



TRADITIONAL MEDICINAL PLANTS USED BY LOCAL PEOPLE IN SHARIS DISTRICT, HAJJAH GOVERNORATE, REPUBLIC OF YEMEN

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ABSTRACT

The aim of this study was to record medicinal use of native plants by the inhabitants of the study area. 65 plant species belonging to 62 genera and 33 families were documented having medicinal importance and are being used by the local people for treating their various diseases, such as diarrhoea, dysentery, gastric ulcer, intestinal worms, abdomen pain, fever, malaria, cough, bronchitis, asthma, headache, toothache, wounds and sores, skin diseases, snake bite and some other diseases. The most important medicinal plant families were Asteraceae, Solanaceae, Amranthaceae, Poaceae and Fabaceae. In majority cases, leaves of the medicinal plants were found leading in terms of their use followed by fruits, whole plant, roots, seeds, stem, rhizome, and flowers. For each species scientific name, local name, habit, family, ailments to be treated, mode of treatment and part, (s) used are provided.

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INTRODUCTION

Plants provide man all his needs in terms of food, clothing, shelter, flavors and fragrances. Plants have formed the basis of system among traditional medicine which has given rise to some important drugs still in use today. Many ancient nations have awakened to the importance of herbal medicine which brings more cures [10]. The traditional Medicine is used in all parts of the world and has a rapidly growing economic importance, mainly by the use of medicinal plants that have a respectable position today, especially in the developing countries [7]. About 80% population of the world depends on the traditional system of health care [26, 18]. Plants have been used since the dawn of human civilization for readymade food, medicines for various ailments, fodder/ forage for cattle, burning, flower for celebration, services to earn, honey collection, making agricultural tools, timber for construction and many more useful items [3, 19]. Over 5000 plant species belonging to angiosperms are used worldwide for medicinal purposes. Medicinal plant products have been used successfully for various ailments both externally and internally. Despite the increasing use of synthetic drugs, plants materials have persisted as the "treatment of choice" as they have no or fewer side effects [17]. The World Health Organization (WHO) reported that nearly 4 billion people (80% of the world population) initially use herbal remedies to resolve their health related issues. Additionally, 25% of the

prescription drugs sold in developed countries comprised active ingredients of herbal origin (such as vinblastine, reserpine, quinine, and aspirin) [14]. Yemen is one of the richest countries in the world in terms of plant diversity, approximately 3000 plant species have been identified within her borders and 415 of these are endemic [6]. More than 800 plant species are used in Yemen in treatment of diseases [4]. Treatment using herbal remedies relies on the presence of a particular type of culture and tradition. Yemeni people are quite interested in wild plants, due to the high proportion of people living in rural areas, and also for economic reasons. In recent years, the plants used traditionally for curative purposes have attracted attention of the researchers. Studies on ethno-medicinal information of ethnic communities in Arabic world are at initial stage. Several ethno-medicinal studies in some Arabic countries have been carried out by [1,2, 8, 9, 13, 15, 16, 20, 21, 23, 25].

MATERIALS AND METHODS

Study Area

The basin of Sharis Valley is located in the west of Yemen, in the east and the northern-east of Hajjah governorate in Sharis district. Fig [1].

Geographically, it is located between latitudes (15° 36' 36" north and 13° 20' 21" north) and between longitudes (33° 43' east, and longitude 45° 43' east) [5].

The study area is about 9100 km² in size and characterized by a contrasts topographical location where the high mountains

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in the East represented by the mountain range of Maswar which is about (3240) meters height, and the highlands and the low-lying plains in the West which are about (720) meters height. According to the climate of the study area, it is hot and rainy in summer, and cold and dry in winter [11].



Fig Map 1 showing location of the study area

Collection of Ethno-botanical Information

Frequent field surveys were carried out in the different areas of Sharis district, Yemen, during the collection of vegetation data, ethno-medicinal information of plants was collected during August, 2015 to MAY, 2016. A semi-structured questionnaire was designed and administered to record medicinal uses of native species by the local people and they were interviewed to extract the ethno-botanical data like local names, parts used, method of preparation and ailments treated. During the survey, plant specimens were also collected from the study area, photographed and identified with the help of available floras. The medicinal uses of plant species were cross checked from the available literature. Voucher specimens were prepared in the form of herbarium and deposited in B.A.M.U Herbarium, Department of Botany, Dr. B.A.M.U University, India. Besides, Herbarium of Hajjah, Department of Biology, Hajjah University, Hajjah, Yemen.

RESULTS

The investigation of the plants known for the ethno-medicinal uses in Sharis district, Hajjah governorate revealed a total of 65 species belonging to 62 genera and 33 families were recorded. For each species scientific name, local name, habit, family, ailments to be treated, mode of treatment and part(s) used are provided in (Table 2).

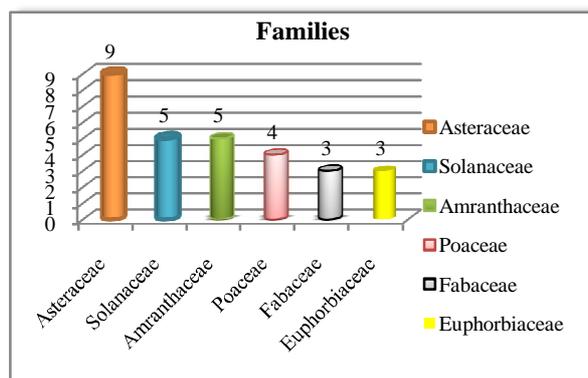


Fig 2 Dominant families with their respective species utilized for different purposes

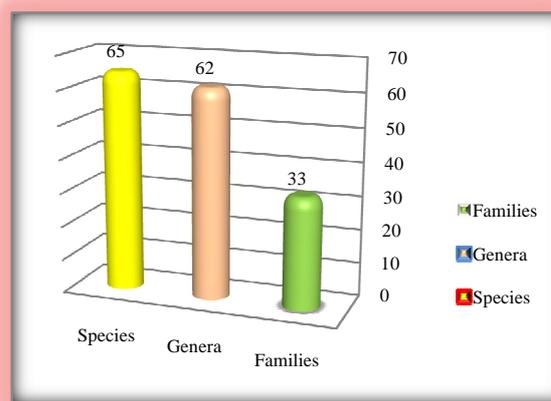


Figure 3 Proportion of Families, Genera and Species of ethno-botanical important plants

From the available information, it is revealed that, these tribal people use plant species, which are not generally used by other population. Data have been gathered on the traditional uses of plant species, especially for asthma, anthelmintic, astringent, burning sensation, constipation, diarrhea, diabetes, eczema, fever, fracture, gonorrhoea, headache, heart disease, itches, jaundice, kidney disease, leprosy, piles, snake-bite, ulcers, worm, wound and others. These commonly used angiosperm plant species are arranged in an alphabetical order along with by their scientific name, local name, habit, family name, part(s) used, ailments and treatment process.

Table 1 Family wise number of genera and species present in the study area

S. No.	Family	No. of Genera	No. of Species	S. No.	Family	No. of Genera	No. of Species
1.	Acanthaceae	2	2	18.	Malvaceae	2	2
2.	Alliaceae	1	2	19.	Moraceae	1	1
3.	Amaranthaceae	5	5	20.	Myrtaceae	1	1
4.	Apocynaceae	2	2	21.	Nyctaginaceae	1	1
5.	Arecaceae	1	1	22.	Oleaceae	1	1
6.	Aristolochiaceae	1	1	23.	Plantaginaceae	1	2
7.	Asparagaceae	1	1	24.	Poaceae	4	4
8.	Asteraceae	8	9	25.	Pteridaceae	1	1
9.	Cactaceae	1	1	26.	Rosaceae	1	1
10.	Capparaceae	1	1	27.	Rubiaceae	1	1
11.	Celastraceae	2	2	28.	Rutaceae	2	2
12.	Chenopodiaceae	1	1	29.	Solanaceae	5	5
13.	Convolvulaceae	1	1	30.	Sterculiaceae	1	1
14.	Cucurbitaceae	1	1	31.	Tiliaceae	1	1
15.	Euphorbiaceae	3	3	32.	Vitaceae	1	1
16.	Fabaceae	3	3	33.	Zygophyllaceae	1	1
17.	Lamiaceae	1	1				

Table 2 Plant species with their Botanical Name & Family, Vernacular names, Habit, Part Used and Indigenous Usage in Sharis district

Botanical name	Family	Local name	Habit	Part used	Ethnobotanical uses
<i>Asystasia gangetica</i> (L.) T.Anders.	Acanthaceae	Sumirah	Herb	Leaves	Leaf powder is mixed with coconut oil and applied topically to heal wounds (burns).
<i>Dicliptera paniculata</i> (Forssk.) I.Darbysh.	Acanthaceae	Khtan	Herb	Whole plant	The whole plant, macerated in an infusion of rice, is taken orally in a large quantity as an antidote to snake poison.
<i>Allium ampeloprasum</i> L.	Alliaceae	Korath	Herb	Whole plant	Eating leek for curing intestinal worms.
<i>Allium sativum</i> L.	Alliaceae	Thum	Herb	Whole plant	Raw bulbs are eaten with meal for reduce high blood pressure and purifier. Bulbs are used as salad given to expedite digestion. Raw bulbs are eaten for curing cough, flu, and dysentery.
<i>Aerva javanica</i> (Burm.f.) Juss. exSchultes.	Amaranthaceae	Rua	Herb	Whole plant	The decoction of the plants is used as a gargle for toothache.
<i>Alternanthera pungens</i> Kunth.	Amaranthaceae	Shook	Herb	Roots	Roots are burned to obtain ash and are applied to tooth and gums.
<i>Amaranthus viridis</i> L.	Amaranthaceae	Selkh	Herb	Stem, Leaves	Paste of stem is applied locally as medicine for scorpion bite. Cold effect; leaf paste smeared on forehead for cool feelings.
<i>Celosia argentea</i> L.	Amaranthaceae	Hregh	Herb	Seeds	Seeds extract are given to cure diarrhea complaints, 2 tablespoonful twice a day for 3-4 days. 50 gm of matured seeds are soaked in 200 ml of warm water for at least two hours and then filtered; the filtrate is given to wash mouth for curing of sores of mouth.
<i>Pupalia lappacea</i> (L.) Juss.	Amaranthaceae	Hamshad	Herb	Leaves	Fresh leaf juice taken orally (5 ml) once in a day to cure stomachache.
<i>Carissa spinarum</i> L.	Apocynaceae	Shaden	Shrub	Roots	Root decoction is given orally in stomach disorders.
<i>Nerium oleander</i> L.	Apocynaceae	Defla	Shrub	Roots	Root paste is applied externally daily on piles till the cured.
<i>Phoenix dactylifera</i> L.	Arecaceae	Nakhil	Tree	Fruits, seeds, leaves,roots	Fruits eat in the morning for curing worms and anemia also increases blood.Root paste is applied on teeth and gums to get relief from toothache.
<i>Aristolochia bracteolata</i> Lam.	Aristolochiaceae	Liyah	Herb	Whole plant, leaves, roots, seeds	Leaf juice or Leaf paste is applied on wound once a day for one week to heal the wound. A cup of fresh leaf extract made in lime water is given with 3 tablespoonful of honey twice a day for one week in order to expel out intestinal worms.
<i>Asparagus africanus</i> Lam.	Asparagaceae	Mashob	Herb	Roots, leaves	Ameba; Root powder mixed with honey and butter and eaten for three consecutive days before breakfast.
<i>Anthemis cotula</i> L.	Asteraceae	Zhorat	Herb	Leaves	Drinking boiled leaves reduce stomach pain.
<i>Bidens biternata</i> (Lour.)Merr. & Sherff.	Asteraceae	Depes	Herb	Leaves	The juice of the plant is extracted manually and the juice is applied on itching feet.
<i>Calendula tripterocarpa</i> Rupr.	Asteraceae	Aghoan	Herb	Leaves, flowers	Powdered leaf is used as sniff for the discharge of mucus.
<i>Eclipta prostrata</i> (L.) L.	Asteraceae	Sang	Herb	Whole plant, Leaves	Whole plant crushed and made into paste, applied externally on forehead to get relief from headache. Leaf paste is used locally to promote hair growth.
<i>Kleinia odora</i> (Forssk.) DC.	Asteraceae	Khthra	Herb	Leaves	Nerve case. Oily extract is boiled, mixed with <i>Cadabarotundifolia</i> and used to massage.
<i>Taraxacum campylodes</i> G.E.Haglund.	Asteraceae	Tarkshgon	Herb	Leaves	Paste of boiled leaves mixed with small quantity of salt and turmeric is used for treating bone fractures
<i>Tridax procumbens</i> (L.) L.	Asteraceae	Zahr Al-Bgr	Herb	Leaves	Leaf juice or leaf powder is applied on wound thrice a day for four to five days to heal wound.
<i>Xanthium spinosum</i> L.	Asteraceae	Hask	Herb	Roots, leaves, fruits	The plant is used as an anti-inflammatory and urinary and in the case of diarrhea, externally the plant is boiled as a disinfectant for wounds, and uses boiling root as a vomit.
<i>Xanthium strumarium</i> L.	Asteraceae	Lyzeeg	Herb	Leaves	Plant paste is applied on the forehead to cure headache. The leaf decoction is used in malarial fever.
<i>Opuntia dillenii</i> (Ker Gawl.) Haw.	Cactaceae	Tin	Shrub	Fruits	It used to decrease diabetes and asthma.
<i>Capparis cartilaginea</i> Decne.	Capparaceae	Lassf	Herb	Leaves	The juice of the leaves is poured into ears to kill worms.
<i>Catha edulis</i> (Vahl) Endl.	Celastraceae	Qat	Tree	Leaves.	Chewing leaves and tender branches reduce diabetes and fatigue.
<i>Gymnosporia senegalensis</i> (Lam.) Loes.	Celastraceae	Deplab	Shrub	Leaves.	Worms; Half cup of fresh leaf juice is given orally.
<i>Chenopodium murale</i> L.	Chenopodiaceae	Fatteeh	Herb	Whole plant	Whole plant paste applied on swollen part of body and to relieve pains.
<i>Ipomoea purpurea</i> (L.) Roth	Convolvulaceae	Mloya	Climber	Leaves	Leaves are grinded and the extract is used for washing hairs to get rid of lice.
<i>Citrullus colocynthis</i> (L.) Schrad.	Cucurbitaceae	Handal	Climber	Leaves, roots, fruits	White pulp of fruit is applied on head for alopecia. Fever; half mature fruit is crushed in a cup of water and given orally. A handful of fresh root pieces are crushed with 2-3 leaves and put in a glass of coconut milk and a cup of extract is given twice a day for three weeks to cure whooping cough and intestinal worms.
<i>Coccinia grandis</i> (L.) Voigt.	Cucurbitaceae	Wgem.	Climber	Leaves, fruits	Young fruits are edible and eaten raw thrice a day for 3-4 days to cure stomatitis. 100 gm of fresh roots pounded and boiled in 250 ml of water. 15 ml of the decoction is taken orally for 3 days to get relief from severe headache.
<i>Acalypha indica</i> L.	Euphorbiaceae	Thefranhi ndi	Herb	Whole plant	Whole plant paste is applied locally on affected parts for curing rheumatic pain and swelling.Leaf juice is given to check vomiting-2 tablespoonful once time.
<i>Euphorbia helioscopia</i> L.	Euphorbiaceae	Hloan	Herb	Seeds	Seeds are given with roasted pepper for the treatment of cholera.
<i>Jatropha curcas</i> L.	Euphorbiaceae	Sharp	Shrub	Latex	It is used as tooth brush in swollen gums.Latex extracted from leaves is applied locally on sores till cure.
<i>Alhagi maurorum</i> Medik.	Fabaceae	Aqool	Herb	Whole plant	Crushed flowers along with sugar are taken orally to cure bleeding piles. Plant decoction is used as diuretic and laxative.
<i>Ceratonia siliqua</i> L.	Fabaceae	Khurub	Tree	Fruits, seeds	Smear the mouth and gum; one cup of fruits syrup is taken internally, 2-3 times in day as needed. Fresh fruit as laxative, eaten 2-3 a day for treatment diarrhea.

<i>Mentha longifolia</i> (L.) L.	Lamiaceae	Habg	Herb	Leaves	Leaf juice mixed with honey in equal proportion is given to cure cough and colds. Leaf extract is given to cure constipation and stomach disorders - two tablespoonful twice a day for three days.
<i>Rosmarinus officinalis</i> L.	Lamiaceae	Ikilil Al-Gabal.	Shrub	Leaves	Leaves are used to treat stomachic, digestive and anti-hypertensive, a handful of dried leaves in a cup of water and drunk as tea after the meals.
<i>Alcearosea</i> L.	Malvaceae	Khadmia	Herb	Leaves	The powdered leaves, young branches and fruits are locally mixed with wheat flour and used as a carminative and de-warming agent, in cattle
<i>Malva parviflora</i> L.	Malvaceae	Khpezh	Herb	Leaves, stems	Decoction of Leaves and stem or cooked as vegetable and used against phlegm, constipation and diabetes.
<i>Morus nigra</i> L.	Moraceae	Toot	Shrub	Fruits	Raspberry juice to treat cases of bilharzia, burning stomach, for the treatment of diarrheal diarrhea and the expulsion of intestinal worms. Raspberry juice is used as a gargle and a drink three times a day for fevers, sore throat and measles.
<i>Psidium guajava</i> L.	Myrtaceae	Guava	Tree	Fruits, leaves	Young leaves and buds pounded into paste and juice extract taken 2-3 teaspoonful three times daily at least three days for curing diarrhea, cough and vomiting. Leaf juice taken orally to cure stomach ache.
<i>Boerhavia diffusa</i> L.	Nyctaginaceae	Saddah	Herb	Leaves	Leaf extract mixed with radish powder is given to cure jaundice disease- 2 tablespoonful twice a day for twenty five days.
<i>Olea europaea</i> L.	Oleaceae	Zyton	Shrub	Fruits	Olive oil treatment for constipation and indigestion.
<i>Plantago afra</i> L.	Plantaginaceae	Hashishet Al-Brageeth.	Herb	Leaves	Leaf paste is used to treat hemorrhoids and skin wounds.
<i>Plantago major</i> L.	Plantaginaceae	Lesan Al-Hml.	Herb	Leaves	Extracted juice from fresh leaves to keep stomach cool and used against tonsillitis.
<i>Arundo donax</i> L.	Poaceae	Qassb	Herb	Rhizome, whole plant	Used as food for cattle. It used for making different types of baskets, mats and for covering huts and sheds.
<i>Cynodon dactylon</i> (L.) Pers.	Poaceae	Wabl	Herb	Leaves, roots, whole Plant	Diarrhea; tubers are pounded with green ginger in equal proportion and add honey in it, administered a tablespoonful of paste internally three times a day for three days. Leaves, aerial parts are crushed with water. 2-3 drops of this extract are poured in the nostril to cure nasal bleeding. Paste is applied on cuts and wounds.
<i>Dactyloctenium aegyptium</i> (L.) Willd.	Poaceae	Regl Al-Hrba.	Herb	Whole Plant, seeds, flowers	Juice of inflorescence is given twice a day for 5 days in stomach pain.
<i>Sorghum bicolor</i> (L.) Moench.	Poaceae	Thrh	Herb	Seeds, whole plant.	Sorghum is used not only for human food, but also for fodder and feed for animals.
<i>Adiantumcapillus-veneris</i> L.	Pteridaceae	Kabzarat Al-Bier	Herb	Whole plant, leaves, rhizome	The paste made from fresh fronds and rhizomes is given with 2 tablespoonful of honey third a day for 2 days to cure amoebic dysentery. The paste is also used as hair tonic by applied on head.
<i>Malussylvestris</i> (L.)Mill.	Rosaceae	Tofah	Tree	Fruits	Apple is used to treat constipation and digestion.
<i>Pentas lanceolata</i> (Forssk.) Deflers.	Rubiaceae	Saforh	Shrub	Roots, Leaves	Root and leaf used to treat lymphadenitis by topical and oral routes.
<i>Citrus limon</i> (L.) Osbeck.	Rutaceae	Limon	Tree	Fruits	Fruit juice mixed with a pinch of salt and sugar is used as a household remedy in vomiting, dysentery, malaria and diarrhea.
<i>Ruta chalepensis</i> L.	Rutaceae	Shadhab	Herb	Leaves, stems, roots	The infusion of the roots is used for treatment of hepatic diseases, especially jaundice with 2 cups per day. Worms; two spoons fresh leaf juice is given orally. Against 'evil eye' Put the plants in the house, or planted it in the garden.
<i>Capsicum annum</i> L.	Solanaceae	Pesbas	Herb	Fruits	Fruits are used as flavoring agent, stimulant, condiment, spices and salad, appetizer and aphrodisiac.
<i>Datura stramonium</i> L.	Solanaceae	Banj	Herb	Fruits, Leaves	Paste of fruits is applied locally for getting relief in pain and swellings. Infusion of leaves is applied on gums once daily before washing mouth in the morning against toothache till cure. Paste of fruits is applied locally on dog bite once a day for 15 days.
<i>Lycopersicon esculentum</i> Mill.	Solanaceae	Tomatoes	Herb	Fruits	It is used to cure scorpion, bees stings, burns; cut one and rub of affected area.
<i>Nicotiana tabacum</i> L.	Solanaceae	Tabagh	Herb	Leaves	Wounds; leaf paste is applied externally on wounds and fresh cuts for healing. Toothache; crushed leaves and applied on teeth for curing gum and teeth troubles.
<i>Solanum americanum</i> Mill.	Solanaceae	Hadg	Herb	Fruits, Leaves	Fruit juice is given to cure Diarrhea disease- two table spoonful twice a day till recovery. Fruit paste is applied on forehead for reducing temperature of body. Ear infection; juice of fresh leaves is dropped in ear.
<i>Waltheria indica</i> L.	Sterculiaceae	Khece Al-Ogab	Herb	Leaves	Stomach Ache; leaves are drunk as tea three times a day until the symptoms disappear. The topical use against poisoning.
<i>Corchorus olitorius</i> L.	Tiliaceae	Molokhia	Herb	Leaves	The leaves are cooked and eaten to treat indigestion and constipation.
<i>Cissus quadrangularis</i> L.	Vitaceae	Khudam	Herb	Roots, stems, leaves	Fresh leaf juice is used in case of ear complaints. Fresh stem segments are chopped into small pieces with bulbs (<i>Allium sativum</i>) cloves in some amount of curd is given as an ideal diet to asthma patients. Paste is used as plaster on the broken bones for joining.
<i>Tribulus terrestris</i> L.	Zygophyllaceae	AdhrasAl-Kilab	Herb	Whole plant	One table spoon leaf juice is given twice a day for two or three days to cure stomachache. Whole plant crushed and extract is given for curing cold and cough- 2-3 tablespoonful twice a day up to recovery.

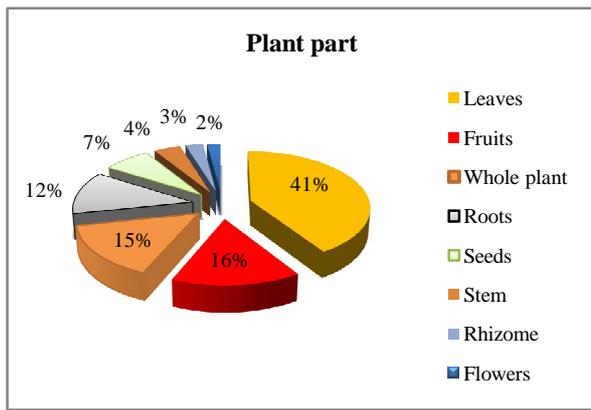


Figure 4 The part of medicinal plants used by the local inhabitant

Table 3 Analysis of the data based on habit showed that leading ethno-botanical plants species.

Habit	No. of species	Percentage	Total number of species
Herbs	47	72.30%	65
Shrubs	9	13.84%	65
Trees	6	9.23%	65
Climbers	3	4.61%	65

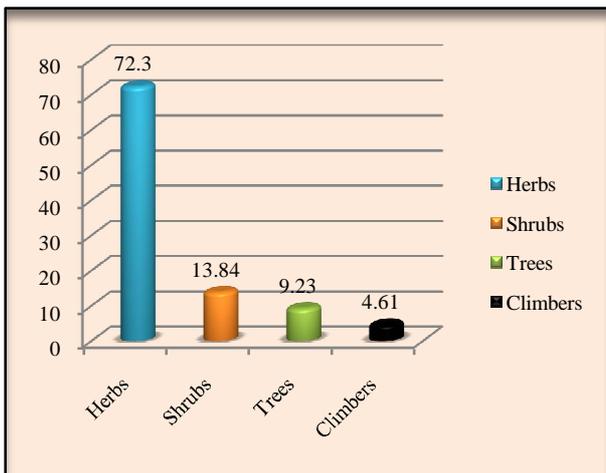


Figure 5 Growth forms (habits) of recorded ethno-botanical plants species

DISCUSSION

In the present ethno-botanical survey, a total of 65 species belonging to 62 genera and 33 families were recorded (Table 2). Analysis of the data based on habits showed that leading medicinal plant species 72.30% belonged to herbs; 13.84% shrubs, 9.23% trees and 4.61% climbers (Table 3; Fig 5). The use of plant parts as medicine shows variation. Leaves 41% are the leading part used in a majority of medicinal plants followed by 16% fruits. 15% whole plant. 12% roots. 7% seeds. 4% stem. 3% rhizome. 2% flowers (Fig4). Work of Caraballo *et al.*, [12], conducted in South-eastern Venezuelan Amazon and Pierre *et al.*, [22], work conducted in Cameroon, where they proved that the leaves were most frequently used plant part by local inhabitants. This probably because leaves are more available and accessible plant part and contain good amount of secondary chemicals which has potential to cure the target ailments. Distribution of medicinal plant species in the families shows variation; Asteraceae is represented by 9 species; and each Solanaceae and Amaranthaceae are represented by 5 species; Poaceae is

represented by 4 species; Fabaceae and Euphorbiaceae are represented by three species; and each Acanthaceae, Alliaceae, Apocynaceae, Celastraceae, Cucurbitaceae, Lamiaceae, Malvaceae, Plantaginaceae and Rutaceae are represented by two species. A single species in each was recorded by 18 families (Table 1; Fig 2). With the help of these plants a wide range of common ailments like skin diseases, ulcer, rheumatism, respiratory diseases, indigestion, allergies, hemorrhoids, headaches, wounds and sores etc., are treated. Greater part of the preparations in the form of juice extracted from the freshly collected plant parts are taken orally, or in the form of powder or paste placed on the skin externally.

CONCLUSION

This investigation proved that, folk medicines are still practiced on wide scale by a big sector of the population in Sharis district of Yemen. The local people are using medicinal plants traditionally for curing various diseases as urine, asthma, diarrhoea, dysentery, piles, wounds, jaundice, pneumonia, worm infection, arthritis, diabetes, diuretic, stomach disorder, snakebite, rheumatism, skin inflammation, ulcer, eye disorder, bone fracture, swelling and injury. So, preservation of the indigenous knowledge of plants used in traditional health care is very important. People utilize different parts of the plant for medicinal purposes, among plants parts, leaves were used substantially by local inhabitants by (41%).

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