The ethnomedicinal plants used for human ailments at Mojana Wodera District, central Ethiopia

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Abstract. Abebe M. 2021. The ethnomedicinal plants used for human ailments at Mojana Wodera District, central Ethiopia. Biodiversitas 22: 4676-4686. An ethnobotanical study was carried out from March 2020 to February 2021 in selected sites of Mojana Wodera District to assess, identifying, and document medicinal plants to treat human ailments. Purposely and volunteer sampling techniques were applied to select 73 practitioners. Of those, 10 practitioners were key informants. Data was collected from informants using semi-structured interviews, focus group discussions, participant observation, and walk-in-the-word. The collected data were entered into an excel spreadsheet for statistical analysis. ANOVA and t-test were applied to compare the knowledge of the informants in different groups. ICF and FL values were calculated to identify the most common human ailments and heal the potential of medicinal plants. The result showed that a higher average (p< 0.05) was recorded for crucial informants, illiterate and higher aged group. Still, there was a significant difference between male and female informants (p=0.032) on knowledge of medicinal plants. A total of 45 medicinal plant species (41 genera and 27 families) were identified to treat 35 types of ailments. From this total, 15.6% were endemic for Ethiopia. Family Euphorbiaceae was dominant (11.1%) for this study. In the finding, the leaf was the most widely plant part which is used to prepare remedies (29.79%), followed by root (28.72%), and the most popular remedy preparation was pounding (31.18%). A higher ICF value (0.78) was recorded for dermatological category ailments, and the highest FL (94.12%) occurred for Lagdera tomentosa, which was under the therapeutic category of the throat and respiratory.

Keywords: Ailments, ethnobotany, illiterate, key informants, pounding

Abbreviations : FL: fidelity level; ICF: informant consensus factor

INTRODUCTION

The term traditional knowledge is defined as the total of knowledge, skills, attitude, and experiences used in the protection of health as well as in the prevention, diagnosis, and improvement or treatment of physical and social imbalance, and relying exclusively on practical experience, and observation (Marsh et al. 2018). This practice passes verbally or in written form (Battiste 2016; Vansina et al. 2017).

People of different countries globally have indigenous knowledge of various medicinal plants based on the type of disease that occurred in their local environment and locally available plants with their effectiveness for specific ailments (Teka et al. 2020). The uses of traditional medicinal plants have significant advantages to cultural development, acceptability, economic affordability. In addition, these medicinal plants cure certain types of diseases compared to modern medicines (Belayneh and Bussa 2014; Aragaw et al. 2020).

In Ethiopia, about 80% of the people and 90% of livestock depend on traditional medicinal plants to heal different ailments (Asmare et al. 2018; Kidane et al. 2018). This is due to difficulties to gain modern medicine and facilities, high acceptance of the healer by the people, low cost of traditional medicine than modern medicine, and availability of traditional medicinal plants in their local environment for immediate action (Hailu et al. 2020).

Ethiopia reaches in biological resources and has about 6,500 species of higher plants, with approximately 12% endemic (Seid 2019; Wassie 2020). This gives good opportunities for the country where medicinal plants play a significant role in supporting the country’s primary healthcare system. However, like other parts of the country, only a minor attempt has been made to explore and document medicinal plants and associated knowledge scientifically. Moreover, the indigenous knowledge of the people and medicinal plants in the study district are at risk by different factors such as an expansion of agriculture, habitat loss, deforestation, climate change, overexploitation, urbanization, and use of plants for firewood and charcoal, etc. In addition to this, the traditional knowledge of medicinal plants has mainly been stored in the aged people, and might been could cause for loss of this golden knowledge of the people in the new generation. In addition to this, no research has been conducted in the study district regarding medicinal plants used to treat human ailments. Thus, the current study aims to explore, identify and document medicinal plant species used to heal human ailments and to document traditional medicinal knowledge of the local people in the study district.
MATERIALS AND METHODS

Description of the study area

The study was conducted in Mojana Wodera District, North Showa zone, Amhara region, central Ethiopia. It is 202 km far from the capital city of Ethiopia, Addis Ababa, and 72 km from the town of North Showa zone, Debre Brehan, in the north direction. The district is bordered with Menze Mama Mider in the north, Menze Lalo Mider in the North West and Menze Keya Geberieal in south, Basona Worena in west and Tarmaber district in the east (Figure 1). The administrative center of the study district is Sela Dingaye, and the elevation of the study district ranges between altitudes of 1459-3172 m above sea level. Traditionally, the study district is divided into three agricultural zones: Dega (28%), Woyna Dega (69%), and kola (3%). The annual rainfall of the districts ranges from 800-1000 mm, and the annual temperature ranges from 10-18°C.

Demographic

The district has a total population of 83814 (44,489 (53.08% men) and 39325 (46.92% women), of whom 7799 (9.31%) are urban inhabitants. Most people's economic income depends on both crop production and livestock. Most people are followers of Ethiopian Orthodox Tewahedo Christianity (99.94%), and the remaining 0.059% are followers of Protestantism.

Informant selection

A total of 73 (51 males and 22 females) informants were selected from seven district sites. Purposive and volunteer sampling techniques were applied to choose the representative general informants and key informants suggested by (Mitchell et al. 2018). The informants' age ranges from 17-85 years old (33 were between 17-39 years old; 24 were between the ages 40 and 59; the other 16 informants were 60 and above years old). In addition, a total of 10 key informants were selected based on the information gotten from the community members, informants themselves, and elders about their better knowledge.

Data collection

An Ethnobotanical survey was conducted from March 19, 2020, to February 10, 2021 (in all seasons) to collect plant specimens in flowering and availability. The data were collected using semi-structured interviews, focus group discussions, participant observation, and walk-in-the-word with their local language, Amharic. Information regarding local names of medicinal plants, part of the plant used for medicine, gathering and preparation methods, the dosage used, diseases treated, route of application, use of the plant other than medicinal uses, and management methods were recorded at the spot. The collected data was dried, deep-frozen, and identified at the national herbarium of Ethiopia in Addis Ababa University.

Figure 1. Map of the study in Mojana Wodera District, North Showa zone, Amhara region, central Ethiopia
**Diversity of medicinal plants**

A total of 45 medicinal plant species belonging to 41 genera and 27 families treated 35 human ailments. Family Euphorbiaceae was the leading 5 (11.1%) Plant species, followed by family Asteraceae 4 (8.9%) plants species. Family Lamiales, Rutaceae, and Solanaceae were represented by 3 (6.7%) plants species each. The other 5 families (Aloaceae, Apocynaceae, Cucurbitaceae, Myrsinaceae, and Myrtaceae) were represented by 2 (4.4%) species each, and the remaining seventeen families had a single species (Table S1).

**Growth habit and their habitat**

Regarding their growth form, herbs were the most harvested to treat human ailments and represented with 18 (40%) species, followed by shrub 14 (31.1%) and tree 11 (24.4%) species, respectively. On the other hand, the climber was a minor plant habit 2 (4.4%), used to treat human ailments in the study district (Figure 2). From the total of 45 plant species, 25 (55.6%) plant species were obtained from the wild, 14 (31.1%) from the home garden, and the remaining 6 (13.3%) were obtained from both wild and home gardens (Figure 3).

**Endemics of the plants for Ethiopia**

Of the 45 plant species recorded in the study district, 28 (62.2%) plants species were indigenous to Ethiopia, and the other 10 (22.2%) plant species were introduced. The remaining 7 (15.6%) plants species were Endemic for Ethiopia.

**Parts of plants used to prepare remedies**

In the study district, the most widespread plant parts used to prepare remedies was leaf (29.79%) followed by root (28.72%), fruit (15.96%), bulb (6.38%), Latex (5.32%), all parts (4.26%) and seed (3.19%) respectively. In addition, the reaming sap and stem were contributed for (2.13%) remedies preparation while Bark and flower were contributed for (1.06%) heals practice (Figure 4).

**Mode of preparation and routes of administration**

Various methods of remedy preparation were employed by the practitioners depending on the type of ailments. The most popular mode of remedy preparation was pounding (29 in frequency, 31.18%), followed by smashing (15, 16.13%), squeezing (10, 10.75%), respectively (Figure 5). Regarding the routes of administration, the oral application was the most common type of administration 46(52.87%) followed by dermal 21(24.14%), nasal 14 (16.09%), anal 5(5.75%), and ocular 1 (1.15%) respectively (Table S1).

**Dosage and antidotes**

In the study district, the practitioners did not use standardized measurement units even though they are used different traditional measurement methods such as SHEKENA, SENE, SENZER, etc. In addition, the system of the measurement varies depending on the age and sex of patients.
Marketable medicinal plants
A survey took place in five local markets of the district (Seladingaye 01, Sasit, Asofe, Begochgate, and Tarmaber). The result showed that, from the total of 45 plant species, 26 (57.78%) were marketable. Out of these 26 (57.78%), medicinal plant species were reported as commercial; only 4 (15.38%) species (Echinops kebericho, Embelia schimperi, Hagenia abyssinica, and Lepidium sativum) were sold and purchased entirely for medicinal purposes. The remaining 84.62% were sold for various food, fence, firewood, timber, beverage, spice, etc. (Table S1).

Efficacy of medicinal plants
From the total of 35 human ailments that occurred in the study district, 10 categories were identified based on humans’ effects. Among these categories, the highest ICF value was recorded for the dermatological category (0.78), followed by gastrointestinal and parasitic disease and evil spirit with ICF values of 0.76 each. Conversely, the least ICF (0.5) value was recorded for musculoskeletal and nervous systems categories (Table 1).

The healing potential of medicinal plants
The highest fidelity level (94.12%) was recorded for Lagerra tomentosa, which was obtained under the therapeutic category of the throat and respiratory; followed by Capsicum annuum (93.75%; obtained under gastrointestinal and parasitic), Carissa spinarum (91.67%; obtained under animal bite disease), and Croton macrostachyus (90.91%; under the therapeutic category of dermatology (Table 2).

Preference ranking
Based on the information obtained from 10 key informants, Acmella caulirhiza was the preferable medicinal plant to treat abdominal pain, the most frequently reported disease under the category of gastrointestinal and parasitic, followed by Ruta chalepensis and Thalictrum rhynchocarpum (Table 3).
Direct matrix method

Direct matrix ranking (DMR) was done for 9 multipurpose medicinal plants to identify the most under pressure medicinal plants and the corresponding factor that threaten the plants. Accordingly, Olea europaea was the most threatened in this study, followed by Croton macrostachyus and Eucalyptus globulus. According to this study, the most factors for the exploitation of medicinal plants were firewood, construction, and charcoal, respectively (Table 4).

Discussion

A comparison of medicinal plant knowledge between communities was held. The result showed that a significant difference was observed between key and general informants. The cause for this higher difference could be the result of experience and the use of different references (Chekole 2017; Kidane et al. 2018). A significant difference was also observed between illiterate informants and primary education informants and informal education and primary education informants. The cause could be primary education informants did not give attention to traditional medicine. Instead, they prefer the modern types of medication in compression. The same finding was reported by (Eshete et al. 2016; Miara et al. 2018; Mbuni et al. 2020). Even though the average result varies in other groups of informants, it was not significant.

Table 1. Informant Consensus Factor (ICF) value of medicinal plants to treat human ailments in the study districts

| Disease category                        | No. of plant species | % of plant species | Use citations | % use citations | ICF  |
|-----------------------------------------|----------------------|--------------------|---------------|----------------|------|
| Dermatological                          | 15                   | 33.33              | 64            | 22.54          | 0.78 |
| Gastrointestinal and parasitic diseases| 13                   | 28.89              | 52            | 18.31          | 0.76 |
| Evil spirit                             | 6                    | 13.33              | 22            | 7.75           | 0.76 |
| Throat and Respiratory                  | 14                   | 31.11              | 54            | 19.01          | 0.75 |
| Animal bite disease                     | 9                    | 20.00              | 32            | 11.27          | 0.74 |
| Bleeding and toothache                  | 5                    | 11.11              | 14            | 4.93           | 0.69 |
| Mechanical injury                       | 3                    | 6.67               | 7             | 2.46           | 0.67 |
| Febrile                                 | 4                    | 8.89               | 10            | 3.52           | 0.67 |
| Internal disease                        | 9                    | 20.00              | 22            | 7.75           | 0.62 |
| Musculoskeletal and Nervous system      | 4                    | 8.89               | 7             | 2.46           | 0.5  |

Table 2. Fidelity level of medicinal plants for a given ailments

| Medicinal plants                  | Therapeutic category       | Ip  | Iu  | FL value |
|-----------------------------------|----------------------------|-----|-----|----------|
| Croton macrostachyus              | Dermatological             | 20  | 22  | 90.91    |
| Capsicum annuum                   | Gastrointestinal and parasitic | 15  | 16  | 93.75    |
| Carissa spinarum                  | Animal bite disease        | 11  | 12  | 91.67    |
| Allium sativum                    | Gastrointestinal and parasitic | 12  | 14  | 85.71    |
| Echinops kebericho                | Evil spirit                | 6   | 7   | 85.71    |
| Artemisia abyssinica              | Evil spirit                | 7   | 9   | 77.78    |
| Ocimum lamifolium                 | Febrile                    | 4   | 6   | 66.67    |
| Verbasum sativum                  | Animal bite disease        | 10  | 12  | 83.33    |
| Laggea tomentosa                  | Throat and respiratory     | 16  | 17  | 94.12    |
| Verbena bonariensis               | Febrile                    | 4   | 5   | 80.00    |

Table 3. Preference ranking of medicinal plants to treat abdominal plain

| Types of medicinal plants         | Informants labeled A to J | Total | Rank |
|-----------------------------------|---------------------------|-------|------|
| Acmella caulirhiza                | A 8 B 6 C 5 D 8 E 5 F 8 G 8 H 4 I 6 J 61 | 61    | 1    |
| Ruta chalepensis                  | A 5 B 7 C 6 D 3 E 8 F 7 G 3 H 8 I 7 J 58 | 58    | 2    |
| Thalictrum rhynchocarpum          | A 3 B 8 C 8 D 6 E 4 F 8 G 3 H 7 I 5 J 57 | 57    | 3    |
| Capsicum annuum                   | A 7 B 1 C 3 D 7 E 3 F 5 G 1 H 6 I 7 J 48 | 48    | 4    |
| Citrus aurantiifolia              | A 6 B 4 C 2 D 5 E 7 F 2 G 6 H 5 I 6 J 46 | 46    | 5    |
| Allium sativum                    | A 2 B 3 C 4 D 4 E 6 F 7 G 8 H 1 I 3 J 42 | 42    | 6    |
| Carissa spinarum                  | A 4 B 5 C 1 D 7 E 2 F 1 G 2 H 4 I 1 J 28 | 28    | 7    |
| Lepidium sativum                  | A 1 B 2 C 1 D 2 E 1 F 3 G 4 H 2 I 2 J 20 | 20    | 8    |

Note: Scores in the table are based on their efficiency to cure abdominal pain. I.e., number 8 indicate high effectiveness, and 1 shows minor point according to the informants.
This study also showed that a significantly higher average number of medicinal plants (p < 0.05) was reported by the age above 60 and 40-59. Generally, this finding revealed that the knowledge of medicinal plants declined from elder to younger informants. During the interview and collection of medicinal plants, the interest and belief of the elder informants to express their effectiveness were high. In contrast, the youngest informants showed low interest (Araújo et al. 2018). The main reason for this common interest of the youngest informants was an expansion of modern medication. Thus, decreasing positive attitude towards medicinal plants is an indication of the erosion of medicinal plants. The same finding was conducted in Tefera et al. (2019) and Azis et al. (2020). Regarding sex, the informants do not have significant differences in the naming of medicinal plants (p = 0.032). This finding agrees with the result of Alalwan et al. (2019).

In the present study, a total of 45 medicinal plants and their uses were documented. This indicates the study district is reached in biodiversity. Regarding families, Euphorbiaceae and Asteraceae have accounted for the highest number (Temam 2019). This indicates that the availability of these families in the study district showed the family’s effectiveness in treating different ailments compared to other families.

The high usage of herbs for medicinal plants to treat different health problems indicates the availability of herbs than trees and shrubs in the study district. The same finding was reported by (Giday et al. 2016). Out of the total listed medicinal plants in the study cites about 55.6% were obtained from the wild (Wondie 2018; Yohannis et al. 2018). In the study district, medicinal plants harvested from the wild are highly affected by factors such as the expansion of agriculture, urbanization, and natural elements. This causes the loss of many medicinal plants from the districts. In turn, this loss of medicinal plants causes the youngest practitioners’ degradation of medicinal plant knowledge (Yohannis et al. 2018; Aman et al. 2020; Mosissa and Atinafu 2021).

The result showed that 77.8% of medicinal plants were endemic and indigenous to the country. This means the practitioners were familiar with the plant, which is available in their local area than exotic species. This indicated that the knowledge of medicinal plants is not recent; instead, it passes from generation to generation (Tuasha et al. 2018).

This study also revealed that leaf and root were the main plant parts used to treat human ailments (Araya et al. 2015). Using the leaf is simple to prepare and to extract the chemicals from it for remedies. At the same time, it has a more negligible effect on mother plants. The current study agrees with the work of (Ahmed et al. 2016). However, using root for preparation of remedies cause for loss of mother plants it will also cause for the local extinction of the plants. The same result was reported by (Agisho et al. 2014).

The result showed that the pounding method of remedies preparation was dominant for the study district, followed by the smashing method. Pounding method remedies preparation has a significant advantage in preserving it in powder, essential during the dry season. This finding coincided with the result of Gebre (2018), Demssie (2020), Taha and Woldeyohannes (2020). Regarding on mode of administration, the oral application was dominant, followed by dermal and nasal. Both oral and nasal routes of administration are considered to undergo rapid physiological reactions with the causative agents and increase the curative power of the remedies. This finding agrees with the result of Chenthamara et al. (2019). In addition to this, the herbalist applied the treatments on the skin if the illness was dermal. Most of the time, water is used to process the plants as universal solvents. However, some plant parts didn’t require water to process.

Regarding the dosage of the remedies, the practitioners had their measurement tools, which were not scientific.

This unscientific measurement could lead to erroneousness. However, the practitioners have used antidotes if the remedies hurt the patient.

Table 4. Average DMR scores of 10 critical informants for 9 medicinal plants and their different uses with factors that threaten their exploitation

| Use diversity | B. abyssinica | C. myricoides | C. abyssinica | C. spinosa | Camaroptera abyssinica | E. globulus | M. lanceolata | M. arboifolia | O. europea | Total | Rank |
|---------------|---------------|---------------|---------------|------------|----------------------|------------|--------------|--------------|------------|-------|------|
| Firewood      | 4             | 2             | 3             | 4          | 2                     | 5          | 4            | 5            | 5          | 14    | 1    |
| Construction  | 2             | 1             | 3             | 3          | 4                     | 3          | 5            | 4            | 2          | 28    | 5    |
| Charcoal      | 1             | 2             | 1             | 2          | 2                     | 2          | 4            | 2            | 4          | 14    | 7    |
| Fence         | 1             | 1             | 2             | 1          | 2                     | 3          | 3            | 3            | 3          | 9     | 3    |
| Medicinal     | 2             | 3             | 4             | 5          | 4                     | 3          | 3            | 3            | 4          | 16    | 4    |
| Agricultural tool | 2         | 3             | 1             | 1          | 1                     | 4          | 4            | 4            | 3          | 11    | 2    |
| Food          | 0             | 3             | 1             | 4          | 1                     | 0          | 0            | 3            | 2          | 9     | 6    |
| Total         | 14            | 20            | 19            | 25         | 27                    | 26         | 18           | 21           | 28         | 52    | 1    |
| Rank          | 9             | 6             | 7             | 4          | 2                     | 3          | 8            | 5            | 1          |       |      |

Note: 5: Best; 4: Very good; 3: Good; used; 1: lest used 0: no value.
The result showed that about 42.22% of medicinal plants were not purchased for either medicinal or other uses in the district. Of the total of 57.78% marketable medicinal plants, only 15.38% were purchased for therapeutic value. The remaining 84.62% were available for different purposes other than medicinal value. The only medicinal plants purchased for traditional medicinal value were *Echinops kebericho*, *Embelia schimperi*, *Hagenia abyssinica*, and *Lepidium sativum*. This indicates that most medicinal plants are harvested from the wild when people want to use them for health care. Medicinal plants of the district are under pressure because the people use them for income generation and other uses in their homes. The current result agreed with the finding of (Lulekal et al. 2013).

Best agreements among informants on medicinal plants were reported to treat dermatological, gastrointestinal & parasitic diseases and evil spirits, respectively (with ICF values of 0.78, 0.76, and 0.75, respectively). The result assured that these diseases are frequent and familiar for the district. At the same time, it also confirmed the effectiveness of the listed medicinal plants to treat these ailments. In other words, the plants cited by critical informants were bioactive for ailments for the above disease.

The highest-fidelity levels for *Laggera tomentosa* (94.12%) to treat throat and respiratory disease, *Capsicum annuum* (93.75%) to treat gastrointestinal and parasitic disease, *Carissa spinarum* (91.67%) to treat animal bite disease, and *Croton macrostachyus* (90.91%) to treat dermatological disease. The highest value of fidelity level indicated the high healing potential of the plants to related diseases.

Abdominal pain was the most frequent disease in the districts. To treat this ailment, a total of 8 medicinal plants were used. *Acmella caulirhiza* was the most effective medicinal plant to treat abdominal pain, *Ruta chalepensis*, and *Thalictrum rhynchospermum*. These medicinal plants also were more effective in treating other ailments. The result showed that the biochemical of the plants have the potential to treat other health.

According to the direct matrix ranking result, *Olea europaea*, *Croton macrostachyus*, and *Eucalyptus globulus* were the most threatened medicinal plant species. As a result, these multipurpose plants are exploited more for their nonmedicinal uses, such as firewood, construction, charcoal, etc. The benefits of medicinal plants for purposes other than their medicinal values have a significant effect on the survival of the plants. The same finding occurred in (Giday et al. 2003).

The district was reached in medicinal plants and endemic plant species diversity, but the attempt to conserve these medicinal plants and indigenous knowledge of the people was not significant. On the other hand, at the moment of expansion of agriculture, urbanization dramatically affects the survival of these medicinal plants in the district. So the district requires special attention from the government and stakeholders as well as the people are mandatory. It also suggested healers’ association which professionals support, and the government should encourage in situ and ex situ conservation strategies for medicinal plants of the districts.

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| Code no. | Scientific name            | Family name | Local name | Other uses | Parts used | Used to treat       | Preparation                                                                 | Taken through |
|---------|---------------------------|-------------|------------|------------|------------|---------------------|-----------------------------------------------------------------------------|---------------|
| M4      | Acmella caulirhiza #      | Asteraceae  | Yemider    | M          | R          | Abdominal pain      | Direct chewing the fresh root                                              | O             |
|         |                           |             | berebere   |            | F, R       | Tonsillitis       | Chewing the root and flower                                                | O             |
| M5      | Acokanthera schimperi (A.DC.) Schwein # | Apocynaceae | Merenze    | M, SPI     | R          | Hemorrhoids         | Pound the root and put it on the affected part                            | O             |
|         |                           |             |            |            |            |                     | Extract liquid from the leaf by squeezing the drink and spill on the affected part | An            |
| M19     | Allium sativum *          | Alliaceae   | Nechi      | FO, SPI,   | Bu         | Abdominal pain      | Pound the bulb and mix with water and drink it                            | O             |
|         |                           |             | shenkurt   | M          |            |                     | Chewing the root                                                         | O             |
| M11     | Aloe pulcherrima Gilbert and Sebsebe @ | Aloaceae | Sete eret  | M          | Sa         | Snake bite          | Take the sap with mouth                                                   | O             |
|         |                           |             |            |            |            |                     | Take the sap with mouth                                                  | O             |
| M6      | Aloe trichosantha #       | Aloaceae    | Wende eret | M          | Sa         | Snake bite          | Take the sap with mouth                                                   | O             |
| M8      | Artemisia abyssinica #    | Asteraceae  | Chiqugn    | M          | L          | Evil eye            | Sniff the fresh leaf                                                      | O             |
|         |                           |             |            |            | L and S     | Cough              | Take the leaf and stem then drink its extracts                           | Na            |
| M10     | Becium grandiflorum (Lam.) Pic.Serm @ Bersama abyssinica # | Lamiaceae | Muatishe   | FIW, M     | L          | Pneumonia           | Pound the leaf and stem then drink its extracts                           | O             |
|         |                           |             |            |            | L          |                     | Pound the leaf; then extract the liquid and drink it.                   | O             |
| M7      | Bersama abyssinica #      | Melianthaceae | Azamer    | FIW, M     | R          | Rabies              | Pound the root then drink the extract and put the decoction on the bite site | O, Dr         |
| M9      | Calotropis procera (Ait.) Airt # | Asclepiadaceae | Kinbo    | M          | L          | Hemorrhoids         | Rubbed the latex on the affected parts.                                  | An            |
|         |                           |             |            |            | R          |                     | Rubbed the latex on the affected parts.                                  | An            |
| M14     | Capsicum annuum L. *      | Solanaceae  | Berbere    | FO, SPI,   | Fr         | Abdominal pain      | Grind the fruit then put on the affected part and hold with teeth        | O             |
|         |                           |             |            | M          | Fr         |                     | Grind the fruit then put on the affected part and hold with teeth        | O             |
| M18     | Carica papaya *           | Caricaceae  | Papaya     | FO, M      | R          | Evil eye            | Pound the root and put it on the fire then sniff it.                     | Na            |
|         |                           |             |            |            | Fr         | Heartburn          | Eat the fruit                                                             | O             |
| M15     | Carissa spinarum L. #     | Apocynaceae | Agam       | FEN, FIW, M| R          | Snake bite          | Pound the root then drink the extract                                    | O             |
|         |                           |             |            |            |            |                     | Boiled the root and drunk the extract                                    | O             |
| M12     | Citrus aurantiifolia *    | Rutaceae    | Lomi       | FO, M      | R          | Abdominal pain      | Pound the root then drink the extract                                    | O             |
|         |                           |             |            |            | Fr         | Vomiting            | Pound the root then drink the extract                                    | O             |
| M17 | Citrus aurantium | Rutaceae | Comtate | FO, M | Fr | Vomiting | Squeezed the fruit and drank the liquid of it | O |
| M13 | Clerodendrum myricoides (Hochst.) Vatke | Lamiaceae | Mischerch | FIW, M | AI | Asthma | Pound all parts then drink the extract | O |
| M16 | Clutta abyssinica Jaub. & Spach. | Euphorbiaceae | Fyele fegi | FIW, M | AI | Cancer | Pound all parts then put on the affected parts | An |
| | | | | | R | Snake bite | Pound and extract its decoction then drink it. | O |
| M23 | Coffea arabica | Rubiaceae | Buna | FO, M | SE | Headache | Roust the seed and pound; then boil with water | O |
| | | | | | SE | Diarrhea | Roust the seed and pound it then mix with milk. Then drink it | O |
| M22 | Croton macrostachyus Del. | Euphorbiaceae | Besana | TIM, FIW, M | L | Allergic | Rubbed with the liquid of the leaf on the affected part | Dr |
| | | | | | L | Wart | Smashed the leaf and put on the affected part | Dr |
| | | | | | L | Snake bite | Extract the liquid by smashing immature leaf and drink it. The remaining crude put on the affected part. | O, Dr |
| M21 | Cucumis ficifolius | Cucurbitaceae | Yemider emnbuye | M | R | Tumor | Pound the root and incarceration on the affected parts. | Na |
| M26 | Cucurbita pepo | Cucurbitaceae | Duba | FO, M | Fr | Dizziness | Eat the fruit after cook it | O |
| M27 | Cyphostemma sp. | Vitaceae | Aserkushe tetebkushe | M | R | Tumor | The root is pounded and tied on affected part | Dr |
| M24 | Datura stramonium L. | Solanaceae | Astengere | M | L | Scabies | The leaf is Smashed and put its extract on the affected part. | Dr |
| M25 | Echinops kebericho | Asteraceae | Kebercho | M | R | Evil eye | The dry root is put on the fire then sniff the smoke | Na |
| | | | | | R | Diarrhea | The dry root is put on the fire then sniff the smoke | Na |
| M20 | Embelia schimperi | Myrsinaceae | Enkoko | M | R, Fr | Asthma | Dry fruit and root put on the fire and sniffed it | Na |
| | | | | | R, Fr | Tania | The fruit and root pound then drink by mixing with water. | O |
| M28 | Eucalyptus camaldulensis | Myrtaceae | Keye beharzafe | TIM, FIW, M | L | Common cold | Boil in water and fumigated it. | Na |
| | | | | | L | Pneumonia | Boil in water and fumigated it. | Na |
| M30 | Eucalyptus globulus | Myrtaceae | Nech beharzafe | TIM, FIW, M | L | Common cold | The leaf is boiled in the water and fumigated it. | Na |
| M32 | Euphorbia tirucalli L. | Euphorbiaceae | Krenchib | M | R, La | Rabies | Pound the root then mix with its latex then drink it | O |
| M35 | Euphorbia abyssinica | Euphorbiaceae | Kulkual | M | R, La | Gonorrhea | Pound the root and mix with its latex then rubbed on the affected part | Dr |
| | | | | | R, La | Hemorrhoides | Pound the root and mix with its latex then rubbed on the affected part | An |
| M36 | Hagenia abyssinica | Rosaceae | Koso | M | Fr | Tania | Pound and mix with water and drunk it | O |
| M31 | Hordeum vulgare | Poaceae | Gebse | FO, BE, M | L | Dandruff | Pound the leaf and then smear n the affected part | Dr |
| M38 | Kalanchoe petipiana @ | Crassulaceae | Endahula | M | L | Tumor            | Heat the leaf on the fire the put it on the affected part |
|-----|-----------------------|--------------|-----------|---|---|------------------|---------------------------------------------------------|
| M37 | Laggera tomentosa     | Asteraceae   | Kesekeso  | M | L | Tonsillitis      | Smashed and squeezed the life and extract its decoction and drink it |
|     | (Sch.Bip. ex A. Rich.)Olivo @ |             |           |   |   | General malaise  | Smashed and squeezed the life and extract its decoction and drink it |
|     |                       |              |           |   |   | “Mich”           |                                                         |
| M34 | Lepidium sativum *    | Brassicaceae | Feto      | M | Fr | Abdominal pain  | Pound and mix with water and drink it                     |
| M33 | Maesa lanceolata Forssk. # | Myrsinaceae | Kelewa    | FIW, M | Fr, Se | Ascaries       | Pound and mix water and drink it                           |
| M29 | Maytenus arbutifolia (A. Rich.) Wilczek @ | Celastraceae | Atate     | FIW, M | Ba, R | Evil eye        | Put on fire and sniff it                                   |
| M41 | Musa acuminata #      | Musaceae     | Muz       | FO, M | Fr | Granule         | Smear the affected parts with peel of banana.             |
| M39 | Ocimum lamifolium Hochst. Ex Benth # | Lamiaceae | Damakese  | M | L | Tonsillitis      | Smashed and squeezed the life and extract its decoction and drink it |
|     |                       |              |           |   |   | General malaise  | Smashed and squeezed the life and extract its decoction and drink it |
|     |                       |              |           |   |   | “Mich”           |                                                         |
| M40 | Olea europaea L.subsp. cuspidate (Wall. Ex G.Don #) | Oleaceae | Weyera    | FIW, M | FUM | L | Tonsillitis      | Smashed and squeezed the life and extract its decoction and drink it |
| M44 | Rhamnus prinoides #   | Rhamnaceae   | Gesho     | BE, M | L  | Tonsillitis      | Smashed and squeezed the life and extract its decoction and drink it |
| M43 | Ruta chalepensis L. # | Rutaceae     | Tenadam   | SPI, M | Fr | Abdominal pain  | Pound and drink it with water                            |
| M42 | Solanum marginatum L.# | Solanaceae | Enbuaye   | M  | L  | nosebleed       | Smashed and put it in the hole of nose                   |
|     |                       |              |           |   |   | Bleeding         | Smashed and put it on the affected part                  |
| M45 | Thalictrum rhynchocarpum Dill. & Rich. # | Ranunculaceae | Sere bizue | M | R | Abdominal pain  | Chewing the root                                         |
| M2  | Tragia cinerea #      | Euphorbiaceae | Albelabit | M | R  | Tumor            | Pound the root and put it on affected part                |
| M1  | Verbascum sinaiticum Benth. # | Scrophulariaceae | Yeaheya joro | M | R  | Evil eye         | Smashed the leaf and extract its decoction then spill it on the affected part |
|     |                       |              |           |   |   | Scabies          | Smashed the leaf on fire and snifed it                   |
|     |                       |              |           |   |   | Snake bite       | Pound the root and mix its extract wit water then drink it |
| M3  | Verbena bonariensis # | Verbenaceae  | Hulegebe  | M  | Al | General malaise  | Pound and drink its extract with water                   |
|     |                       |              |           |   |   | “Mich”           | Smashed the leaf and extract its decoction then drink it |
|     |                       |              |           |   |   | Epilepsy         | Put the leaf on the fire and sniffed it                  |

Note: For Ethiopia (Endmic (@)), indigenous (#) and introduced (*)); Plant part (leaf (L), root (R), all part (Al), flower (FL), bulb (BU), sap (Sa), stem (S), latex (La), fruit (Fr), seed (Se) and bark (Ba); Uses (medicinal (M), spice (SPI), food (FO), firewood (FIW), fence (FEN), timber (TIM), beverage (BE) and fumigation (FUM)); Mode of application (oral (O), anal (An), dermal (Dr) and nasal;