



Original Research Article

Ethnobotanical Study on Medicinal Plant Uses against Human Ailments in Lay Armachiho District, Northwest Ethiopia

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ABSTRACT

Indigenous communities have cultivated a rich knowledge of plant utilization and conservation techniques. Nevertheless, scientific research on these practices has received relatively little attention. Therefore, ethnobotanical investigation of therapeutic species was undertaken in Lay Armachiho to document their uses and management practices. Nine study kebeles with good plant cover and number of healers were purposively selected. Seventy-two non-key and 18 key informants were chosen through purposive and randomly stratified method, respectively. Ethnobotanical information were gathered from between February and March 2020 using face-to-face, focus group discussions, and direct observation with informants. Descriptive statistics, ranking and clustering methods were used to analyze were used data gathered from respondents. Seventy-eight species of medicinal plants were documented. Large proportion (60.3%) of therapeutic plants were distributed in the wild habitat and shrubs were the dominant habit (28, 35.9%). About 66 human ailments have been identified that can be treated with many therapeutic species. The most commonly used plant part was leaf was found the most frequently used part (41, 35.04%) and crushing (35, 31.8%) was the main preparation method. *Croton macrostachyus*, *Hagenia abyssinica*, *Allium sativum* and exhibited a high level of consensus among respondents. *Croton macrostachyus* and *Ximenia americana* ranked as the top multi-use plants, while *Zehneria scabra* had the top fidelity level (98%) for healing febrile conditions. Farmland encroachment (29.82%) was found the primary threat to therapeutic species. The area is endowed with a high number of therapeutic species with a high wealth of indigenous knowledge about its uses, which calls for prudent use and appropriate conservation measures.

Keywords: Armachiho, Central Gondar, indigenous community, respondents, therapeutic species.

INTRODUCTION

Ethiopia is thought to be one of the most biodiversity-rich countries in Africa, hosting 5,757 higher plant species, with 10% of them being endemic (Sebsebe and Ensermu, 2014). These plant

resources provide materials to maintain ecological stability, preserve cultural heritage, biological information and indigenous knowledge.. Hence, plants are sources for food, medicine, fuel, building materials, and tools for recreational and spiritual fulfillment (Kidane et al., 2021). Ethiopia is home of many plant species proven to be very efficient in healing (Endeshaw, 2007). Edwards (2001) and Seraw et al. (2024) found that evergreen scrub, woodland, rocky areas and grassland have a higher theropuetic species, with woodlands showing the greatest potential. Ethnobotanical studies are valuable for recording and sharing information about these therapeutic species (Martin, 1995; Kidane et al., 2021; Seraw et al., 2).

The widespread adoption of cultural remedies in Ethiopia reflects a deep-rooted cultural belief in its efficacy and its cost-effectiveness in relation to the contemporary medical practices (Dawit, 2001). But, thereoptic species and the local wisdom linked with these plants are losing due to both natural and human-induced factors, along with verbal transfer custom (Edwards, 2001; Ermias *et al.*, 2008) forcing cultural practitioners to move far so as to gather in the natural environment (Mesfin *et al.*, 2005; Seraw et al., 2024)). Thus, large number of therapeutic species are endangered, causing many potentially beneficial plant species to, even, disappear globally prior to their documentation (WCMC, 1992). Kebu et al. (2004) and Kidane et al., 2021 concurred that the compilation of therapeutic species knowledge remains inadequate, as there is no comprehensive assessment of the therapeutic species culturally utilized plants traditionally used by the local communities. Thus, it is essential to compile these species along with the local wisdom to ensure its transmission to future generations.

Lay Armachiho District has diverse land features and vegetation distributions that have contributed to the wealth of indigenous knowledge of medicinal plants. s. Such anthropogenic activities are eroding the theoraptic species along with the local wisdom. Before the total loss of plant resources, proper documentation is required for sustainable uses. Therefore, this work was initiated with the aim of wisdom documentation regarding the cultural use and conservation of therapeutic species before their total loss.

MATERIALS AND METHODS

Study Area Description

Lay Armachiho is found in Central Gondar Zone and is bordered by Chilga, Tach Armachiho, Wegera and Gondar town to the west, north, east and south, respectively (Figure 1). Tekeldengaye serves as the center of the district, located northwest of the city of Gondar at 21 km. The district contained 31 administrative units (30 urban and one rural Kebeles) that covers 1,294.71 km². with a population size of 183,924. The district placed between the elevations ranges of 1002 to 3001 masl. The district has three agroecosystems, low lying lands (32.1%), middle lands (60.4%) as well as uplands (7.5%). Leptosol, Lithic leptosol and eutric are dominant soil categories. Agriculture is the predominant activity, with a typical mixed economy (crop production and animal husbandry).

According to Ethiopian Metrological Agency, Tikle Dingay station data (2010-2019) mean annual precipitation for the area ranges from about 1300 mm to about 1505 millimeter. The district experiences a single peak rainfall pattern, with the wet season lasting from June up to October.

However, most of the precipitation falls in July and August (Figure 2). The Ethiopian summer season, spanning from June to August, is the main rainy period. Monthly temperatures ranged from 11°C to 30°C, with an average annual of 20°C.

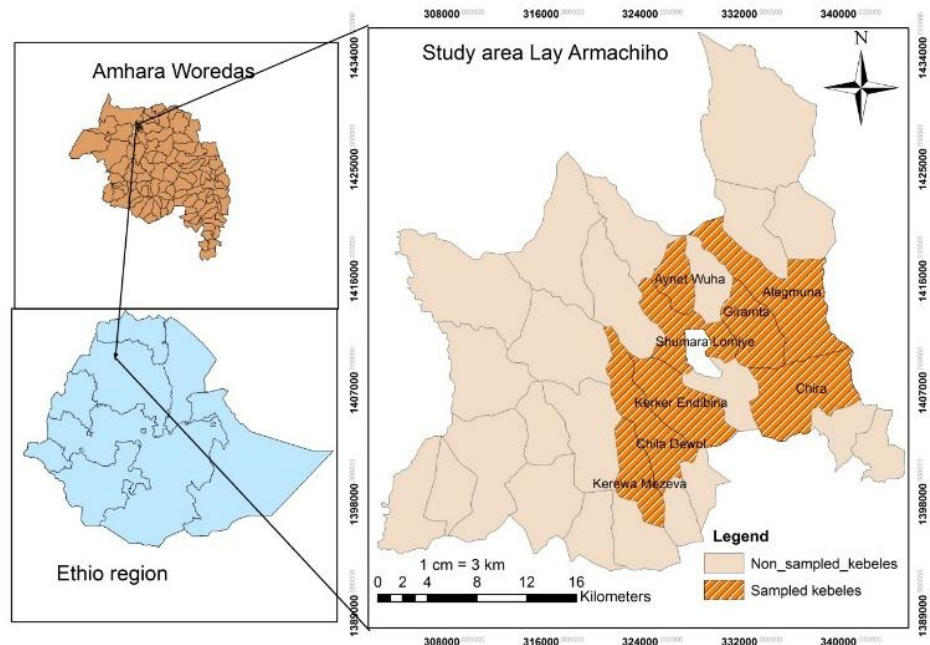


Figure 1: Study area location map

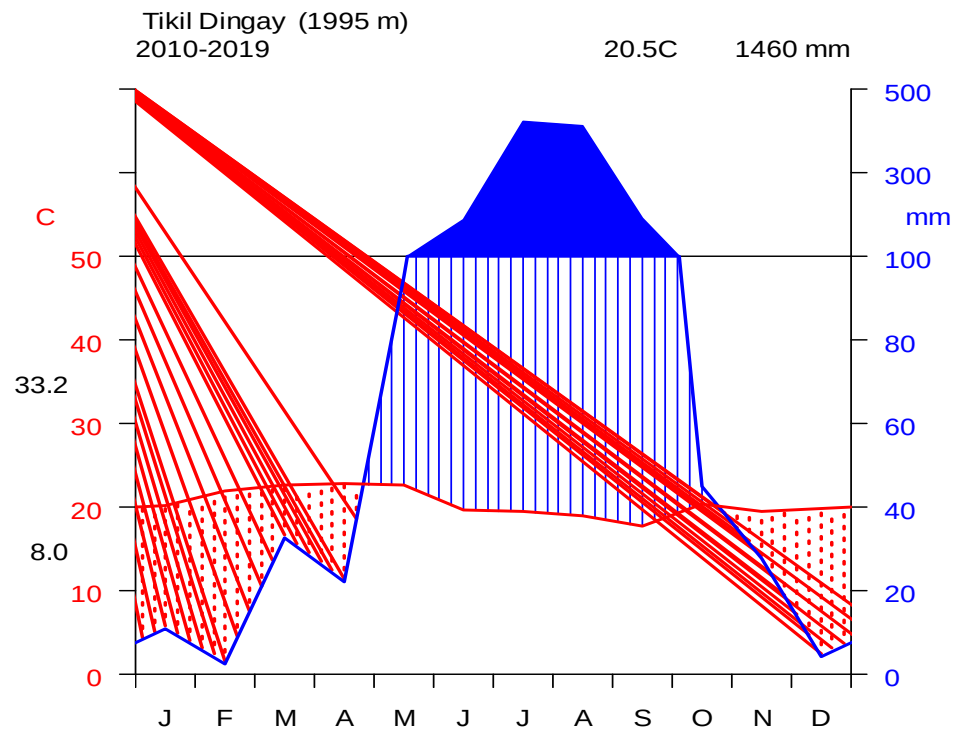


Figure 2: Study area Climate diagram

The district's terrain is predominantly mountainous, with small flat areas consisting largely evergreen afromontane forest and grassland complex type. Key plant species are *Rhamnus*

prinoides, *Cordia Africana*, *Olea europaea* subsp. *cuspidata*, *Phytolacca dodecandra*, *Ficus sycomorus*, and *Capparis tomentosa* and *Croton macrostachyus* (Friis et al., 2010).

Sampling of respondents and study sites

A field survey was done in February 2020 to have sufficient impression about the study area in terms of topographical features/agroecology/, vegetation distribution and availability of healers which were used as selection criteria for the study sites. Thus, purposive selection, based on recommendation of elders, development officers and leaders, was made for the nine study kebeles (Alegmuna, Yanikev, Giramta, AynetWuha, Shumara Lomiye, Kerewa Mezeva, Chira, Kerker Endibina and Chila Dewol). Ninety respondents (62 men and 28 women) above 18 years old were selected to collect data. From these, 18 key informants (two from each Kebele) were chosen by using purposive means based on the involvement of clergies, known residents and leaders. Seventy-two non-key respondents were obtained by stratifying them into 48 masculine and 24 feminine, by using equal representation from each kebele.

Data collection

Ethnobotanical data were gathered via in-depth (individual) interviews, focus group discussions, and direct field observations along with the respondents. Partially structured questionnaires were developed in English beforehand and converted into Amharic during data collection. Questions were centered vernacular names of therapeutic species, uses, habitat, growth form, parts used, ways of preparation, and administration. All data were collected using texts, photos and botanical preparations. In addition, focus group discussion was conducted before and during the ethnobotanical data collection according to Martin (1995) using 10 healers. These were conducted with members of the traditional medicine association, other local healers and knowledgeable members of the local community at specific times in each site. At the end of the interview, each informant's contribution was acknowledged, indicating the value of their knowledge in public health and biodiversity conservation. Furthermore, the interview was conducted during a guided field walk while walking so as to record information on medicinal plants. Accordingly, with the assistance of guides and respondents records of the collection type, landforms, soil types, natural and human-induced threatening factors, as well as the plants' habits and habitats were made in the-site (Kidane et al., 2021; Seraw et al. 2024). Respondents were communicated at least twice over a three-week period to verify the consistency of the information gathered. If any of the respondents' responses contradicted the initial information, it was entirely omitted as unreliable.

Data analyses

The basic ethnobiological data encompassing methods of preparing and applying remedies, aliment treatment, dosages, parts used, habits, threatening factors, and conservation status of therapeutic species were analyzed through statistical descriptions. This analyses involved the use of frequency, percentage, and means. Ethnobotanical tools, respondent's agreement, informant consensus factor (ICF), preference ranking (PR), direct matrix ranking (DMR), and fidelity level, were used to verify data.

Informant consensus (agreements) was applied to calculate the number of informant reports for each plant species as traditional medicinal uses. ICF was computed for each class of ailments to assess the level of consensus among regarding the therapeutic properties of plants and common illness. ICF was determined by subtracting the number of species utilized (nt) from the total number of use citations in each category (nur), and then dividing this result by the total number

of use citations in that category minus one (Heinerich, 2000). This factor yields a value between 0 and 1, with higher values indicating a strong level of agreement among informant

PR was done using eight experienced key respondents to evaluate the efficacy of six therapeutic species for curing wounds as outlined by Martin (1995). The plants considered most potent were assigned the highest score of 6, while those deemed least potent received a score of 1. The scores for each species were totaled, and rankings were established based on these sums, highlighting the most potent therapeutic species used by the locals for this ailment (Seraw et al., 2024)

DMR was performed to assess the multi-use therapeutic species frequently mentioned by respondents, following the approach suggested by Cotton (1996), Kedane et al. (2021) and Seraw et al. (2024). From the total therapeutic species, six multi-use trees were chosen based on their relative benefits and six use categories (building, charcoal, fencing, fuelwood, therapeutic use, and shelter) were identified (Kedane et al., 2021; Seraw et al., 2024). Five key respondents were then asked to assign use values for each attribute, with a scale ranging from 5 (best) to 0 (not used). The scale was defined as follows: 5 = excellent, 4 = very good, 3 = good, 2 = somewhat used, 1 = least used, and 0 = not used at all. The average value for each use category was calculated based on the informants' input, and the total scores for each species were summed and ranked accordingly (Kedane et al., 2021; Seraw et al., 2024).

FL reflects respondent's percent who report utilizing a specific species for a given ailment. It is computed using the formula $FL (\%) = (N_p / N) \times 100$, where N_p is the number of respondents who acknowledge the plant's application for that ailment, and N is the total number of informants who employ the plant for any medicinal use, as noted by Alexiades (1996). Information on both general and specific use reports was collected, and the fidelity level index was computed and summarized (Seraw et al., 2024).

RESULTS AND DISCUSSION

Therapeutic Species Composition and Distribution

The study identified 78 therapeutic species across 70 genera and 45 families that are recognized for their therapeutic utility to mankind (Appendix 1). The results demonstrated that the local communities in the study area have a long and rich experience of interaction with their natural resources revealing depicting that preparing cultural remedies is viewed as a commonplace activity among them.

The number of therapeutic plants identified in this study is less than the species reported by Gebeyehu et al. (2014) and Seraw et al. (2024) who reported 107 and 113 species, respectively. In addition, our work revealed a smaller count of therapeutic species compared to Mekuanent et al. (2015), who disclosed 102 species. Furthermore, we reported fewer species than Getnet et al. (2015), who identified 163 species. On the other hand, Dereje (2018) recorded lower number of species (65) compare red to our report. Messay et al. (2015) also disclosed less number of species (54) than our result. This demonstrated that the use of local therapeutic species varies by location (Dereje, 2018). The predominant family identified in this study was Solanaceae, with five species (Appendix 1). In contrast, Mekuanint et al. (2015) found Fabaceae as the dominant family. Similarly, Yihenew et al. (2017) and Seraw et al., (2024) reported Asteraceae as the leading family. This indicates that their abundance (species richness) varies across different locations (Seraw et al., 2024).

Shrubs were the dominant habit (28, 35.9%) followed by herbs (25, 32.1%) and trees (17, 21.8%) whereas climbers (8, 10.3%) were less used as traditional medicines. This may be attributed to the high demand trees for varied values demonstrated that most medicinal plants in homegardens are shrubs and herbaceous species. This could also be linked to the perennial accessibility (always present) of shrub species in the region. These findings align with those of Alemayehu (2010) and Ermias et al. (2008), who noted that shrubs were the most commonly harvested types for medicinal purposes in their ethnobotanical studies.

This finding aligns with Alemayehu's (2010) work, which demonstrated that shrubs were the most commonly harvested growth forms for therapeutic purposes in his ethnobotanical investigation. In addition, Ermias *et al.* (2008) reported similar result. However, the finding of Endalew (2007) and Tizazu (2005) noted that herbaceous species were the most sought-after source for therapeutic purposes.

The findings highlighted that the majority of medicinal plants utilized by the communities were sourced from the natural environment (60.3%), with the next largest group coming from homegardens (29.5%) while a combined total of both wild and homegarden sources accounted for 10.3% which corresponds with the established trends noted in several medicinal plant works (Bizuneh et al., 2018; Nigussie et al., 2018; Mulugeta, 2016; Mengistu et al., 2019). Correspondingly, residents of the district tend to invest less effort in cultivating therapeutic plants in their homegardens, opting instead to venture to nearby or distant locations to harvest them from the wild, even though they do grow some popular medicinal plants such as *Allium cepa*, *Allium sativum*, *Zingiber officinale*, *Cucurbita pepo*, *Citrus limon*, *Rhamnus prinoides*, *Coffea arabica*, *Brassica nigra*, *Capsicum annum*, *Carica papaya*, *Lycopersicon esculentum*, *Musa x paradisiaca*, *Nigella sativa* and *Ruta chalepensis* in their homegarden for other purposes like food, alcohol preparation and stimulant. During the survey, it was observed that some practitioners deliberately refrain from cultivating specific plant species in their gardens which are used to treat specific ailments, as a way to maintain the secrecy of their therapeutic properties.

Health issues addressed

Forty six health concerns of mankind were found cured by therapeutic species of the District. Healers often diagnose medical problems through patient consultation and visual assessments. One plant may be used to address multiple ailments, while one health condition can be managed with various species (Table 1 and Appendix 1). Based on the respondents' response, wounds are cured with the highest number of therapeutic species (15 species). This ailment is widespread in the district, as many residents are involved in farming and are thus more vulnerable to cuts and injuries. Coughs are addressed with eight species, while cure for the evil eye and stomachaches involve seven and six species, respectively. The local community prefers cultural practitioners for these conditions, largely due to the easy access of herbal remedies compared to modern medical options (Mengistu et al., 2019). Eighty percent of Ethiopians still utilize plant-based remedies for various health conditions (Edward, 2001). Mirutse et al., (2009) and Seraw et al. (2024) also came with similar results.

Table 1: Health conditions cured by a wider range of plant species

No.	Health Condition	Vernacular Name/Amharic	No. of Plant Species Used
1	Wound/injury	Kusil	15

2	Cough	Sall	8
3	Evil Eye/sprit	Budda	7
4	Stomachache/illness	qurtet	6
5	Eczema	Asim	5
6	Diarrhea/loose stools	Tekimat	4
7	Dandruff	Forefore	4
8	Malaria	Niddad /Wobba	4
9	Swelling/endema	Ebitett	4
10	Devil/satan	Seyttan	3
11	Headache/cephalalgia	Rass himem	3
12	Poisoning/intoxication	memerez	3
13	Tapeworm infection	Kosso	3

Cultural wisdom of respondents

Male respondents mentioned more therapeutic species than females, suggesting possession of more cultural wisdom about these plants than their female counterparts (Table 2). This disparity is attributed to the traditional methods of knowledge transfer, which tend to favor males, particularly first son (Ermias et al., 2008). Sons get more opportunities to learn about therapeutic plants, as fathers are more inclined to share their knowledge with boys by permitting them to gather these species in the natural vegetation, while girls are made to engage in home activities. In line with this result, Tilahun (2009) noted that females are primarily tasked with cooking and caring children which limits their involvement in the surrounding areas.

According to the data obtained from the study, more informants were not well educated. This indicated that illiterate informants handle much knowledge of traditional medicine than educated informants. With regard to age classes, most knowledgeable individuals were aged 61-80, followed by those in the 41-60 age range (Table 2). The result clearly demonstrates that elders have a deeper cultural wisdom in therapeutic species remedies, including their collection methods, preparation techniques, and administration practices. This aligns with studies of Solomon et al. (2015), Ermias et al. (2013) and Miruts et al. (2009).

In terms of indigenous knowledge transmission, male parents were the primary source of information about cultural therapeutic species, accounting for 42.21%, followed by female parents at 14.45% and brothers at 12.23% (Table 3). This indicates that practitioners primarily acquire their wisdom from fathers, mothers or their kin. Practitioners tend to keep their wisdom confidential, mainly with verbal transmission. Furthermore, despite the strong emphasis on secrecy in the transmissions of cultural wisdom, younger individuals show less attention in acquiring and preserving the wisdom.

Table 2: Cultural wisdom of respondents

Items	Sex		Informant Age Groups				Educational status			
	Male	Female	18 – 40	41 – 60	61 – 80	>80	Illiterate	1-8	9-12	>12
Frequency	62	28	21	24	31	14	23	51	9	7
Use report	332	128	45	97	247	71	121	266	42	31
Average	5.35	4.57	2.14	4.04	7.97	5.07	5.26	10.05	4.67	4.43

Table 3: Therapeutic species cultural wisdom sources

Source	Respondents	Percent
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Male parents	37	42.21
Female parents	14	14.45
Brother	10	12.23
Sister	9	8.89
Colleagues	9	11.11
Others	9	11.11

Traditional medicine preparation and routes of application

Different parts of medicinal plants have been documented for their use in medication. The frequently utilized plant part was leaves (41, 35.04%) followed by roots (20, 25.64%) and fruit (13, 11.11%) respectively (Figure 3). This preference may be attributed to their greater availability during collection, less effort in preparing remedies from leaves and efficacy as a result of secondary metabolites present. Abiyu et al. (2014) and Dereje (2018) also highlighted leaves as significant sources for traditional remedy preparation.

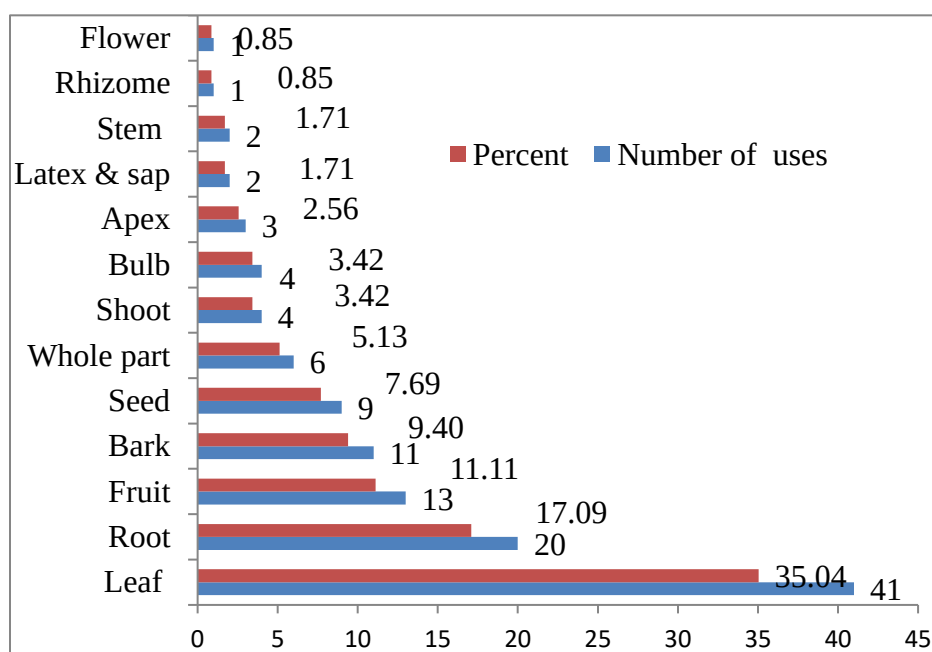


Figure 3: Plant parts used for remedy preparation

Local communities utilized a range of methods to prepare remedies, with the most frequent being crushing (31.81%), and powdering appeared next (13.65%) (Figure 4). The preference of preparing remedy varied based on the particular health condition being cured. Typically, techniques like crushing are favored over decoction, as temperature can compromise the ingredients of the remedies. This insight is supported by the work of Mulugeta (2016).

Respondents highlighted various experiences in preparing remedies, including one plant part or mixing parts of different species, newly harvested or dry. Findings indicated that majority of medicinal substances were derived from one species (80.76%), while combined formulations were 19.24%. In addition, majority of therapeutic species were utilized in newly harvested condition form, comprising 71.81%, compared 28.18% that were used dried. The preference for

newly harvested ones is due to the volatile nature biochemical in the therapeutic species. This finding is supported by the previous work (Moa *et al.*, 2013). Some remedies are combined with various additives such as butter, honey, sugar, tea, salt, food, water, coffee, and milk. Plant medicines, sometimes, are taken with some additional materials (additives) like honey, tea, salt, food, coffee, which might strengthen the curing power, enhancing their flavor, and alleviating any unpleasant feeling associated with them. For instance, *Allium sativum* (garlic) is pounded, powdered, and honey is added on it so as to cure malaria. The other materials added to the remedies are water, sugar, better.

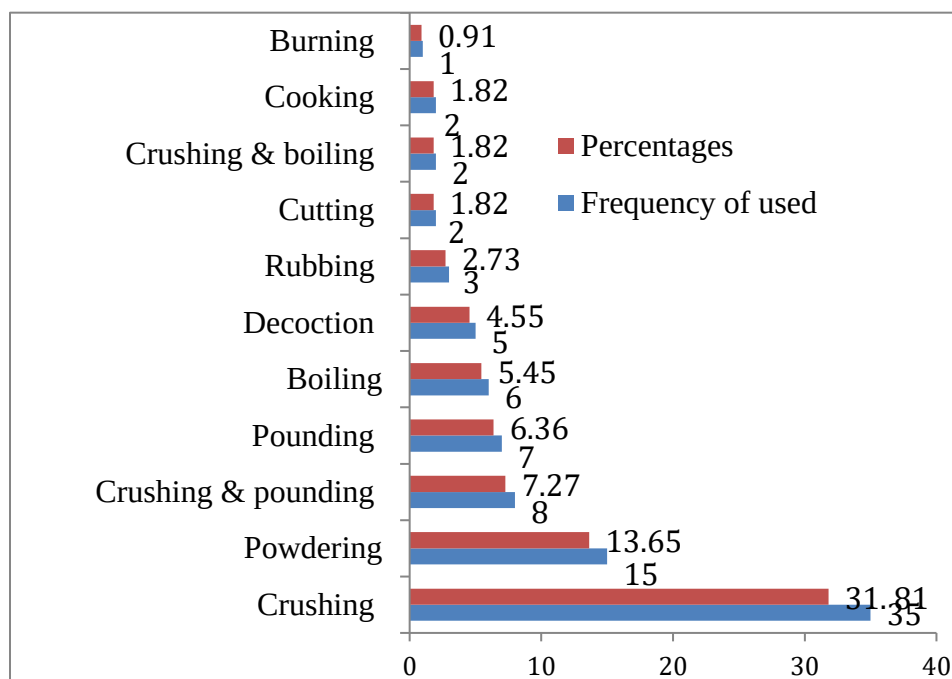


Figure 4: Techniques of preparing medicines from therapeutic species

Remedies were administered through various routes, with oral application representing the most significant portion (47.26%) and dermal appeared next (36.78%), nasal application (15.10%) and Ear drops (1, 0.95% respectively). Endoparasites predominantly affect the population in the district, likely influencing the preference for oral route. Various reports elsewhere in Ethiopia have indicated that oral administration is the predominant route (Gidey *et al.*, 2011; Moa *et al.*, 2013).

The traditional healers prepared medicinal plants in various ways and applied it using different methods to the patients. Creamed accounted about 38.53%) and drinking appeared next (28.14%). Smoking accounted for 13.53 %, swallow after chewing recorded for about 11.46%, bandaging 7.28% and tying 1.05%. as similarly reported by Mengistu *et al.* (2019)

Locals utilized a variety of means to determine the amount (dose) of remedies to be given to the patient. Local metrics, such as hand span for measuring bark, roots, and stems, along with household items like measuring cups, mugs, and bowls, were employed to estimate the amounts of medicine as similarly reported by Mengistu *et al.* (2019). Generally, the dosages of remedies are not yet standardized and healers are using equipment which is available in their homes and consider patient age, physical and health conditions. Thus, this is expected to cause risk due to

under dose and over dose during treatment of patients. Hence, Solomon *et al.* (2015) reported that lack of precision and standardization has been mentioned as drawbacks of traditional medication.

Consensus of respondents

The respondents' consensus finding demonstrated that *Allium sativum*, *Hagenia abyssinica*, and several others were cited by the greatest number of respondents (Table 4). Seraw *et al.* (2024) reported similar findings

Table 4: Therapeutic species mentioned more than 30 respondent

Therapeutic species	Respondents mentioned the species	Percentage
<i>Allium sativum</i>	49	53.34
<i>Hagenia abyssinica</i>	48	52.23
<i>Croton macrostachyus</i> , <i>Daturastramonium</i>	46	50.01
<i>Carissa spinarum</i>	44	47.79
<i>Embeliaschimperi</i> , <i>Otostegia integrifolia</i>	43	46.68
<i>Zehneriascabra</i>	42	45.57
<i>Cucurbita pepo</i> , <i>Ocimum gratissimum</i> , <i>Zingiber officinale</i>	41	44.45
<i>Dodonea angestifolia</i>	40	43.34
<i>Foeniculum vulgare</i> , <i>Nigella sativa</i> , <i>Ximenia americana</i>	39	42.23
<i>Euphorbia tirucalli</i> , <i>Eucalyptus globulus</i>	38	41.12
<i>Acokanthera schimperi</i>	35	37.79
<i>Capparis tomentosa</i> , <i>Carica papaya</i> , <i>Euphorbia abyssinica</i>	32	34.45
<i>Ruta chalepensis</i>	31	33.34

The findings from the respondent consensus factors demonstrated that therapeutic species regarded as efficient for certain ailments exhibited higher ICF. This reveals such condition (ailment) is widespread than those with lower ICF values (Table 5). Specifically, Gonorrhea recorded the highest ICF at 0.98, closely descended by Cancer and TB at 0.97, and Cramp and impotency also held an ICF of 0.97.

Table 5: Respondent consensus factor by group of ailments

Ailment category	Species	Use citations	ICF
Gonorrhea	3	97	0.98
Cancer and TB	3	78	0.97
Cramp and impotency	4	109	0.97
Animal causing (Rabies, poisoning and snake bite)	5	102	0.96
Goiter, tumor, wart and hemorrhoids	6	117	0.96

Diabetes, hypertension, gastritis and hepatitis	8	122	0.94
Malaria, head ache and febrile illness	11	141	0.93
Evil spirit and evil eye	11	124	0.92
Swelling and bleeding	11	130	0.92
Gastro-intestinal (gut disease causing worms, dysentery, amoebae, giardiasis, tapeworm infection, and emesis)	18	152	0.89
Respiratory (tonsil infection, flu, common cold, reactive air way disease and tussis)	16	137	0.89
Dermal (Wound, dandruff, eczema, itchy and impetigo)	30	229	0.87

Preference ranking exercise indicated that *Sida rhombifolia* ranked first in efficacy for curing wounds (Table 6). Ethnobotanical investigations done in different parts of the country including Yohannis et al. (2018) and Seraw et al. (2024) reported similar results in thier ethnobotanical study.

Table 6: Six therapeutic species preference ranking in curing wound

Therapeutic species	Informants (I1- I8)								Total	Rank
	I1	I2	I3	I4	I5	I6	I7	I8		
<i>Centella asiatica</i>	2	1	3	3	2	3	2	3	19	4 th
<i>Rumex nervosus</i>	5	5	2	5	4	5	6	5	37	2 nd
<i>Sida rhombifolia</i>	6	4	4	5	6	4	5	6	40	1 st
<i>Ximenia americana</i>	4	6	6	4	3	4	3	3	33	3 rd
<i>Stereospermum kunthianum</i>	3	2	5	1	2	1	1	2	17	5 th
<i>Linum usitatissimum</i>	1	3	1	2	1	2	2	1	13	6 th

The results of the direct matrix ranking demonstrated that majority of individuals utilize species for a variety of purposes, such as tools for agriculture, firewood, charcoal, building, fencing, and medicinal uses. *Ximenia american* emerged as the highest-ranked multipurpose species, with *Croton macrostachyus* following closely behind (Table 7). Of the six-selected use categories, charcoal and fuel wood were ranked first and second. Other studies conducted in different parts of Ethiopia, revealed *Croton macrostachyu* sand *Olea europaea* subsp. *cuspidata* as the most preferred multipurpose medicinal plants (Yohannis et al., 2018; Abiyu et al., 2014; Seraw et al., 2024). These similar reports suggested their relative importance for the livelihood of the local residents and the burden posed on these plant species (Kedane et al., 2021; seraw et al., 2024). Thus, appropriate interventions shall be taken before their total loss.

Table 7: Direct matrix ranking for therapeutic species having multiple utility

Use categories	Medicinal plants						Total	Rank
	<i>Olea europaea</i>	<i>Cordia africana</i>	<i>Croton macrostachyus</i>	<i>Syzygium guineense</i>	<i>Ximenia american</i>	<i>Azadirachta indica</i>		
Construction	21	24	24	23	22	22	136	3 rd
Charcoal	24	25	23	26	25	22	145	1 st
Fencing	16	20	20	16	19	18	109	6 th
Firewood	23	23	24	23	27	24	144	2 nd

Medicinal	11	13	23	20	27	22	116	5 th
Shade	17	18	18	19	23	29	124	4 th
Total	112	123	140	127	143	136		
Rank	6 th	5 th	2 nd	4 th	1 st	3 rd		

With respect to fidelity level index (Table 8), species predominantly utilized by the local population for curing a single disease show higher FL values than those used for several ailments. The data indicates that *Zehneria scabra* boasts the highest FL at 99%, closely descended by *Hagenia abyssinica* at 97% (Table 8). Seraw et al. (2024) did similar work. In addition, a high fidelity level reflect the species effectiveness in curing the particular health condition.

Table 8: Fidelity Level Index of some medicinal plants

Plant species	Treatment for	IP	Pu	FL	FL%
<i>Allium sativum</i>	Tussis	38	47	0.80	82
<i>Hagenia abyssinica</i>	Tape worm infection	46	48	0.97	97
<i>Croton macrostachyus</i>	Dandruff	36	44	0.81	81
<i>Datura stramonium</i>	Wound/injury	30	44	0.68	68
<i>Carissa spinarum</i>	Evil eye/sprit	39	44	0.89	89
<i>Otostegia integrifolia</i>	Common cold	34	41	0.82	82
<i>Zehneria scabra</i>	Fibril illness	41	42	0.99	99

Treats on therapeutic species and cultural wisdoms

The encroachment of farmlands is the leading factor contributing to the decline of therapeutic species (Table 9) since the communities primarily rely on mixed farming as their main income base. This issue has been corroborated by various studies such as Yihenew et al. (2018) and Tadesse et al. (2015). Furthermore, Bizuneh et al. (2018) also highlighted the detrimental effects of deforestation on therapeutic species.

Table 9: Threats to medicinal plants in the study area

Major treats	Frequency	Percentage
Farmland encroachment	33	29.72
Building	18	14.99
Charcoal	16	14.14
Overgrazing	28	25.24
Firewood collection	19	15.89

Alongside the dangers facing therapeutic species, cultural wisdom is at risk of disappearing due to the youth's declining interest in learning and utilizing cultural remedy practices. Respondents noted that factors such as secrecy, non-formal transmission of wisdoms, the impact of modern education, and the younger generation's reluctance contribute to this loss. Elders highlighted several negative influences, including the perceived low income from cultural practices and the push for modernization. Additional studies have noted that young people across various cultural groups in Ethiopia exhibit a disinterest in learning cultural wisdoms (Ermias et

al., 2014; Miruse et al., 2009; Seraw et al., 2024)). Numerous respondents indicated that their wisdom of therapeutic species has diminished over time, primarily because they have not developed a routine for properly recording ethnomedicinal information. Consequently, this poses a serious threat to the future accessibility of indigenous ethnomedicinal wisdom, which is vital for addressing the primary healthcare needs of the locals.

Therapeutic species conservation

Certain members of the recognized the significance of both ex-situ and in-situ plant conservation. For example, some individuals have begun protecting plants in fenced pastures, within various places of worship (such as churches and mosques), along the edges of their fields, and around their home gardens and living fences. Several people in the district have acknowledged the critical importance of both *ex-situ* and *in-situ* conservation. For example, several individuals have exerted efforts to safeguard plants in protected pastureland, within places of worship, along the borders of farmlands, and around their homegardens and living fences. *Olea europaea* subsp. *cuspidata* and *Euphorbia abyssinica* can be found within church forests, along with various other plant species. *Allium cepa*, *Allium sativum* and some other species are commonly present in most homegardens within the study area, as residents rely on these plants for daily use in cooking, medicinal purposes, food, and other benefits. Homegardens are serving as unofficial experimentation sites for cultivating new varieties and alien species (Mesfin et al., 2009, Seraw et al., 2024)).

Mesfin et al. (2009) and Seraw et al. (2024) noted that homegardens are being used as informal experimentation plots for new varieties and exotic species. Species like *Vachellia abyssinica* and *Cordia africana* remain as remnants of natural vegetation in farmlands. However, many healers tend to prioritize the immediate benefits of these therapeutic species over their long-term sustainability, leading to destructive collection practices.

CONCLUSION

The compilation of a significant number of therapeutic species (78 species) alongside diverse remedy preparation techniques and application methods demonstrates that the local population in the study area possesses extensive ethnomedicinal wisdoms enabling them to rely heavily on cultural plant medicine for their primary healthcare needs. The results further showed that the majority of cultural therapeutic species are obtained from natural habitats, highlighting a weakness in local conservation efforts. As a consequence, some medicinal plants, prized for their diverse applications, could face the threat of local extinction in the near future.

RECOMMENDATIONS

- Locals in the district should be encouraged to grow highly proffered medicinal plants (such as *Sida rhombifolia*, *Ximenia americana*) and other multipurpose plants (*Olea europea*, *Cordia africana*) in homegardens, in the farmland borders and other areas available for their growth.
- Enhancing awareness of healers on the sustainable utilization and management of plant resources found in the natural environment.
- Phytochemical and toxicological studies need to be carried out on therapeutic species on those with high informant consensus and fidelity level values so as to identify the active ingredients for production of drugs.

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APPENDIX

Appendix 1: List of medicinal plants for treating human ailments:

Habit: T-tree, S-shrub, H-herb, and C-climber; Habitat: W- Wild, HG- Home Garden) Parts: Leaf(L); Stem(S); Bark(B); Seed(Sd); Root(R); Bulb(Bb); Fruit(F); Apex(A); Shoot(St); Sap(Sp); Flower(Fl) Rhizome(Rm); Stem bark(Sb); Root bark(Rb); Latex(Lx).

Scientific name	Family	Vernacular name	Habit	Habitat	Parts used	Ailment treated	Method of preparation and application	Collection
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<i>Acokanthera schimperi</i> (A.DC.) Schweinf.	Apocynaceae	Mirez	S	W	L,Sb	Gonorrhea & Amoeba	Crush, pound with water, filter and drink	0 7 1
					Sd	Evil Eye	Tie the dry seed on the neck	
<i>Acacia abyssinica</i> Hochst. ex Benth	Fabaceae	Bazeragerar	T	W	B	Scorpion poison	Crush and cream	0 6 0
<i>Acacia mellifera</i> Benth.	Fabaceae	Girar	T	W	R, B	Tonsillitis	Crush and take orally	0 3 4
<i>Allium cepa</i> L.	Alliaceae	Qeyshinkurt	H	HG	Bb	Hypertension	chopp, macerate in water, filter and drink	0 5 8
<i>Allium sativum</i> L.	Alliaceae	Nechshinkurt	H	HG	Bb	Cough	Crush, pound and eaten with honey	0 2 6
						Evil eye	The bulb mix with the roots of <i>Withanias ommifera</i> , <i>Solanecio gigas</i> , <i>Carissa spinarum</i> , <i>Verbena officinalis</i> , <i>Capparis tomentosa</i> , <i>Asparagus africanus</i> , <i>Clausena anisata</i> , <i>Justicia schimperiana</i> , <i>Verbascum siniaticum</i> , <i>Jusminum grandiflorum</i> , <i>Cucumis ficifolius</i> , and whole parts of <i>Artemisia afra</i> , <i>Ruta chalepensis</i> , are crushed and powdered then sniff&	

							drink with coffee cup and fumigat.	
						Malaria	Crush and mix with honey then eat until recovery/ The bulb are chopped and smashed together in water for one day and drunk the decanted liquid every morning until recovery.	
						Hemorrhoids	Crushed, mix with the fruit juice of <i>Citrus aurantifolia</i> drink until recovery	
<i>Aloe macrocarpa</i> Tod.	Aloaceae	Eret	H	W	L	Dandruff	Mucilage mixed and paint the skin and hair	065
						Gastritis	Chopped and macerated in water for a night, a glass of the bitter solution is drunk every two hours.	
					R	Impotency	Crushed, powdered, mixed with butter then paint the whole part of penis	
<i>Anogeissus leiocarpa</i> (A. Rich) Guill. & Perr	Combretaceae	Kekera	T	W	Sb	Diarrhea & Stomach ache	Crushed, decoction and drunk two	016

							spoon until recovery	
<i>Argemone mexicana</i> L.	Papaveraceae	Yahyaeshoh	H	W	L	Influenza	Crushed and taken Orally	058
					R	Rabies	Crushed, mix with water, give to all animals orally	
<i>Arundo donax</i> L.	Poaceae	Shenbeko	H	W	R	Evil eye	Grounded with seeds of <i>Allium sativum</i> , leaves of <i>Ruta chalepensis</i> and leaves of <i>Artemisia abyssinica</i> , powder soaked with water and inhaled; burned on fire and fumigated	077
<i>Azadirachta indica</i> A. Juss.	Meliaceae	Nim	T	W	L	Diabetes	Make juice, drink one cup until recovery	056
<i>Bersama abyssinica</i> Fresen	Melanthaceae	Abalo	T	W	F,R	Eczema (CHIFIE),	Pounded to powder, mixed with honey or butter and applied on the wound.	021
<i>Brassica nigra</i> L.	Brassicaceae	Senafich	H	W/HG	L	Abdominal pain	Powdered with <i>Lepidium sativum</i> seeds, diluted with water, then drink	046
<i>Brucea antidysenterica</i> J.F. Mill.	Simarobaceae	Waginos	S	W	L	Wart	Crushed with <i>Clematis simensis</i> , <i>Brucea antidysenterica</i> and <i>Oenanthe palustris</i> , and put on the powder on the affected part	039
<i>Buddleja polystachya</i> Fresen.	Loganiaceae	Amfar	T	W	L	Wound & Dandruff	Crush the fresh & creamed	030
<i>Calotropis procera</i> L.	Asclepiadaceae	Tobia	S	W	L	Swelling	Warm the leaf and rubbing the swelled part	042

						Tumor	Crushed with <i>Cucumis ficifolius</i> , <i>Solanum incanum</i> & <i>Solanum marginatum</i> then the powder is added to the affected part for 3 days	
<i>Capparis tomentosa</i> Lam.	Capparidaceae	Gumero	S	W	R	Evil eye	The root is crushed with <i>Allium sativum</i> , <i>Achyranthes aspera</i> , <i>Ruta chalepensis</i> , <i>Clematis simensis</i> , <i>Withania somnifera</i> , <i>Cucumis ficifolius</i> and <i>Capparis tomentosa</i> then suspend it on the neck	01 1
<i>Capsicum annum</i> L.	Solanaceae	Berberie	H	HG	F	Tonsillitis	Crushed, fumigate by adding the fruit on an open fire till sneezing, the tonsil moves up while sneezing	0 3 2
<i>Carica papaya</i> L.	Caricaceae	Papaya	T	HG	L	Intestinal Parasites	Boiled the fresh in water, cooled then drunk in the mornings	0 7 8
					S	Malaria	Dry/fresh seeds is pounded with water and drunk	
					F	Gastric illness	Fresh fruit taken orally	

<i>Carissa spinarum</i> L.	Apocynaceae	Agam	S	W	L,R, B	Evil eye, Gonorrhea, Headache, Stomachache	Crushed parts, added on fire then inhaled the fumigate	0 6 9
					A	Insect/animal bite	Crushed, tied the affected body part	
					R	Evil spirit /MEFTHE SIRAY/	Washing by root juice of <i>Rumex nervosus</i> , <i>Rothea myricoides</i> , <i>Asparagus africanus</i> , <i>Verbascum sinaiticum</i> , <i>Verbena officinalis</i> , <i>Cucumis ficifolius</i> ., <i>Plumbago zeylanicum</i> , <i>Euclea racemosa</i> , <i>Calpurnia aurea</i> , <i>Justicia schimperiana</i> , <i>Carisaspinarum</i> , <i>Ferrula communis</i> and <i>Aloe vera</i> for 7 days	
<i>Catha edulis</i> (Vahl) Forssk. ex Endl.	Celastraceae	Chat	S	HG	L	Evil spirit	Leaf is boiled with <i>Vernoniaadoens</i> isroot, then drink	02 8
<i>Centella asiatica</i> L.	Apiaceae	Yeayitjoro	H	W	L	Wound	Crushed, mixed with cold water and decanted, then applying on the affected part	04 5
<i>Cissus petiolata</i> Hook. f.	Vitaceae	Alkie	C	W	R	Swelling, tumor	Inhaling its root powder on fire	05 7

<i>Citrus limon</i> (L.) Burm. f.	Rutaceae	Lome	S	HG	F	Common cold, Asthema, Mouth smelling	Squeezed and added sugar and taken orally	0 3 5
						Athlete's foot	Its fruit is squeezed and creamed on affected part for continuous days.	
<i>Clausenaanisata</i> (Willd.) Hook.f	Rutaceae	Limich	S	W	R	Evil spirit	Inhaling its root powder with roots of <i>Croton</i> <i>macrostachyus</i> and <i>Capparis</i> <i>tomentosa</i> on fire	07 3
<i>Clematis simensis</i> Fresen.	Ranuncul aceae	YeazoAreg	C	W	S	Cancer (NEKERSA)	The smooth bark is removed, and the stem is chopped and applied on the swelling	0 5 5
					L	Swelling	Crushed & tied on swelling	
<i>Coffea arabica</i> L.	Rubiaceae	Buna	S	HG	Sd	Wound, Spider poison, diarrhea	Roust the seed, mixed with honey and drink	0 3 1
<i>Commelina latifolia</i> Hochst. ex A Rich.	Commelin aceae	Yewhaenkur	H	W	St	Wound (GORMIT)	Crushed and tied with cotton cloth until recovery	0 1 8
<i>Cordiaafricana</i> Lam.	Boraginac eae	Wanza	T	W/ HG	L,B	Hepatitis	Crushed and then inhaled after boiling, Drinking the decoction	00 3
<i>Coriandrum sativum</i> L.	Apiaceae	Dinbelal	H	HG	Sd	Cough	Boiled mixed with butter and water and drunk.	0 2 0
<i>Crinum abyssinicum</i> (Hochst ex A. Rich) I.Nord.	Amaryllid aceae	Yejibshinkur t	H	W	L, Bb	Snake bite	Crashed and applied on the affected part	02 3

<i>Croton macrostachyus</i> Hochst.	Euphorbiaceae	Besana/Mesana	T	W/HG	L,	Acute bleeding & Tetanus	Creamed latex of petiole or leaf	050
					Sb	Intestinal parasites, Amoeba, Gonorrhea & Pneumonia	Crushed the fresh, pounded with water, drunk filtrate after breakfast in the morning until recovery	
<i>Cucurbita pepo</i> L.	Cucurbitaceae	Duba	C	HG	F, Sd	Taeniasis	Dried fruit and seed is roasted and mixed with fruit of <i>Embelia schimperi</i> is given to eat; Dry, cooked and given to eat in empty stomach	067
					Sd	Tape worm, Ascaris		
<i>Datura stramonium</i> L.	Solanaceae	Astenagir	H	W	F	Intelligence/enhance memory	Ground & eaten with WOT prepared from only garlic, paper and SHIRO with teff injera for 7 days	002
					L	Scabies & head wound	Crushed and creamed on head	
<i>Dodonaea angustifolia</i> L.f.	Sapindaceae	Kitkita	S	W	St/	Eczema	Charred with fire, mix ash with butter & creamed	036
					A	Bone broken	Crushed, tied with rope as bandage by bamboo stem (Kerkeha), SHEMBEKO	
<i>Embeliaschimperi</i> Vatke	Myrsinaceae	Enkoko	C	W	F	Tape worm	Crushed and drunk mixed with tela (more alcoholic)	024
<i>Eucalyptus globulus</i> Labill.	Myrtaceae	Nechbaharza f	T	W/HG	L	Common cold, Skin ailments	Boiling with water and drinking	019

<i>Euphorbia abyssinica</i> Gmel.	Euphorbia ceae	Kulkual	T	W	Lx	Diabetes	Collected with cup and half is drunk three times a day before food (age, & physical appearance)	0 6 1
						Homorrhoids	Collected, cream swelling as it is fresh.	
						Ascaris	Add five drops latex on fresh Injera, eat before food in every morning till cure	
<i>Euphorbia tirucalli</i> L.	Euphorbia ceae	Kinchib	S	W	Sap	Swelling	Creamed on the affected area	0 4 3
<i>Foeniculum vulgare</i> Mill.	Apiaceae	Ensilal	H	HG	R, L	Cough	Crushed, mixed with <i>Trachyspermum ammi</i> & drink the decoction	03 8
<i>Guizotiaschimperii</i> Sch. Bip.exWalp.	Astraceae	Mech	H	W	R	Stomach ache	Chewed & swallowed the liquid orally	0 2 9
<i>Hagenia abyssinica</i> (Bruce) J.F.Gmel.	Rosaceae	Koso	T	W	F	Tape worm, Vomiting & Diarrhea	Ground, mixed with milk and drunk before eat food in the morning	0 1 7
<i>Hibiscus macranthus</i> Hochst. ExA.Rich.	Malvaceae	Nacha	S	W	L	Eczema (CHIFIE)	Chewed & creamed with cotton.	0 1 2
<i>Kalanchoe petitioides</i> A.Rich.	Crassulaceae	Andahula	H	W	R	Ascaris	Chopped on stone, mixed with water, squeezed, drink.	0 0 1
<i>Laggera tomentosa</i> (Sch. Bip. ex A. Rich.) Oliv. & Hiern	Asteraceae	Keskesso	S	HG	L	Cancer (NEQERSA)	Crushed, squeezed, and applied on wound or add small drops water	0 5 1

					F	Sadden sickness (Quriba)	drink bitter liquid for 8 days	
<i>Lepidium sativum</i> L,	Brassicaceae	Feto	H	W/HG	Sd	Evil eye, sun stroke /febrile/	Crushed, mixed with water and sprayed on body parts.	068
						Dysentery	Pounded, mixed with Yoghurt, shacked well and drunk.	
<i>Linum usitatissimum</i> L.	Linaceae	Telba	H	W/HG	Sd	Wound (GORMIT)	Mixed with honey, tie the wound.	033
<i>Lycopersicon esculentum</i> Mill.	Solanaceae	Tematem	H	HG	L	Spider poison	Chewed & put on the wound	025
<i>Momordica foetida</i> Schumach.	Cucurbitaceae	Kura mechat	C	W	L	Wound(ALMAZALCHIRA)	Crushed and applied on the affected part	008
<i>Musa x paradisiaca</i> L.	Musaceae	Muz	H	HG	F	Cough	Eat every morning for five days before food	037
<i>Nigella sativa</i> L.	Ranunculaceae	Awosda/tikurazmud	H	W/HG	Sd	Asthema	Pounded, powdered & drink with coffee	062
						Stomachache	Crushed & pounded then taken before food.	
<i>Ocimum basilicum</i> L.	Lamiaceae	Zikakibe	H	HG	L	Headache	Crushed & Sniffed during pain	072
						Malaria	Pounded with bulb of <i>Allium sativum</i> , eaten with honey in the morning before malaria ailment happened.	
<i>Ocimum gratissimum</i> L.	Lamiaceae	Damakesse	S	HG	L	Febrile ailments/ Mich/	Drinking its leaf tea	063

<i>Olea europaea</i> subsp. <i>cuspidata</i> L.	Oleaceae	Woirra	T	W	L	Clean tooth, Tonsillitis, Deafness	Chewing, smoking	013
<i>Otostegia integrifolia</i> Benth.	Lamiaceae	Tunjut	S	W	L, St	Common cold, Stomach ache	Smoking and fumigated the house	074
<i>Pavoniaurens</i> Cav.	Malvaceae	Abelbalit	H	W	R	Impotency	Drinking 1 cup decoction	040
<i>Phytolacca dodecandra</i> L'Herit.	Phytolaccaceae	MehanEndod	C	W	L, F, R	Abortion, Anthrax, Itchy, abdominal pain	Crushed and taken orally	059
<i>Premnaschimperi</i> Engl.	Lamiaceae	Chocho	S	W	L, B	Wound (CHIFIE)	Crushed and powder then creamed with butter or honey.	075
<i>Pterolobium stellatum</i> Forssk.	Fabaceae	Kentetifa	C	W	L	Tumor	Crushed with <i>Calotropis procera</i> , <i>Cucumis ficifolius</i> and <i>Solanum nigrum</i> , powder is added to the affected part	066
<i>Rhamnusprinoidea</i> L. Herit,	Rhamnaceae	Gesho	S	HG	L	Wound (ALMAZBAL ECHIRA)	Crushed into powder and applied as bandage on the wounds until recover.	007
<i>Ricinus communis</i> L.	Euphorbiaceae	Bulka/chachima	S	HG	Sd	Eczema	Roasted, grounded, mixed with butter and cream the affected part	014
<i>Rosa abyssinica</i> Lindley	Rosaceae	Kega	S	W	Bb	Cough	Grounded with water, filtered & taken orally	027
					Fl	Eczema	Squeezed and applied on the affected part	
					St	Stomachache	Squeezed & fluid taken orally	
<i>Rumex abyssinicus</i> Jacq.	Polygonaceae	Mekmoko	H	HG	L, R	Hypertension, Vomiting.	Crushed, dried, pounded & drink with milk in the morning for two days	004
<i>Rumex nervosus</i> Vahl,	Polygonaceae	Ambacho	S	W	L	Wound (male circumcision)	Crushed, squeezed &	015

							applied on the wound.	
<i>Ruta chalepensis</i> L.	Rutaceae	Tenaadam	H	HG	L	Evil eye	Crushed with roots of <i>Carissa spinarum</i> <i>Allium sativum</i> , <i>Achyranthes aspera</i> , <i>Securidaca longepedunculata</i> , <i>Ziziphus abyssinica</i> , <i>Clematis simensis</i> , <i>Withania somnifera</i> , <i>Cucumis ficifolius</i> and <i>Capparis tomentosata</i> hen tie on the neck	04 1
<i>Schinus molle</i> L.	Anacardiaceae	Kundo berbere	T	HG	F	Cough, Abdominal cramp	Pounded, crushed and drink	0 6 4
<i>Sida ovata</i> Forssk.	Malvaceae	Chifrig	S	W	L	Skin infection	Rubbed on infected skin	0 7
						wound	Pounded and mixed with the leaf of <i>Vernonia auriculifera</i> & parted on	6
<i>Sidarhombifolia</i> L.	Malvaceae	Gorgegit	S	W	L	Wound	Crushed and lied on the wound	0 5 3
						Dandruff	Crashed and washing with its decoction	
						Bleeding	Crashed and creamed on the affected part	
<i>Solanum incanum</i> L.	Solanaceae	Yekolla Embu ay	S	W	F,	TB, cough	The fruit is washed, dried and crushed. It is boiled, and drunk with butter every morning till cured	0 1 0

					F	Wound (GORMIT), Eczema	The wound is washed with water, the fruit is squeezed and applied on the wound	
<i>Stereospermum kunthianum</i> Cham.	Bignoniaceae	Zana	T	W	L, A	Bleeding, Wound	Crashed and applied on affected part	047
<i>Syzygium guineense</i> (Willd.) DC.	Myrtaceae	Dokma	T	W	Sb, Rb	Diarrhea, Evil spirit	Mix the powder with honey/ water and then drinking	070
<i>Terminalia laxiflora</i> Engl. & Diels	Combretaceae	Wonbella	T	W	R	Snake bite	Warming and rubbing the affected part by the root	044
<i>Vernonia adoensis</i> Sch. Bip ex Walp	Astraceae	Eras abera	S	HG	R	Amoeba, Snake poison, Gardiasis, Gastrics	Crushed, root is chewed and juice is swallowed.	009
<i>Vernonia amygdalina</i> Del.	Astraceae	Gerawa	S	HG	L, R	Dandruff, Malaria, Goiter, Impotence, Heart, Problem, Cough, Wound	Crushed, Pounded is creamed fungus leg, Chewed and the sap is swallowed	052
<i>Withania somnifera</i> (L.) Dunal in DC.	Solanaceae	Kumo	S	W	L, R	Malaria, Cough, Impotence, Evil eye & Evil spirit,	Crushed and powdered, boiled, drunk juiced for 4 days; Squeezed leaves then cream the skin	048
<i>Ximenia americana</i> L.	Oleaceae	Enkoy	S	W	Sb	Wound	Crushing and Applying a spoonful of powder on the wound	005
<i>Zehneriascabra</i> (Linn. f.) Sond.	Cucurbitaceae	Haregres	C	W/ HG	Leaves	Fibril illness/MICH/, Skin swelling	The leaves are boiled in water and the patient is fumigated or the leaves are squeezed between palms	022

							and the juice is applied on the skin	
<i>Zingiber officinale</i> Roscoe	Zingibiraceae	Zinjibil	H	HG	Rm	Influenza, abdominal pain (HODKURTET)	The bark is removed, chopped, chewed and the liquid is swallowed, prepared as tea	0 0 6
<i>Ziziphus spina-christi</i> (L.) Desf	Rhamnaceae	Gava	S	W	L	Abdominal pain, Dandruff (FOREFOR)	Crushed mixed with <i>Acacia oerfota</i> root or bark, oral drink water on the morning time in empty stomach	0 4 9