

ISSN 1996-3351

Asian Journal of
Biological
Sciences



Research Article

Ethnobotanical Study of Medicinal Plants Used for Treatment of Liver Diseases in Tepi Town, Southwest Ethiopia

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Abstract

Background and Objective: Traditional medicine plants are used for human diseases treatment throughout the world typically liver problems practiced by traditional healers. The study was carried out in Tepi town southwest Ethiopia with the objective of survey the medicinal plants used for the treatment of liver diseases and documented associated knowledge of the people. **Materials and Methods:** By using purposive sampling method and different data collection techniques such as questionnaire, interview, focus group discussion and case study, the reliable data was recorded. **Results:** Based on this ethnobotanical study a total of 33 medicinal plants belonging to 26 families were reported and documented from three kebeles of the town. The highest family in terms of species number was Asteraceae accounts 5 species followed by Euphorbiaceae 4 species and the rest families each with 1 species. Herbs were dominant habit plants (33.33%) followed by shrubs (24.24%) and tree (24.24%). The most frequently utilized plant parts for treatment of liver disease was leaf (36.36%) followed by combination of leaf and root (21.21%). **Conclusion:** The medicinal plant preparations were administered via oral route of administration that employed for the medicinal plant preparations most commonly used route of application. Adapting a recommended diagnostic and treatment using physical diagnosis by indigenous healers/practitioners attempted curing liver problem implementing prevention and control policies in the general population needs an urgent attention in the country.

Key words: Medicinal plant, ethnomedicinal use study, asteraceae, liver disease, medicinal plants, teppi, traditional medicine, indigenous healers

Citation: Belachew Garedeew and Dagne Abebe, 2019. Ethnobotanical study of medicinal plants used for treatment of liver diseases in Tepi town, Southwest Ethiopia. *Asian J. Biol. Sci.*, 12: 648-655.

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Competing Interest: The authors have declared that no competing interest exists.

Data Availability: All relevant data are within the paper and its supporting information files.

INTRODUCTION

Herbal drugs have been used for the treatment of liver diseases since ancient times and have a time-honored history in Ethiopia. Traditional medicine is used throughout the world which is locally available plants and are easily accessible and capitalizes on traditional wisdom-repository of knowledge, simple to use and affordable in cost compared to modern medication of western^{1,2}.

Liver is the largest organ in the body. Liver diseases remain serious health problems and are caused, among others by drugs, chemicals and alcohol and a variety of factors and affecting everyone from infants to older adults worldwide³⁻⁵. As shown by most studies on the surveys of utilization of medicinal plants for the treatment of different diseases in different parts of Ethiopia various types of plants identified in Ethiopia claimed to be used. Liver disease is a major cause of morbidity and mortality throughout the world that conventional medical therapy used for many common disorders, including non-alcoholic fatty liver disease and viral hepatitis has limited efficacy and potentially life-threatening side effects. Various medicinal plants and their formulations and dosage are used in traditional medicine for their effects on liver disorder and a number of herbal preparations are available on the market traditionally since ancient time^{4,6,7}.

The diagnosis of major liver diseases can be made by herbalists or medical practitioners from prior medical history of patient and physical examination and laboratory tests among other. A considerable amount of research has been conducted worldwide and in Ethiopia too on medicinal plants and ethnobotany with an emphasis on field surveys and documentation of people's indigenous knowledge on the usage of traditional medicinal plants that used for curing of liver complication. Therefore, the main objective of this research was to ethnobotanical study on the medicinal plants with emphasis on the compilation and documentation of indigenous knowledge associated with the treatment of liver diseases in Teppi town using varieties of medicinal plants.

MATERIALS AND METHODS

Study site: Teppi town is located in southwest of Ethiopia. It is the administrative center of Yeki district of Sheka zone. Geographically, the district lies between 7°12'-7°43' W latitude and 35°32'-35°75' E longitude. The altitudinal range of the district falls between 1001-2007 m above sea level and it receives high amount of rainfall, with an average of 1171-2200 mm annually with most rainy months

are April-September. It is conducive for cultivation of cash crops such as coffee, ginger, turmeric, piper and others.

Site selection and data collection: The compiled research data was investigated from March-June, 2017 in Tepi town, Sheka zone southwest Ethiopia. The study sites were selected all Kebeles of the town; namely Andinet, Hibret, Selam and Qorcha. All traditional healer/herbalist were incorporated based on the guidance and information of elder people in the locality. Different data collection techniques such as questionnaire, interview, focus group discussion and case study were used for this study, Hence, a total of 9 herbalists and 43 key informants were interviewed and almost all of the respondents were volunteer for giving all possible information and trends for treatment of liver diseases effectively in the Kebeles.

Market survey of medicinal plants: The market survey and observation were made at Tepi local market which is the administrative center of Yeki district and interviews were made with medicinal plant sellers and buyers. The survey was done to assess the variety and amount of the medicinal plants supplied from the area and to record information either the medicinal plants are marketable for the use of remedy or for any else utilizations.

Data analysis: The medicinal plant data reported used for treatment of liver diseases and associated indigenous knowledge was entered in to Excel spreadsheet and summarized using descriptive statistics. The spreadsheet data filter facility was employed to determine frequencies and percentage of citations so as to identify the most common use, parts used and route of administration and habit of medicinal plants preferred for treatment of liver problem throughout the country. The results were presented using pie charts, bar chart and tables.

RESULTS

General information of informants: In this survey, a total of 52 persons (43 farmers and 9 traditional healers) were involved for reliable data collection in Yeki district of four villages. All of the respondents found in the study area were males because the traditional knowledge of practicing medicinal plants as healers was transmitted from father to the elder son. Most of the respondents were between the age of 45 and 75 years old (91.9%). The person in this age group is more experienced and knowledgeable as compare

to the younger age. Orthodox religion and farmer job account for higher percentage of the study participants.

Liver diseases and medicinal plants used: As the key informants and traditional practitioners explained from the district, most of the cause for the liver disease assumed to be drinking alcohol and unknown reasons. The healer's had trained diagnosis the patients by using physical observations like eye color (yellowish) and los of weight and also history of the patients. A total of 33 medicinal plants used for treatment of liver disease were collected and identified from study area. In addition to their medicinal values, they are utilized for other purposes for the community. These plants are distributed into 26 families. Among the families represented by several species, Asteraceae (5) followed by Euphorbiaceae (4) and the remaining families accounted 1 species each for the sizeable fraction of the total number species documented in the study (Table 1).

Habitat and habits of medicinal plants: The major habitat of medicinal plants collected from wild (66.67%) followed by both homegarden and wild (21.21%) (Fig. 1). As pointed out by informants of the study area highest number of natural environment medicinal plants entails that the majority of plants of medicinally importance were not yet cultivated purposively by traditional healers for the uses of remedies.

The assessment on the growth form of the medicinal plants depicted that herbs constituted the highest number of medicinal plants (33.33%) followed by shrubs (24.24%) and tree (24.24%). However, only a small number of species (3.03%) were determined as epiphytes (Fig. 2).

Plant parts used: Based on the aforementioned data, cumulatively 33 medicinal plants with 26 families were used in the 3 sites (villages) for the treatment of liver diseases of human. Based on the report, frequently cited medicinal plant by the traditional healers from these sites was *Justicia schimperiana* which is assumed to be curative to the infection of the diseases. The parts used, the indications, the preparation and application of the plants products and the frequency of citation of the plants during the survey.

As cited by the traditional practitioners, the plant parts of the medicinal plants employed to treat human liver problems were use different parts and most of the plants are used single for medication. But sometime, traditional healers also used some ingredients such as milk to prepare the remedies. As it is displayed the Fig. 3, the plant parts widely used by the healers to treat liver diseases during remedy preparation surveyed were leaves (36.36%) followed by

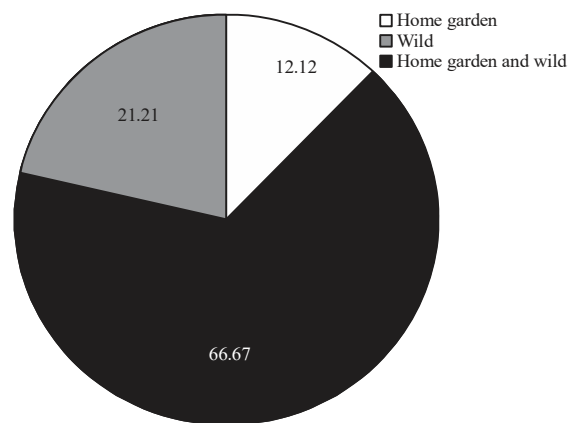


Fig. 1: Common habitat of medicinal plants

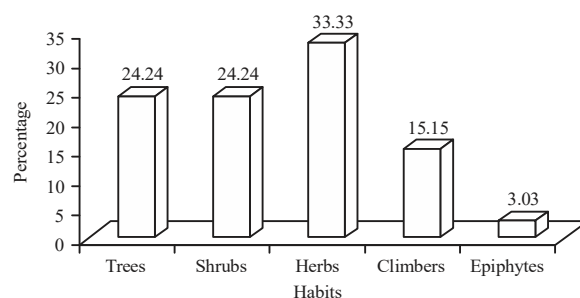


Fig. 2: Habit of medicinal plants

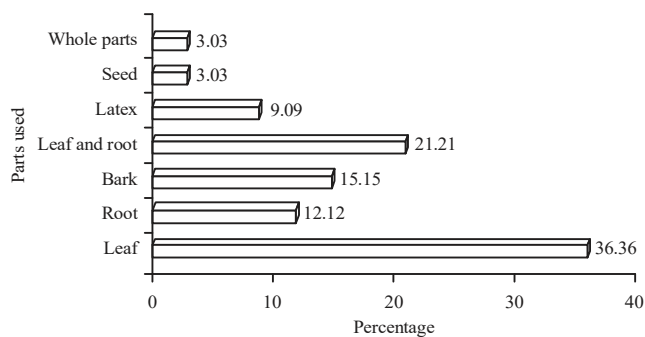


Fig. 3: Parts of medicinal plants used for treatment of intestinal parasitic diseases

combination of leaf and root (21.21%), bark (15.15%) and root (12.12%). Accordingly, collecting leaves do not pose a greater danger to the existence of an individual plant as compared with the collection of roots, barks, stems or whole plants and hence do not affect sustainable utilization of the plants.

Almost all of the interviewed healers were men. Generally, they use their knowledge on medicinal plants to help the community by selling their products to the patients in the village and district. The major symptoms used for

Table 1: List of medicinal plants used for treatment of liver diseases in Tepi town, southwest Ethiopia

Species	Family	Local name	Hb	Hab	PU	Mode of preparation and dosage	RA
<i>Aeolanthus densiflorus</i> Ryding	Lamiaceae	Yeto	H	WH	La	Grind the leaf of yeto and wanza boil then drink 1 cup per a day for 4 days Tef bread and milk used to detoxify dosage	Or
<i>Asparagus falcatus</i> L.	Asparagaceae	Ufoo	Cl	F	R and L	Grind and squeeze	Or
<i>Basella alba</i> L.	Basellaceae	Nopo	Cl	Wi	L	Crush the fresh leaves and filter with little water and finally drink the extraction with a glass per a day in the morning, for babies with coffee cup and for pregnancy like the adult advise, no side effect at all	Or
<i>Cirsium dender</i> Friis	Asteraceae	Daji umbelo	H	WH	R	Crush the root or boil the fresh root and then mix the extraction with honey and drink one glass for adult and one coffee cup for babies every morning	Or
<i>Cirsium englerianum</i> O. Hoffm.	Asteraceae	Aa' i ombaloo (K)	H	HG	R and L	Grind and squeeze	Or
<i>Clerodendrum myricoides</i> (Hochst.) R. Br.	Lamiaceae	Miserej (Am)	Sh	Wi	R	Grind and extract the juice. Drink the juice with a full of tea cup, for children depth with small finger joint, for pregnancy forbidden	Or
<i>Cordia africana</i> Lam.	Boraginaceae	Wanza (Am)	T	Wi	L	Grind the fresh leaf of wanza and prepare a juice. Drink the juice with a small glass for three days, babies ¼ of adult, abort the pregnancy- detoxified by milk and other product	Or
<i>Croton macrostachyus</i> Del.	Euphorbiaceae	Waaqoo	T	F and FL	La	Ground and squeeze	Dr
<i>Dicrocephala integrifolia</i> (L.f) Kuntze	Asteraceae	Burbu'o (sh)	H	Wi	L	Crushing and squeezing the leaf drop on the wound	Dr
<i>Dracaena steudneri</i> Engl.	Dracaenaceae	Mota (Am)	Sh	Wi	B	Grind the bark and mix the extract with water and drink the next morning one coffee cup of 2nd line of the 2nd finger	Or
<i>Ekebergia capensis</i> Sparrm	Meliaceae	Lol (Am)	T	Wi	B	• Never give for pregnant	Or
<i>Erythrina bruci</i> Schweinf	Fabaceae	Kollachoo	T	FL	R and L	Mix lol and tikur inchet bark grind and drink the extract	Or
<i>Erythrococca trichogyne</i> (Müll. Arg.) Prain	Euphorbiaceae	Shamle (Am)	Cl	Wi	L	Grind the mixture of leaf of bichirekucho, wanza and umbelo together then drink the extract 1 cup at morning 3-4 days	Or
<i>Helichysum</i> spp.	Asteraceae	Shopo (Sh)	H	Wi	L	Crush the leaf and drink extract	Or
<i>Hordeum vulgare</i> L.	Poaceae	Tikur gebs (Am)	H	HG	Se	Grind the dry seed of barely and bark of shello and then mix the powder with water. Drink only one tea cup for adult in the morning and half for children	Or
<i>Huperzia saururus</i> (Lam.) Trevis	Lycopodiaceae	Yuwit (Sh)	Ep.	Wi	WP	Crush the leaves and extract the juice and the drink the extraction with coffee cup one per a day in the morning that measure depth the upper joint of smaller finger	Or
<i>Hypericum revolutum</i> Vahl.	Hypericaceae	Amija	Sh	Wi	La	Crush the wet leaf and drink for adult, ½ cup morning and night for 2 days and ¼ of the adult for baby and pregnant for 4-5 days but if it is excess it brings vomit. Mocho minimize the dose of the medicine	Or
<i>Ilex mitis</i> (L.) Radlk.	Aquifoliaceae	Qeto (Sh)	T	Wi	B	Boil in wet and drink juice after a day	Or
<i>Impatiens ethiopia</i> Grey-Wilson	Balsaminaceae	Gishlit (Am)	H	Wi	L	Grind the mixture of Ye'ero, Bokelekeko, Qeremendero and Achebeno together. Then drink the extract ½ glass at morning until it signs diarrhea and vomit not for baby and pregnant. Tef bread minimize dosage	Or
<i>Justicia schimperiana</i> (Hochst.ex Nees) T. Anders	Acanthaceae	Sensel (Am)	Sh	Wi	L	Crushing the twig and mixing with water, letting to stay for 30 min, filtering and drinking, drinking much aguat (whey) after 10 min	Or

Table 1: Continue

Species	Family	Local name	Hb	Hab	PU	Mode of preparation and dosage	RA
<i>Lobelia gibberoa</i> Hemsli.	Campanulaceae	Gibira (Am)	H	Wi	R and L	Grind the root of gibira together with Omo and Umbelo root together then extract the juice. Drink the juice with one full of coffee cup per a day every morning. Detoxify by eating bread of black tef. <ul style="list-style-type: none"> Not allowed of drinking water and milk Forbidden for pregnancy For babies measures in depth of upper small finger accordingly Grind the leaf and mix little water. Drink the juice measures with upper joint of little finger depth of coffee cup; babies half. <ul style="list-style-type: none"> Not for pregnant and aged; detoxified by pure cow milk Crush the fresh bark of werango and the extract 1 cup could be drunken with hot milk for 4 days; Pediatric dose is ½ adult dose	Or
<i>Macaranga capensis</i> (Baill) Benth.	Euphorbiaceae	Werango (SH)	T	Wi	B		Or
<i>Maesa lanceolata</i> Forssk.	Myrsinaceae	kelewa (Am)	Sh	Wi	B	Grind the fresh bark of kelewa gently and mix the extraction with milk and then boil with fire. Finally drink with cup of coffee. For babies ½ of adult but forbidden for pregnancy, milk by itself detoxifier	Or
<i>Momordica foetida</i> Schum	Cucurbitaceae	Yumbaa'o (K)	Cl	WH	R and L	Grind and squeeze	Or and Dr
<i>Pavonia urens</i> Cav.	Malvaceae	Gaahijjo (K)	H	HG	R	Ground and boil the fresh root then drink	Or
<i>Phoenix reclinata</i>	Arecaceae	Zembaba (Am)	T	WH	L	Squeezing the leaves	Or and Oc
<i>Phytolacca dodecandra</i> L.Herit.	Phytolaccaceae	Indod (Am)	Cl	WH	R and L	Grind and squeeze	Or and Dr
<i>Pittosporum viridiflorum</i> Sims.	Pittosporaceae	Shello (Sh)	T	Wi	L	Boil the leaf and drink 1 glass for adult and cup for baby next morning	Or
<i>Ranunculus multifidus</i> Forssk.	Ranunculaceae	Foggjyo (K)	H	WH	L	The wet leaf heat with fire and rub it then glue for 2-3 days: <ul style="list-style-type: none"> Caution: Do not spray to eye 	Dr
<i>Ricinus communis</i> L.	Euphorbiaceae	Gulo (Am)	Sh	WH	R	Crush the mixture of Timbahoo and gedrano the fresh root. Drink the extract 1st line of small finger and ½ for baby 1 time a day for 3 days	Or
<i>Rytigynia neoclecta</i> (Heirn) Robyns.	Rubiaceae	Nechato (Sh)	Sh	Wi	L	Diarrhoea, vomit and slept are sign of curesity The fresh leaf of nechato grind and mix with water then filter the juice and drink 1st half of glass and 2nd and 3rd day full of glass per a day: <ul style="list-style-type: none"> Detoxify by bread of black tef or bula For babies ¼ of adult Forbidden for pregnancy 	Or
<i>Rumex nepalensis</i> Spreng.	Polygonaceae	Gorachoo (Oro)	H	HG	R and L	Grind the root or leaves then drink the extract or spray to the kin	Or and Dr
<i>Solanecio gigas</i> (Vatke) C.Jeffrey	Asteraceae	Yeshikoko gomen (Am)	Sh	WH	L	Squeeze the leaves	Or and Dr

Hb: Habit, T: Tree, Sh: Shrub, H: Herb, Cl: Climber, Ep: Epiphyte, Hab: Habitat, F: Forest, FL: Farmland, GL: Grassland, HG: Home garden, RP: Riparian, PU: Part use, L: Leaves, R: Roots, B: Bark, S: Seed, La: Latex, leaf, L and R leaf and root, WP: Whole plant, RA: Route of administration, Or: Oral, Dr: Dermal, Wi: Widow island, WH: Webster head, Oc: Ocular

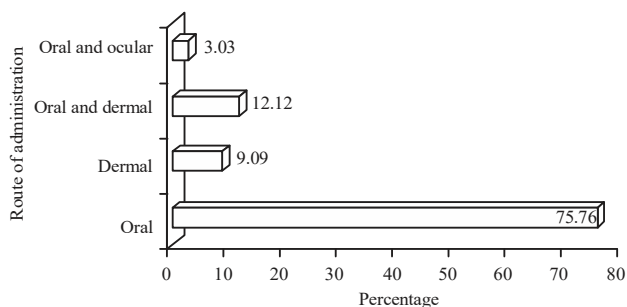


Fig. 4: Administration routes of medicinal plants in the study area

diagnosing the liver problem by healer to for further treatment of the problem were due yellowish of eye, skin, weight lost and etc.

Preparation methods and route of administration of medicine:

According to information gathered from informants, different methods of preparations were involved to use the medicinal plants to treat the liver diseases in the study area. Among those the most well known mode of preparation of remedies, grinding and crushing were the major practice that the healers used to treat liver disease. Collection and application of medicinal plants in the study area required especial attention and hygiene. Mostly traditional herbalists and elders were participated in the activity of traditional remedy preparations. During collection and preparations of medicinal plants, practitioners respect some beliefs including refraining from (e.g., sexual activities with his/her wife/husband, talking about healing power of medicines with other persons and eating breakfast before collection and preparations) and pray to get permission from God as cited by local people of the study area. The plants parts were used separately but sometime, traditional healers also used some ingredients such as milk to prepare the remedies. Regarding the route application of medicinal plants the prominent method is mainly (75.76%) through oral followed by oral and dermal (12.12%) and dermal (9.09%) (Fig. 4).

DISCUSSION

Liver is the largest gland is a vital organ. It is the metabolic “engine-room of the body”. Almost all the drugs, foods and water constituents are metabolized and detoxified in the liver and as such it is often exposed to maladies resulting in a number of clinical syndromes. Many chemicals, foods,

drugs and infections (parasitic, bacterial, viral or fungal) can cause variety of liver diseases such as hepatitis, jaundice, cirrhosis, liver cancer, etc.⁸. As the key informants and traditional practitioners explained from the district, most of the cause for the liver disease assumed to be drinking alcohol and unknown reasons. The healers’ had trained diagnosis the patients by using physical observations like eye color (yellowish) and los of weight and also history of the patients. A total of 33 belongs to 26 families of medicinal plants used for treatment of liver disease were collected and identified. Among these families Asteraceae was contributed the highest species each for the sizeable fraction of the total number species documented in the study.

Most of medicinal plants were collected from wild in fresh conditions. As the information gained from the informants, wild natural habitat is somehow uninterrupted by anthropogenic effect compare to other habitats and hence it is easy to get medicinal plants in non-cultivated environments such as forest, grassland, etc. As pointed out by informants of the study area highest number of natural environment medicinal plants entails that the majority of plants of medicinally importance were not yet cultivated purposively by traditional healers for the uses of remedies. The finding of the present study agreed with the investigations of Addisie *et al.*⁹ and Yirga *et al.*¹⁰ conducted in other part of Ethiopia revealed that most of medicinal plant were collected from the wild natural habitat nearby forest and grassland areas. Collection and application of medicinal plants in the study area required especial attention and hygiene. Mostly traditional herbalists and elders were participated in the activity of traditional remedy preparations. Leaf is frequently cited parts of plant used for remedy preparation. This finding is comparable with Abera¹¹, Belayneh *et al.*¹², Birhane *et al.*¹³ and Teklay *et al.*¹⁴ conducted in different parts of the country.

Oral remedy application route was the prominent practice to treat liver disease. This is because the effect of medicine had been easy to observe and side effect is very less compare to other route of administration. In similar manner, various studies^{13,15-17} carried out elsewhere in the country have designated that oral as the predominant route of application. Thus, as cited by most informants of the study area oral application route of remedies is painless and unproblematic way of taking the medicines. In the study area the amount of remedy and prescription rates were generally dependent on the type, degree and duration of the ailments. The data obtained from respondents showed that traditional medicines

dosage were employed by using various units of measurement such as finger length (e.g., for root, stem and bark), pinch (e.g., for powdered plant parts) and numbers (e.g., for leaves, seeds and fruits) to estimate and fix the measured quantity of the medicine which depends on the perception of healers/herbalists. In addition, informants of the study area also indicated that the doses were prescribed through estimation in terms of liter, spoon, cup of tea, cup of coffee, palm of hand and other determinations by depending on the age of the patient being treated. This was also similar findings from the different communities of Ethiopia^{4,13}.

Therefore, the authors recommended that the current findings on the traditional medication of liver diseases is common the districts so as to support with scientific approaches. To do this the valuable plants must be tested for antibacterial, antifungal, antiparasitic, antiviral and cytotoxic activities to confirm the therapeutical claims indicated by informants. These plants are also taken a measure to conserve *in situ* and *ex situ* type for their sustainability.

CONCLUSION

As the finding of this study indicated, liver diseases with different related complications such as hepatitis, jaundice and any infection of liver common in the study area which is not given emphasis comparing from other diseases as national level using modern approaches. This survey underlines that 33 medicinally valuable plant species were used to treat liver diseases and the symptoms that might be related to the liver complication. Therefore, there is a realistic potential that these plants would contain compounds with anti-liver problems potency. In present study, the results reported are preliminary findings. For the improvement and promotion of the local traditional knowledge using medicinal plants against, there liver diseases the need to investigate the phytochemical, pharmacological and toxicological profile of the plants used in order to ensure their efficacy as well as their safety.

SIGNIFICANCE STATEMENT

The significance of this study discovered the medicinal plants used to treat liver disease that can be beneficial for conservation of the indigenous knowledge and the medicinally valuable plants to support with science of technology in the future. This study will help the researchers to uncover the critical areas of medicinal plants knowledge

that many researchers were not able to explore and the liver disease is currently one of the major killer of human beings.

ACKNOWLEDGMENTS

The authors are thankful to the informants who gave us clear information and shared their medicinal plant knowledge as well as the elders and the local administration of the town for their support in facilitating the interview process. The authors also thank the staff of Biology Department, Mizan-Tepi University for idea support.

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