field collection numbers, pressed, and dried for identification. Some medicinal plant species were tentatively identified on the field using illustrations. In addition, further identification of all specimens was done by comparison with herbarium specimens, illustrations and taxonomic keys from Flora of Ethiopia and Eritrea, with the assistance of experts at Addis Ababa University, National Herbarium. The identified specimens were deposited in Hara maya University Herbarium.

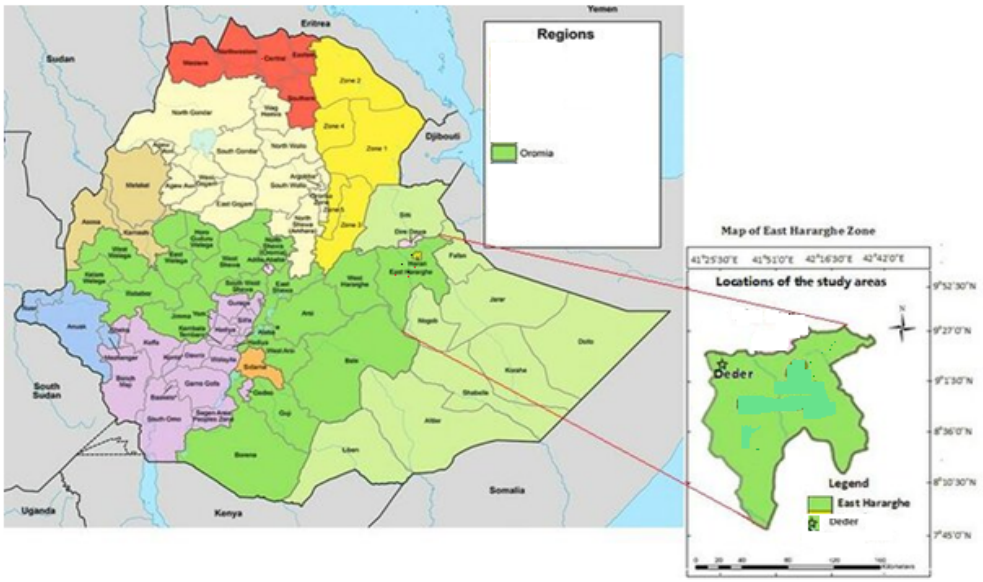

Figure 1. Map of the study area

Ethnobotanical data analysis

Descriptive statistics was used to summarize demographic and ethnobotanical data. Ethnobotanical indices, including Informant Consensus Factor (ICF**),** Fidelity Level (FL**) and** Preference Ranking (PR) were computed (Bogale *et al*. 2023). Informant consensus factor was computed to show level of agreement among informants on the medicinal plants mentioned to treat a certain ailment category using the following formula.

$$ICF = \frac{Nuc - Ns}{Nuc - 1}$$

Where, Nuc is the number of use citations in each illness category and Ns is the total number of species reported by informants for that illness category. The ICF values range from 0 to 1, with high values (i.e. close to 1) indicating that relatively few plants are used by a large proportion of informants, while low values (< 0.5) indicate that informants do not agree on the plant species to be used to treat a category of ailments.

Fidelity index was computed to reveal how really a given plant species is effective to treat a particular ailment, and was measured by using the following formula.

$$FL\ (\%) = \frac{IP}{IU} \times 100$$

Where, IP is the number of informants that independently suggested the use of a species to treat a particular disease and IU is the total number of informants that mentioned a plant species for any disease.

Preference ranking (PR) was conducted for 9 plant species more frequently mentioned to treat rabies, which is one of the commonly reported deadly viral disease. In ranking exercise, 10 key informants were randomly selected and asked to rank plants based on their perceived effectiveness to cure the disease by assigning the highest value (9) for the most efficacious plant and lowest value (1) for the least efficacious plant (Bogale *et al*. 2023).

Difference in traditional medicinal knowledge due to gender was analyzed using independent t-test while Mann-Whitney U test was used for age group. One-way ANOVA was used to analyze depth of medicinal knowledge between different formal education categories, i.e., first cycle primary school (grade 1-5), second cycle primary school (grade 6-8), secondary school (grade 9-12) and no formal education. In all cases, number of medicinal plants reported were used as dependent variable. Analyses were done using SPSS version 16.

Results and Discussion

Traditionally used medicinal plants of Deder district

In this study, a total of 100 plant species distributed in 51 families were recorded to have ethnomedicinal values for different health problems affecting humans (Table 1). The practice of traditional medicine using such large number of plant species shows that community of Deder district rely on traditional medicine. Family Asteraceae was represented by the highest number of species (10) followed by Lamiaceae (9); Solanaceae, Apiaceae and Rosaceae (each 4 spp); Boraginaceae, Cucurbitaceae, Euphorbiaceae, Fabaceae, Myrtaceae and Viscaceae (each 3 spp); Polygonaceae, Acanthaceae, Brassicaceae, Loranthaceae, Menispermaceae, Myrsinaceae, Verbenaceae, Alliaceae, Asclepiadaceae, Moraceae and Ranunculaceae (each 2 spp) and the rest 29 families were represented by one sp each. Previous studies by Bogale *et al*. (2023) and Meseret and Shumete (2025) investigated traditional medicinal plants in two districts of the West Hararghe zone, which share more or less similar agroecological characteristics with current study site. They reported that the families Asteraceae and Lamiaceae contain numerous plant species with medicinal properties. Additionally, Kedir *et al*. (2022) reported the Asteraceae family as particularly rich in medicinal plant species, several of which are consistent with the findings of the present research. Some of the species they identified are also found in the current study and are used to treat similar ailments, supporting their potential therapeutic efficacy. The current study district and the two districts within the West Hararge Zone studied by Bogale *et al*. (2023) and Meseret and Shumete (2025) broadly share similar agroecological conditions and cultural settings. Although some plant species are reported as remedies for the same ailment across the three studied districts, we also observed that the same plant species are reported for different ailments in different districts, despite the broader cultural overlap. This pattern may reflect inter-district differences in local ethnomedicinal knowledge regarding the selection and use of plant species, knowledge that has been accumulated and shaped over time. It is also plausible that ailments are assigned similar names across the districts according to local/traditional disease categorization. However, the underlying causes and syndromes associated with these locally named ailments may differ between districts, leading to the selection of different medicinal plants based on local experience and therapeutic needs.

Familial species richness of Asteraceae and Lamiaceae families may suggest their abundant occurrence in the vegetation of the study area. These two families have also been reported as having large number of medicinal plant species by different authors in Ethiopia (e.g., Birhanu *et al*. 2015, Mesfin *et al*. 2009) and elsewhere outside Ethiopia (da Costa *et al*. 2021, Hosseini *et al*. 2021, Jafarirad & Rasoulpour 2019), which could be attributed to the presence of bioactive compounds in their tissues (Marchioni *et al*. 2020, Sokovic *et al*. 2019). Many species from family Lamiaceae contain secondary compounds, including terpenoids, flavonoids, phenolics and alkaloids (Poonkodi 2016, Wojdylo 2007). Likewise, the Asteraceae family possesses sesquiterpenoids, diterpenoids, phenols and flavonoids with a variety of biological activities (Jaiswal *et al*. 2011, Petropoulos *et al*. 2019). In addition, review of some previous literatures (Teklehaymanot & Giday 2007, Lulekal *et al*. 2008) indicate that several plant species identified as medicinal in this study have also been documented for their therapeutic use in other regions of Ethiopia. This suggests the genuine therapeutic potential of these medicinal plants, highlighting the need for further research to isolate their active compounds for future drug development. Analysis of plant growth form of the medicinal plant species revealed that herbs constituted the largest category, followed by shrubs, tree species, climbers and mistletoes (Figure 2). In many similar studies (e.g., Kedir *et al*. 2022, Bogale *et al*. 2023, Meseret & Shumete 2025), herbaceous plants are used most for medicinal purpose, may be due to their strong therapeutic activity and ease of harvesting from the wild (Murad *et al*. 2013).

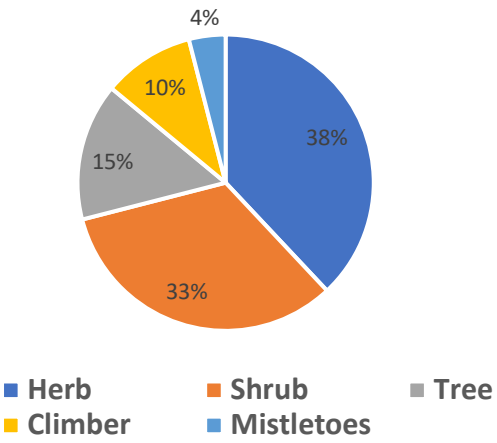

Figure 2. Life form category of reported medicinal plants

Plant parts used, herbal preparation and routes of application

People of the study area use different plant parts for the preparation of traditional remedies. Leaves including shoot tips constituted the largest proportion of parts used for remedy preparation followed by roots; fruits, seed and flower together; whole part; bark and bulb (Figure 3). This result accords with some previous studies conducted in different parts of the country (Megersa et al. 2013, Teklay et al. 2013). The use of specific plant parts suggests that these parts may have bioactive compound(s) that are effective against the specific ailments and help in pharmaceutical screening to discover modern drugs (Murad et al. 2013). Some researchers (Teklehaymanot & Giday 2007, Lulekal et al. 2013) reported that underground plant parts such as roots, bulbs and rhizomes are the most utilized parts in the preparation of remedies. In this study, the use of underground plant parts, for example, roots are also found to be considerable though less reported compared to leaves. Herbal preparations that involve roots, rhizomes, bulbs, barks, stems or whole parts have negative effects on the survival of the plants (Abbasi et al. 2013, Lulekal et al. 2013, Murad et al. 2013). Though excessive harvest of leaves may damage plants, particularly the young plants bearing few leaves, the fear of destruction of medicinal plants due to the nature of plant parts collected for the purpose of medicine seems to be minimal in the area where this study was conducted. Because collection of plant parts that often serve as organ of natural regeneration were not reported much. As in some other previous research reports (Lulekal et al. 2013), plant parts in dried form were less reported (13.68%) as compared to plant parts in fresh (74.73%). This could be due to loss of therapeutic potential when used in dry form.

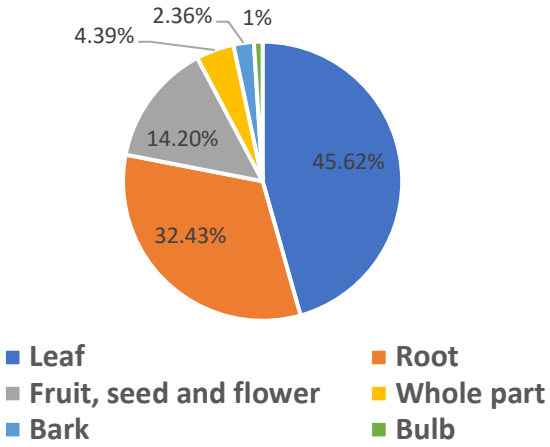

Figure 3. Plant parts used for remedy preparation

Local communities use a variety of techniques to prepare traditional medicines, with crushing, pounding or grinding plant parts into smaller size accounting for the majority (71.43%) of preparations. Water is most commonly employed as the solvent to dissolve plant material, although some remedies use intact plant parts directly (for example, chewing stems or using them to clean teeth). Juice or latex obtained by squeezing plant tissues is sometimes applied to the eyes or rubbed onto the skin. Administration routes were primarily oral, followed by dermal, nasal, ocular and aural (Figure 4). Similar patterns have been reported elsewhere (e.g., Agisho et al. 2014, Alemayehu et al. 2015, Kewessa et al. 2015). Most remedies were prepared from a single species, but use of multi-plant combinations were also reported.

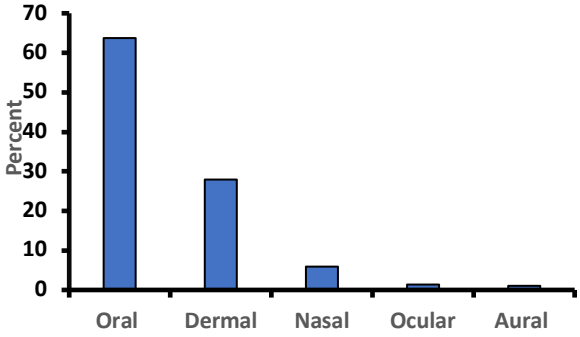

Figure 4. Route of remedy administration

Table 1. Medicinal plants used by people of Deder district

Voucher number	Scientific name	Family Name	Local Name	Habit	Health problem treated	Part(s) used, mode of preparations and application
MHU94	*Vachellia abyssinica* (Hochst. ex Benth.) Kyal. & Boatwr.	Fabaceae	Laafto	Tree	Chancroid	The crushed **root** is boiled in water and consumed
					Epistaxis	The smashed leaf is squeezed and the extract is dropped into the nostrils
MHU21	*Achyranthes aspera* L.	Amaranthaceae	Faarot	Herb	Febrile illness	The crushed leaf is squeezed to drink its juice with coffee
					Dysentery	The crushed root is mixed with water to drink the filtrate
					Abdominal pain	The crushed leaf is steeped in hot water to make tea for drinking
					Infertility	The crushed root is concocted with water and honey, and boiled for consuming
MHU34	*Allium sativum* L.	Amaryllidaceae	Qulubbii Adii	Herb	Stomachache	Bulb will be pounded together with seeds of *Lepidium sativum* and eaten with bread
MHU36	*Aloe megalacantha* Baker	Asphodelaceae	Hargeysa Guraacha	Shrub	Liver disease	The flower is chopped, squeezed, and the juice is consumed
					Impotence	The root will be chewed
MHU58	*Artemisia abyssinica* Sch. Bip. ex Oliv. & Hiern	Asteraceae	Saarnabii	Herb	Stabbing pain, rheumatism caused by cold weather	The crushed leaf is mixed with oil for massaging the body
					Tonsillitis	Entire plant part is crushed, mixed with water and drunk with coffee
MHU67	*Asparagus africanus* Lam.	Asparagaceae	Hidda Sare	Climber	Toothache	Root will be chewed and held on the affected tooth
					Scabies	The crushed leaf is mixed with butter and rubbed on the skin
					Dystocia	Root will be crushed together with that of *Rubia cordifolia*, boiled to consume
MHU69	*Asystasia gangetica* (L.) T. Anderson	Acanthaceae	Telenjjii Guraacha	Herb	Bleeding	The crushed leaf is tied on the cut body part
MHU73	*Bersama abyssinica* Fresen.	Francoaceae	Qillisaa	Tree	Ascariasis	Apical shoot will be crushed, boiled with water and honey for consumption
					Diarrhea	The leaf will be decocted in water to drink the extract
					Constipation	
					Eczema	Root will be pounded together with root of *Cucumis africanus* and mixed with butter to smear on the body
MHU51	*Bidens pilosa* L.	Asteraceae	Xiyyee	Herb	Bleeding	Leaf will be crushed and bandaged on bleeding body part
					Snake bite	Root and leaf will be crushed together, mixed with water for drinking
					Febrile illness	The crushed shoot tip is squeezed to drink its extract with coffee

MHU11	*Brucea antidysenterica* J.F. Mill.	Simaroubaceae	Buna Jinnii	Shrub	Eczema	Leaf will be pounded, mixed with butter and creamed
					Jock-itch	Leaf will be pounded, mixed with butter and creamed
					Dysentery	Leaf will be boiled in water, mixed with honey or sugar and drunk
					Ascariasis	Shoot tip will be crushed and boiled with water and honey to drink
					Hepatitis	Leaf will be crushed with root of *Cucumis africanus*, mixed with water to drink
MHU19	*Calpurnia aurea* (Aiton) Benth.	Fabaceae	Ceekaa	Shrub	Rabies	Stem will be powdered and baked with *Eragrostis teff* seed flour dough to consume in a bread from
					Syphilis	Smashed shoot tip is mixed with coffee to drink
					Prolapsed anus and uterus	Smashed shoot tip is mixed with coffee to drink
					Diarrhea	Smashed shoot tip is mixed with coffee to drink
					Snake bite	The sap from a smashed leaf is used to drink
					Scabies	Leaf will be crushed and used to wash body with water
MHU43	*Capparis sepiaria* L.	Capparaceae	Riga gaangge	Shrub	Swelling (Boil)	Leaf will be crushed & tied onto the affected body part
MHU45	*Carissa spinarum* L.	Apocynaceae	Agamsa	Shrub	Impotence	The unripe fruit will be infused in hot water and consumed as a tea
					Headache	Dry leaf will be smoked and inhaled through nostrils
					Stomachache	Leaf will be pounded and mixed with honey and eaten
					Gonorrhea	The pounded leaf is consumed with *Tella* (local beer)
					Snake bite	Root will be decocted in water and the extract will be drunk
					Rheumatism	
MHU22	*Cissampelos mucronata* A. Rich.	Menispermaceae	Baal-tokkee	Climber	Abdominal pain	Root will be crushed, mixed with water and drunk
MHU06	*Clematis simensis* Fresen.	Ranunculaceae	Hidda Xilloo	Climber	Hemorrhoids	Shoot tip will be crushed together with root of *Phytolacca dodecandra* and fruits of *Solanum giganteum*, and mixed with sap of *Gomphocarpus fruticosus* for dressing on the affected area with clean cloth
					Skin cyst and tumor	Shoot tip will be crushed together with that of *Dodonaea angustifolia* and tied on the skin
MHU09	*Clutia abyssinica* Jaub. & Spach.	Peraceae	Haba Uruu	Shrub	Tinea versicolor	Leaf will be crushed and rubbed on the affected skin part
					Dysentery	Root will be crushed, boiled in water and drunk
					Constipation	
					Fever	
					Gastritis	
MHU10	*Commelina benghalensis* Forssk.	Commelinaceae	Hola gabis	Herb	Tinea versicolor	Leaf extract will be applied on skin
					Tooth ache	Root will be chewed and held around the affected tooth

MHU16	*Cordia africana* Lam.	Boraginaceae	Weddessa	Tree	Eczema	Stem bark will be powdered, mixed with butter and heated to smear on the body
					Wound	Leaf ash will be mixed with butter and creamed on the affected part
					Skin rash	
					Gastric ulcer	Stem will be chewed and swallowed
MHU78	*Coriandrum sativum* L.	Apiaceae	Shukaar	Herb	Stabbing pain often believed to happen due to cold weather	Leaf will be mixed with leaf of *Artemisia abyssinica* and boiled in oil to smear the decoct on the affected area
MHU81	*Crambe abyssinica* Hochst. ex R.E.Fr.	Brassicaceae	Fujul	Herb	Snake bite	Leaf will be crushed and creamed on the affected area
MHU26	*Crinum abyssinicum* Hochst. ex A. Rich.	Amaryllidaceae	Qulubbii Waraabessaa	Herb	Rabies	Bulb will be pounded with root of *Croton macrostachyus* and *Echinops kebericho* mixed with water for drinking
MHU08	*Croton macrostachyus* Hochst. ex Delile	Euphorbiaceae	Makkanisaa	Tree	Lymphatic swelling	Leaf will be powdered and drunk with coffee
					Febrile illness	The smoke from its leaf, combined with that of *Ocimum forskolei*, will be used for bathing
					Gonorrhea	Stem bark will be powdered together with bark of *Vernonia amygdalina,* mixed with **Tella** (local beer) for drinking
					Head ache	Leave will be smashed with leaves of *O. lamifolium* and sniffed
					Hemorrhoids	Leaf will be pounded together with fresh leaf of *Cucumis africanus* then creamed
					Tinea versicolor	Shoot tip will be crushed, mixed with lemon juice and rubbed against the skin
					Rabies	Root will be pounded together with roots of *Crinum abyssinicum* and *Echinops kebericho,* mixed with water and drunk
MHU25	*Cucumis africanus* L. f.	Cucurbitaceae	Haraggoge Xiqqo	Climber	Retained placenta	Root will be pounded and mixed with water to drink
					Eczema	Root will be pounded together with root of *Bersama abyssinica* and mixed with butter to apply on the affected body part
					Snake bite	Root will be crushed and tied on the affected part
					Skin rash	Root will be crushed and boiled in water for steam bathing
					Hepatitis	Root of *Cucumis africanus* and *Stephania abyssinica*, and leaf of *Juniperus procera* will be crushed together and mixed with *Tella* to drink

					Gonorrhea	Root of *Cucumis africanus* together with that of *Stephania abyssinica*, and leaf of *Juniperus procera* will be crushed and consumed with T*ella*
					Rabies	Root of *Cucumis africanus* together with that of *Croton macrostachyus* and *Echinops kebericho* will be pounded and mixed with water to drink
					Hemorrhoids	Leaf will be crushed together with leaf of *Juniperus procera* and tied on the affected body part
					Skin fungus	Fruit will be heated and rubbed against the infected skin
					Gallstone	The crushed fruit is heated with honey and consumed
					Urination problem	The stem will be chewed and the juice will be drunk
MHU98	*Cynoglossum lanceolatum* Forssk.	Boraginaceae	Maxxannee Adii	Herb	Cough	Leaf will be crushed together with root of *Salvia nilotica* and boiled in water, mixed with honey and drunk
					Dystocia	Leaf will be crushed, boiled in water, mixed with honey and drunk
					Retained placenta	Leaf will be crushed boiled in water and drunk
MHU76	*Cyperus rigidifolius* Steud.	Cyperaceae	Qundhii	Herb	Menorrhagia	Root will be powdered and mixed with barley flour to be made into bread and eaten
MHU64	*Datura stramonium* L.	Solanaceae	Banjjii	Herb	Tooth Gum illness	Fruit will be boiled and held on the affected gum
					Ear infection	Leaf will be ground, mixed with oil and dropped into the ear canal
					Dandruff	Leaf will be crushed, mixed with water to wash
					Swelling	Leaf will be crushed and tied
MHU63	*Dodonaea angustifolia* L.	Sapindaceae	Xiddacha	Shrub	Skin cyst and tumor	Shoot tips will be crushed together with that of *Clematis simensis* and dressed on the affected skin
					Eczema	Root will be crushed and smashed.
MHU55	*Dovyalis abyssinica* (A. Rich.) Warb.	Flacourtiaceae	Shinbirqolii Habashaa	Shrub	Retained placenta	Leaf will be pounded, boiled in water and the filtrate will be drunk
					Ascariasis	Fruit will be decocted and the extract will be drunk
					Gum bleeding	Fruit will be eaten fresh
MHU66	*Echinops amplexicaulis* Oliv.	Asteraceae	Qoree Harre	Herb	Toothache	Root will be crushed and held on the sick tooth
MHU85	*Echinops kebericho* Mesfin	Asteraceae	Qabarish	Herb	Abdominal pain	Root will be powdered, mixed with honey and water to drink
					Headache	Root smoke will be used for inhaling and bathing
					Rabies	The root together with that of *Croton macrostachyus* and *Cucumis africanus* will be pounded and mixed with water to drink
MHU90	*Englerina woodfordioides* (Schweinf.) Balle	Loranthaceae	Digalo Kukii	Mostletoe	Fetus Erythroblastosis	The entire part will be boiled in water and drunk
					Ascariasis	

MHU54	*Erica arborea* L.	Ericaceae	Asxaa	Shrub	Body swelling	Root will be boiled in water, and the filtrate will be drunk
MHU12	*Eucalyptus globulus* L.	Myrtaceae	Baarzaafii Adii	Tree	Stabbing pain caused by cold	Leaf will be boiled with that of *Artemisia abyssinica* for steam bathing
					Influenza	Leaf will be boiled for steam bathing
MHU20	*Ficus sur* Forssk.	Moraceae	Habruu	Tree	Skin infection	Sap from the twig will be applied on the skin
					Headache	Root smoke is inhaled and used for bathing
					Tinea versicolor	Sap from the twig will be applied on the skin
MHU23	*Ficus vasta* Forssk.	Moraceae	Qillxxu	Tree	Abdominal pain	Stem tips, barks and seeds will be crushed together, boiled in water and drunk
					Heart disease	Whole plant part is powdered, boiled and consumed
					Tooth ache	Stem bark will be powdered, boiled in water and drunk
					Snake bite	Stem will be crushed, mixed with water and drunk
					Kidney and Urination problem	Stem tips, barks and seeds will be crushed together boiled in water and drunk
					Fever	Stem will be crushed, mixed with water and drunk
MHU30	*Foeniculum vulgare* Mill.	Apiaceae	Insilaalii	Herb	Sudden illness	Shoot will be chewed to swallow the juice
					Urination retention	The entire shoot will be boiled in water together with leaves of *Verbascum sinaiticum, Catha edulis,* and *Cucumis africanus* for drinking
MHU32	*Ginger officinale* Roscoe	Zingiberaceae	Zanjabilii	Herb	Influenza	The rhizome will be crushed and made into tea and drunk
MHU77	*Gomphocarpus fruticosus* (L.) W.T. Aiton	Apocyanaceae	Anannoo	Shrub	Hemorrhoids	Root sap will applied-
MHU83	*Gomphocarpus purpurascens* A. Rich.	Apocyanaceae	Ari-Iyyoo	Shrub	Skin itching	The powdered leaf will be mixed with oil to smear on the skin
					Hemorrhoids	
MHU48	*Hagenia abyssinica* (Bruce) J.F. Gmel.	Rosaceae	Heexoo	Tree	Taeniasis	Flower will be pounded, mixed with water or *Tella* to drink
MHU57	*Heteromorpha arborescens* (Spreng.) Cham. & Schltdl.	Apiaceae	Ali-Hanqa	Shrub	Impotence	Fresh root will be chewed
					Epilepsy	Leaf will be pounded together with fresh leaves of *Artemisia abyssinica* and *Cucumis africanus,* mixed with water and drunk
					Taeniasis	Leaf will be crushed, mixed with water and drunk
					Hemorrhoids	The powdered leaf will be mixed with oil and applied onto the skin
MHU60	*Inula confertiflora* A. Rich.	Asteraceae	Woynaagifti	Shrub	Epistaxis	Leaf will be smashed and sniffed
					Diarrhea	Root will be chewed with salt and juice will be swallowed

					Leprosy	Root will be crushed together with roots of *Croton macrostachyus, Thalictrum rhynchocarpum* and *Cucumis africanus*, decocted and the extract will be creamed onto the skin
					Febrile illness	Leaf will be smashed and sniffed
					Scabies	Leaf will be immersed in hot water and rubbed against the skin
					Diffuse cutaneous leishmaniasis	Leaf will be pounded, mixed with butter and creamed
					Skin rash	Leaf will be crushed together with root of *Rumex nepalensis* and applied on the skin
					Snake bite	Root will be chewed and the juice will be swallowed
					Rabies	Root will be crushed and drunk with water
MHU71	*Juniperus procera* Hochst. ex Endl.	Cupressaceae	Gaanttiraa Habashaa	Tree	Retained placenta	Stem tips will be crushed, mixed with water and the filtrate will be drunk
MHU75	*Justica schimperiana* (Hochst.ex. Nees) T. Andreson	Acanthaceae	Dhumugaa	Shrub	Rabies	Root and leaf will be pounded, mixed with tella/local beer and drunk
					Amoebiasis	Root will be powdered together with that of *Phytolacca dodecandra* and *C. macrostachyus* and drunk with coffee
MHU47	*Lepidium sativum* L.	Brassicaceae	Shifuu (Feexoo)	Herb	Tonsillitis	Seed will be powdered, mixed with water and drunk
					Throat infection	Seed will be boiled and the filtrate will be drunk
					Wound	Seed will be crushed and placed on the wound
MHU39	*Leucas martinicensis* (Jacq.) R. Br.	Lamiaceae	Bocuu Fardaa	Herb	Abdominal pain	Leaf will be crushed and squeezed to drink the extract
					Skin rash	Leaf will be crushed to apply the extract on the skin
					Menorrhagia	Leaf will be crushed and squeezed to drink the extract
MHU42	*Leucas minimifolia* Chiov.	Lamiaceae	Muka Adii	Herb	Eye disease	Leaf will be crushed and the sap will be dropped into the eye
MHU52	*Leucas stachydiformis* (Benth.) Hochst.ex Briq.	Lamiaceae	Muka Boftaa	Herb	Skin itching	Leaf will be crushed and placed on the affected area
MHU53	*Lippia adoensis* Hochst. Ex Walp.	Verbenaceae	Sukee	Shrub	Eczema	Leaf will be crushed and applied on the skin
					Febrile illness	Shoot tip will be crushed squeezed and drunk with coffee
MHU96	*Maesa lanceolata* Forssk.	Myrsinaceae	Habayyii	Tree	Gingivitis	Seeds will be powdered mixed with butter and then used as ointment
					Scabies	Seeds will be powdered, mixed with butter and used as ointment
					Fever	Seeds will be crushed, boiled in water and drunk
MHU15	*Mirabilis jalapa* L.	Nyctaginaceae	Harmal Mixaaxis	Shrub	Breast ulcer	Root will be crushed with seeds of *Nigella sativa*, mixed with honey and water, boiled and drunk
					Toothache	Root will be crushed and held on the sick tooth

					Epilepsy	Root will be crushed, mixed with water and the filtrate will be drunk
					Skin cyst and Tumor	Root will be crushed and bandaged onto the skin
					Gallstone	Crushed root will be decocted and drunk
MHU13	*Momordica foetida* Schumach.	Cucurbitaceae	Haraggoge Guraattii	Climber	Stomach ache	Root will be chewed with salt and juice swallowed
					Skin Rash	Root will be crushed and boiled in water to have steam bath and/or wash the body with
					Wound	Leaf sap will be dropped onto the wound
					Rabies	Fruit will be crushed, boiled in water and drunk
MHU80	*Myrsine africana* L.	Myrsinaceae	Qacuu	Shrub	Throat infection	Fruit will be crushed boiled as tea and drunk
					Wound	
					Syphilis	
					Taeniasis	
					Back pain	Fruit powder will be baked with Teff flour and eaten
MHU93	*Myrtus communis* L.	Myrtaceae	Adas	Shrub	Erythroblastosis	Leaf will be crushed together with that of *Ocimum basilicum, Myrtus communis*, bulb of *Allium sativum* and seeds of *Nigella sativa* and the extract will be drunk
					Diarrhea	Leaf sap will be drunk
					Headache	Crushed leaf will be boiled in water and drunk
MHU91	*Nigella sativa* L.	Ranunculaceae	Abasoddaa Guraacha	Herb	Headache	Pounded seed will be inhaled through nostrils
					Erythroblastosis	Seeds will be crushed together with bulb of *Allium sativum,* leaves of *Ocimum basilicum* and *Myrtus communis,* and the extract will be drunk
MHU100	*Ocimum basilicum* L.	Lamiaceae	Basobilaa	Herb	Erythroblastosis	Leaf will be crushed together with bulb of *Allium sativum,* seeds of *Nigella sativa* and leaves of *Myrtus communis* and the extract will be drunk
MHU14	*Ocimum forskolei* Benth.	Lamiaceae	Cabbii	Shrub	Febrile illness	Leaf will be crushed and smelled, also infused in tea/coffee and drunk
					Headache	
					Eye disease	Leaves crushed together with leaf of *Vernonia amygdalina* and the extract will be dropped into the eye
MHU17	*Ocimum lamifolium* Hochst.ex. Benth.	Lamiaceae	Daamakasse	Shrub	Febrile illness	Leaf will be crushed and smelled, also infused in tea/coffee and drunk
					Headache	Leaf will be crushed together with leaves of *Carissa spinarum*, *Croton macrostachyus*, *Ocimum forskolei* and *Ocimum basilicum* then sniffed.
					Itching	Leaf will be crushed and used to wash face with water

					Impotence	Root will be chewed
					Eye disease	Leaves will be crushed with that of *Vernonia amygdalina* and *Artemisia abyssinica*, squeezed to drop the extract into the eye
MHU50	*Orobanche minor* Smith.	Orobanchaceae	Tomaa Sinbiro	Herb	Tooth ache	Root will be chewed and held on the affected teeth
MHU70	*Osyris quadripartita* Decn.	Santalaceae	Waatoo	Shrub	Candidiasis	Root smoke bath for women
					Ear infection	Crushed leaf will be mixed with water, and the filtrate will be dropped into the ear
MHU79	*Panicum hochstetteri* Steud.	Poaceae	Hinnaa Gogorrii	Climber	Kidney problem	Leaf will be crushed, boiled in water and drunk
MHU29	*Phragmanthera macrosolen* (Steud. Ex A. Rich.) M.G. Gilbert	Loranthaceae	Digalo Ceekaa	Herb	Dystocia	The entire part will be crushed and drunk with tea
					Diarrhea	Leaf will be crushed mixed with water, and the filtrate will be drunk
MHU56	*Phytolacca dodecandra* L. Herit.	Phytolaccaceae	Handode Masheena	Shrub	Liver disease	Root will be crushed, mixed with water and the extract will be drunk
					Hepatitis	Root will be chewed
					Gonorrhea	Root together with that of *Croton macrostachyus* will be powdered and drunk with water
					Hemorrhoids	Leaves will be pounded with leaves of *Ficus vasta, Justicia schimperiana* and *Rhamnus prinoides* and drunk with alcohol or tea
					Rabies	Root will be crushed, mixed with a local beer/*Tella* and drunk
MHU41	*Plantago lanceolata* L.	Plantaginaceae	Qorxobbii	Herb	Tinea versicolor	Leaves will be rubbed against the skin
					Wound	Leaves crushed and placed on the wound
MHU44	*Plumbago zeylanica* L.	Plumbaginaceae	Marxas	Shrub	Lymphoma	Crushed leaves will be mixed with honey and consumed
					Body swelling	
MHU59	*Afrocarpus falcatus* (Thunb.) C.N. Page	Podocarpaceae	Birbirsa	Tree	Gastritis	Crushed bark is boiled in water with honey and drunk
MHU46	*Portulaca oleracea* L.	Portulacaceae	Mararree Harree	Herb	Constipation	Leaf will be cooked and consumed
					Cough	
MHU24	*Pouzolzia zeylanica* (L.) Benn.	Urticaceae	Hidhaa Gaangge	Shrub	Wound	Leaf will be crushed and placed on wound
					Poison drink	Crushed leaf will be drunk with water
MHU84	*Premna schimperi* Engl.	Verbenaceae	Urgeessaa	Shrub	Diarrhoea	Leaf will be crushed together with leaves of *Calpurnia aurea* and *Croton macrostachyus* and then drunk with water
					Tooth ache	Root and leaf will be chewed and held on the affected teeth
					Ear disease	Shoot tip will be crushed and the juice will be dropped into the ear
					Headache	Powdered bark will be crushed and sniffed

MHU74	*Prunus africana* (Hook. f.) Kalkm.	Rosaceae	Dikttii	Tree	Syphilis	Root and bark will be boiled, and the decoction will be drunk
MHU49	*Prunus persica* (L.) BatSch.	Rosaceae	Kukii	Tree	Ear disease	Leaf will be crushed and the juice will be dropped into the ear
					Ascariasis	Leave and seed will be crushed together with root of *Rubus steudneri*, mixed with water to drink
					Infertility in women	Leave will be crushed together with roots of *Rubia cordifolia, Rubus steudneri* and *Thalictrum rhynchocarpum*, boiled in water and honey to drink
MHU28	*Psidum guajava* L.	Myrtaceae	Zeytuna	Tree	Snake bite	Shoot tip will be crushed and tied on the affected area
MHU18	*Rhamnus prinoides* L'Herit.	Rhamnaceae	Geshoo	Shrub	Skin fungus	Leaf will be pounded and applied on the affected part
					Wound	
MHU40	*Rhus ruspolii* Engl.	Anacardiaceae	Xaaxessaa	Tree	Intestinal worms	Seed powder will be drunk with water
MHU27	*Ricinus communis* L'Herit.	Euphorbiaceae	Qobbo qaxxe	Shrub	Muscle disorder	Seed will be crushed and used to massage the affected area
					Hemorrhoids	Oil from the seed will be applied
					Swelling with oozing pus	Leaf will be heated together with leaf of *Croton macrostachyus and Rumex nepalensis, smashed and tied on the swelling.*
MHU82	*Rubia cordifolia* L.	Rubiaceae	Hidda Dimaa	Climber	Dystocia	Crushed root will be infused in tea and drunk
					Menorrhagia	
					Tooth ache	Root will be chewed and held on the teeth
					Abdominal pain	Root will be chewed and swallowed
					Infertility in women	Root will be crushed together with roots of *Rubus steudneri*, *Prunus persica* and *Thalictrum rhynchocarpum*, boiled in water and honey and drunk.
MHU72	*Rubus steudneri* Schweinf.	Rosaceae	Gora Killee	Shrub	Infertility in women	Root will be crushed together with roots of *Rubia cordifolia* and *Thalictrum rhynchocarpum*, boiled in water and honey, and drunk
					Ascariasis	Root will be crushed together with leaf and seeds of *Prunus persica* and drunk with water
MHU89	*Rumex abyssinicus* Jacq.	Polygonaceae	Dhangosha Ra'ee	Herb	Hypertension	Root will be pounded together with bulb of *Allium sativum*, boiled in water and drunk
					Amoebiasis	Crushed root will be infused in tea and drunk
MHU88	*Rumex nepalensis* Spreng.	Polygonaceae	Mucharaab Dimaa	Herb	Gonorrhea	Root will be pounded with seeds of *Nigella sativa* and drunk with water
					Stomachache	Root pounded, infused in coffee and drunk
MHU86	*Salvia nilotica* Jacq.	Lamiaceae	Muka Sibilaa	Herb	Abdominal pain	Root will be crushed, infused in coffee and drunk
					Stomachache	Root will be chewed
					Febrile illness	Leaf will be crushed, infused in coffee and drunk
MHU07	*Senecio hadiensis* Forssk.	Asteraceae	Janaraas	Climber	Colds	Leaf will be crushed together with leaves of *Artemisia abyssinica, Rumex nepalensis,* bulbs of *Allium sativum* and

						seeds of *Brassica carinata,* mixed with honey and oil and drunk
MHU02	*Sida schimperiana* Hochst.ex A. Rich.	Malvacaeae	Vitimo	Herb	Ascariasis	The entire plant will be crushed infused in water and drunk
					Impotence	The entire plant will be crushed boiled with water and drunk
					Swelling (Boil)	Leaf will be crushed, boiled and drunk
					Tooth ache	Root will be used as toothbrush
MHU38	*Solanum giganteum* Jacq.	Solanacae	Hiddi Guddo	Shrub	Tonsillitis	Fruit juice will be mixed with pounded bulb of *Allium sativum* and honey, and consumed
					Jock-itch	Roasted seed will be powdered and applied onto the skin
					Skin itching	
					Pneumonia	Seed powder will be boiled in water and drunk
MHU37	*Solanum nigrum* L.	Solanaceae	Mujulo	Herb	Abdominal pain	Juice of the ripened fruit will be consumed
MHU05	*Spilanthes mauritiana* D.C	Asteraceae	Gutichaa	.Herb	Tonsillitis	Flower will be chewed
					Round worm	Root will be chewed and the juice is swallowed
					Tooth ache	Root will be chewed and held at the affected teeth
MHU87	*Stephania abyssinica* (Quart.-Dill. & A. Rich.) Walp.	Menispermaceae	Hidda Kalalaa	Climber	Wound	Pounded leaf will be applied onto the wound
					Syphilis, Gonorrhea	Root of *Stephania abyssinica together* with that of *Cucumis africanus* and leaf of *Juniperus procera* will be crushed and drunk with *tella* (local beer).
					Hepatitis	Root of *Cucumis africanus* and *Stephania abyssinica*, and leaf of *Juniperus procera* will be crushed together, mixed with *Tella* and drunk
MHU61	*Tagetes minuta* L.	Asteraceae	Ardii fadaas	Herb	Constipation	Root will be crushed, mixed with water and the filtrate will be drunk
MHU65	*Thalictrum rhynchocarpum* Quart.-Dill. & A. Rich.	Apiaceae	Sire bizuu	Herb	Gonorrhea	Root will be crushed together with root of *Salvia nilotica,* mixed with **tella** and drunk.
					Menorrhagia Infertility in women	Root will be crushed, infused in tea and drunk
MHU01	*Thymus schimperi* Ron.	Lamiaceae	Xosinyoo	Herb	Whooping cough	Leaf infused into tea and drunk
					Hypertension	
MHU68	*Trichodesma zeylancium* (Burm.f.) R.Br.	Boraginaceae	Guraan Qaayyi	Herb	Snake bite	Crushed leaf will be applied on the affected area.
MHU99	*Trigonella foenum-graecum* L.	Fabaceae	Hulbata	Herb	Abdominal pain	Powdered seed will be mixed with honey and consumed
					Body swelling	
MHU92	*Verbascum sinaiticum* Benth.	Scrophulariaceae	Gurra Harre	Herb	Snake bite	Root will be chewed and the juice be swallowed
					Abdominal pain	Crushed root will be infused in water and drunk

					Urination problem	Leaf will be crushed, boiled in water and drunk
					Diarrhoea	Powdered leaf powder will be drunk with water
					Asthma	Flower will be powdered and consumed with honey
MHU97	*Vernonia amygdalina* Del.	Asteraceae	Ebichaa	Shrub	Tooth ache	Root and leaf will be chewed with bulb of *Allium sativum*
					Stomachache	Leaf will be pounded together with leaf o*f Ruta chalepensis,* bulb of *A. sativum* and rhizome of *Ginger officinale* and then eaten with honey
					Ascariasis	Leaf will be crushed, infused in coffee and drunk
MHU33	*Vernonia auriculifera* Hiern.	Asteraceae	Dhoborok	Shrub	Febrile illness	Leaf will be crushed, infused in coffee and drunk
MHU95	*Verbena officinalis* L.	Verbenaceae	Atuchii	Shrub	Amoebiasis	Entire plant will be pounded and drunk with water
					Snake bite	Root will be crushed and drunk with water
					Stomachache	
					Ascariasis	Root will be crushed together with root of *Zehneria scabra* mixed with water and the filtrate will be drunk
					Tonsillitis	Root will be chewed
					Febrile illness	Crushed leaf will be infused in coffee and drunk
					Urination problem	
MHU31	*Viscum schimperi* Engl.	Santalaceae	Digalo Laafto	Mistletoe	Goiter	The entire plant will be powdered together with seeds of *Nigella sativa*, mixed with honey, boiled and drunk
MHU04	*Viscum triflorum* DC.	Santalaceae	Digalo Ejarsaa	Mistletoe	Dystocia	The entire plant will be crushed mixed with honey and consumed
MHU62	*Viscum tuberculatum* A. Rich.	Santalaceae	Digalo Makkanisaa	Mistletoe		
MHU03	*Withania somnifera* (L.) Dunal.	Solanaceae	Hiddi Bude	Shrub	Eye disease	Root will be crushed with root of *Xanthium spinosum* shoot tips, macerated in water and the extract will be dropped into the eye
MHU35	*Zehneria scabra* (Linn.f.) Sond.	Cucurbitaceae	Hidda Adii	Climber	Dandruff	Crushed root will be mixed with water and used to wash head

Measurement of ICF index

More than 60 human ailments have been documented as being treated with traditional plant-based medicine. These ailments were categorized into 11 distinct groups. The average Informant Consensus Factor (ICF) value across all disease categories was 0.77, with the highest ICF value of 0.83 observed in the category of febrile and fever-related illnesses, and the lowest value of 0.59 for lymphatic, blood, and cardiovascular issues (Table 2). A high ICF value indicates a strong consensus among participants regarding the plant species used for treating a specific disease category (Abebe & Teferi 2021). It is likely that these plant species possess therapeutic properties, highlighting the need for further phytochemical and pharmacological investigations.

Table 2. Informant consensus factor on major categories of human health problems

No	Major Health Problem Category	Ns	Nuc	ICF
1	Febrile and fever	29	162	0.83
2	Skeletomuscular problems	12	61	0.82
3	Dental problems	11	54	0.81
4	Genitourinary and fertility problems	42	208	0.80
5	Dermatological problems	55	258	0.79
6	Gastrointestinal problems	44	200	0.78
7	Snake bite and poisoning	18	78	0.78
8	Sensorial problems	21	47	0.78
9	Respiratory tract problems	16	66	0.77
10	Rabies	9	30	0.72
11	Lymphatic, blood and cardiovascular problems	23	55	0.59

Note: Ns = Number of species used, Nuc = Number of use citations

Measurement of FL index

Fidelity level is a useful index for confirming the inhabitants' agreement on a medicinal plant for treating certain ailment(s). We selected medicinal plant species that have been frequently cited to treat few ailments to attest that local community agree on the curative potential of the mentioned plant for the cited ailment. The medicinal plants that are reported by local people to treat several unrelated ailments have less fidelity level value. Conversely, plants cited by many respondents to treat one or few common ailments will have high fidelity, suggesting their higher curative potential. Analysis of FL values showed that *Cucumis africanus* and *Croton macrostachyus* scored lower FL (Table 3). This underscores that the local community of this study area use these plant species for multiple of unrelated ailments. On the other hand, a medicinal plant species used to treat one or few health problems has highest fidelity value. For example, *Senecio hadiensis* and *Hagenia abyssinica* scored 100% FL (Table 3), suggesting communal beliefs of respondents on their curative potential for the ailments they are cited for. To validate these traditional assertions, scientific phytochemical and pharmacological studies should be undertaken for use as remedies.

Table 3. Fidelity level (FL) values of mostly cited medicinal plants for commonly reported ailments

No	**Scientific name**	**Major disease(s) treated**	**IP**	**IU**	**FL%**
1	*Senecio hadiensis*	Cold	10	10	100.00
2	*Hagenia abyssinica*	Taeniasis, Constipation	27	27	100.00
3	*Rumex nepalensis*	Gonorrhea	33	36	91.67
4	*Salvia nilotica*	Febrile illnesses	26	31	83.87
5	*Rubia cordifolia*	Menorrhagia and women fertility related illnesses	15	18	83.33
6	*Ocimum lamifolium*	Head ache and Febrile illness	19	24	79.17
7	*Bersama abyssinica*	Ascariasis, Constipation	9	12	75.00
8	*Stephania abyssinica*	Hepatitis, Gonorrhea, Syphilis	12	16	75.00
9	*Inula confertiflora*	Leishmaniasis, Snake bite poison	27	39	69.23
10	*Artemisia abyssinica*	Rheumatism	13	19	68.49
11	*Brucea antidysenterica*	Eczema	12	18	66.67
12	*Verbascum sinaiticum*	Diarrhea, Urination problem	17	27	62.96

13	*Croton macrostachyus*	Skin Fungal infection, Swelling and Hemorrhoids	27	47	57.45
14	*Cucumis africanus*	Hepatitis, Gonorrhea, Retained Placenta, Urination problem	28	50	56.00

IP = the number of informants independently suggested the use of a species to treat a particular disease category, and IU = the total number of informants mentioned the plant for any major disease

Preference ranking

Nine plant species reported to treat rabies were ranked by 10 key informants based on their perceived efficacy. Result showed that *Croton macrostachyus* was the most preferred, whereas *Rumex nervosus* was least preferred (Table 4). The preference of C*. macrostachyus* for the treatment of rabies is vindicated by reports from other parts of Ethiopia (Megersa et al. 2013, Pagadala et al. 2015). Preference ranking was based on perceived curative power of each plant species that requires further phytochemical and pharmacological study. Previously different researchers (e.g., Asfaw et al. 2017, Asfaw et al. 2019, Pagadala et al. 2015, Yeweynshet et al. 2021, Yeweynshet et al. 2022) have reported that *C. macrostachuys* is a cure for rabies

Table 4. Preference ranking of medicinal plant species reported to treat Rabies

Scientific Name	Informants (I1-10)										Mean	Rank
	I1	I2	I3	I4	I5	I6	I7	I8	I9	I10		
Croton macrostachyus	6	9	9	9	9	9	8	8	7	5	8.8	1st
Inula confertiflora	1	8	1	8	8	8	9	7	6	7	7.0	2nd
Momordica foetida	8	7	5	7	6	7	4	1	8	2	6.1	3rd
Phytolacca dodecandra	9	4	8	4	5	6	1	2	4	6	5.4	4th
Calpurnia aurea	2	3	3	2	7	5	7	6	5	8	5.3	5th
Echinops kebericho	7	6	6	3	4	1	5	5	9	1	5.2	6th
Justicia schimperiana	5	2	4	5	3	2	2	9	1	9	4.6	7th
Cucumis africanus	4	5	7	6	1	3	3	4	1	3	4.1	8th
Rumex nervosus	3	1	2	1	2	4	6	3	3	4	3.2	9th

Respondents' socio-demographic characteristics and ethnomedicinal knowledge

There was a highly significant difference in the number of medicinal plants reported between age categories (Mann-Whitney U test, P<0.001, Z=-4). Individuals aged 41 and older (n=206) reported more medicinal plants than those under 41 (Figure 5). This indicates that knowledge of medicinal plants tends to decrease with age, highlighting a concerning lack of knowledge transfer from the elderly to the youth, which threatens the preservation of indigenous knowledge.

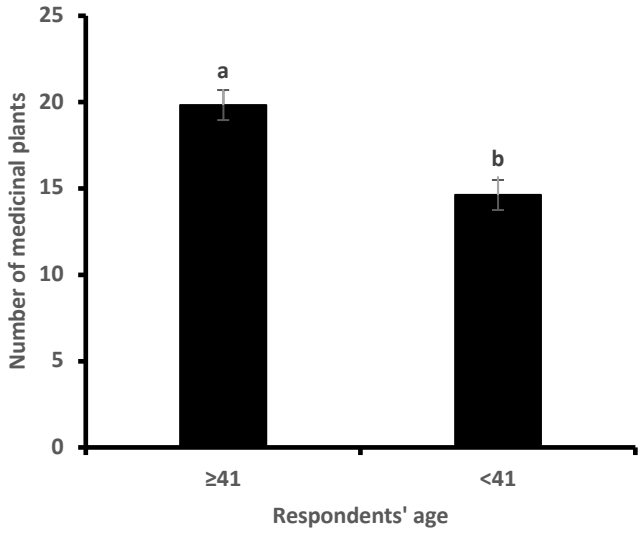

Figure 5. Number of medicinal plants reported by age category. Values are mean±SE

People with no formal education were found to report the highest number (23.94±1.94) of medicinal plants than those who took formal education (one-way ANOVA, F=11.12, df=3, P<0.01). This shows that people with formal education seem to give less attention to traditional medication probably for preferring modern medication to traditional one, and the guardianship role for preserving indigenous knowledge is largely in the hands of non-educated people.

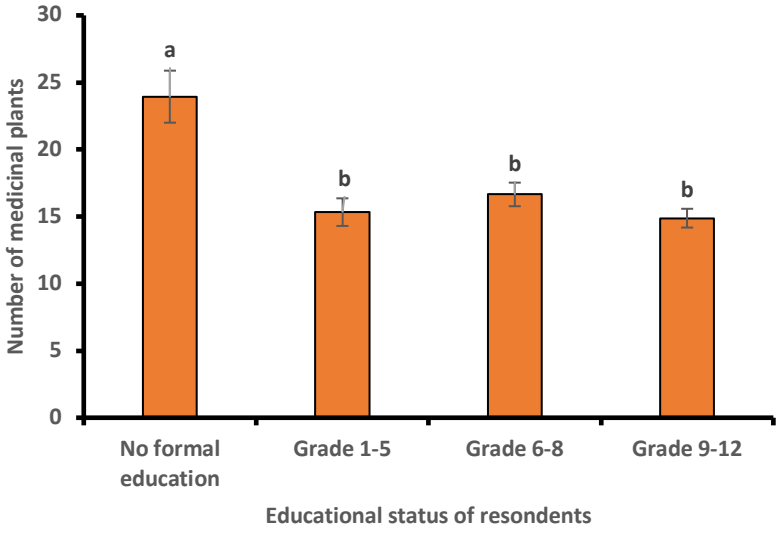

Figure 6. Number of medicinal plants reported by age category. Values are mean ± SE

Conclusions

The present study deciphered the use of plants in healthcare by indigenous people of Deder district considerably. Some of the medicinal plants reported in this study have been mentioned in different regions in Ethiopia for similar or related ailments. These plants, especially those with high ICF, FL and PR should be further investigated pharmacologically to confirm the traditional claims by indigenous people. We also noted that younger individuals reported a smaller number of medicinal plants, suggesting rapid loss of indigenous knowledge. Therefore, educational programs on knowledge transfer from elderly to the youth should be arranged regularly by district administrations to help preserve indigenous knowledge on traditional medical practices.

Declarations

List of abbreviations: Not applicable

Ethics approval and consent to participate: Prior to data collection we explained the objective of the study and obtained oral consent

Consent for publication: The authors have agreed to publish the manuscript

Availability of data and materials: All required data are included in the manuscript

Competing interest: Authors declare that there is no competing interest

Funding information: We received research fund from the Ministry of Education, Ethiopia

Author contributions: M.C.E. contributed to the designing of the research and specimen identification, analyzed data and wrote the manuscript; M.K. conducted field work, contributed to specimen identification and manuscript writing; J.M.S. contributed to the writing.

Acknowledgements

The authors thank Deder district Administrative Office and the respondents for their cooperation.

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