

## Ethnomedicinal Investigation of Phytomedicines among the local communities of Arid areas of Pakistan

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The investigation on phytomedicine was conducted in order to assess the traditional uses and exact distribution of medicinal flora of arid areas of Pakistan. It was found that in a total of 59 plant species belonging to 50 genera and 30 families are reported to be used for different diseases as asthma, piles, cancer, skin diseases, as astringent, spermatorrhea, as refrigerant and diabetes. It was investigated that conservation of medicinally important plants and traditional folk knowledge is necessary in order to save them from extinction.

**Keywords:** Ethnomedicinal, Phytomedicines, Arid areas, Pakistan

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Medicinal plants of course multitude of medicines from common cold to cancer. They act as therapeutic agents and provide new active ingredients for manufacture of traditional and modern medicines. Pakistan is one of richest country in medicinal plant heritage. It has diverse ecological factors, highly fascinating and versatile medicinal flora, variety of natural habitants and several ecological regions. Arid areas are present in every province where medicinal plants grow naturally. But the rich medicinal flora is under genetic erosion and there is need to conserve this wealth for future generations<sup>1</sup>. Ethnomedicines in the form of folk recipes and herbal medicines are oral traditions of health prevalent among tribal and rural communities in Pakistan and in other parts of world. In Pakistan the traditional medicines are mostly based on Unani system of medicines. The reason for their popularity in rural areas is due to their low cost, naturalness and no side effect as compared to allopathic medicines<sup>2</sup>. According to WHO 60 % patients in Pakistan, 85 % in Burma, 80 % in India, 60 % in Indonesia, 75 % in Nepal and 90 % in Bangladesh are treated by plant based remedies used by traditional healers and methods<sup>3</sup>.

Pakistan is a developing country of South Asia, spreading over an area of 87.98 million hectares. The country is situated between latitude 23° and 37° North

and longitude 61° and 76° East. The annual rainfall ranges from 125 mm in the South to 875 mm in sub-mountainous and northern plains. About 70% of the rain falls during the monsoon season (July-September). However, occasional showers also occur during the winter. The summer months, except in mountainous areas, are very hot, while the winter months are mild in the plains and extremely severe in hilly regions. Pakistan is the ninth most densely populated country in the world. According to the latest estimates, the population of the country is over 120 million. The state-owned forest area, under the control of the Forest Department, is 4.58 million hectares, only 5.2 % of the total area of Pakistan, Jammu and Kashmir. Annual production of timber and fuel wood is 0.482 million m<sup>3</sup> and 0.234 million m<sup>3</sup>, respectively<sup>4</sup>.

Medicinal plants have a rich resource base, which is spread over a wide range of ecological zones in Pakistan. Out of about 5691 known species of the flowering plants in Pakistan<sup>5</sup> about 40 % of these plants are confined to the arid and semiarid regions, 35% in arid to moist regions and 26 % in sub-humid to moist regions<sup>6</sup>. Although in 1956 the number of plant listed as herbal drugs were only 356, now out of 5961 plants 1010 can be classified as medicinal<sup>7</sup>.

Ethnotaxonomic investigation of medicinally important plants was conducted to unveil the wealth that nature has hidden in the heart of old hand

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community and different parts of versatile medicinal flora of arid areas (whose floral survival depends on natural rainfall). Native inhabitants are so much close to nature as a result of this they have strong defensive or immune system against diseases. Aged aborigines have immense traditional indigenous knowledge. It is right to say them 'natural healers'. Local people classify medicinal plants according to their needs, demands, physical nature of plants and type of disease. Local people use medicinal plants in every aspect of due to their multifunctional purpose. They use them as food, in social and ceremonial functions, to save children from evil eye or spirits, to bath the dead body, recitation of Holy Quran, ethnoveterinary purposes, for timber and lumber, formation of cultural products but main focus was rely on medicinal aspects<sup>8</sup>.

In the present era ethnotaxonomical investigation of medicinal plants needs serious considerations. The main problems causing extinction of traditional knowledge are mortality of old experienced traditional healers, unawareness of youth about medicinal plants, over population, over exploitation, over grazing, deforestation, unbalanced collection of medicinal plants by herbal doctors and inhabitants and change in life style due to modern civilization. The study was designed to disseminate the dynamics of local knowledge and challenge of modern health care development about the traditional medicines in arid areas of Pakistan.

## Materials and methods

The field surveys were conducted in order to document the unique medicinal flora of arid areas of Pakistan including Attock, Mianwali, Salt Range, Sind and Heripur (NWFP). Frequent field trips were arranged in different arid areas of Pakistan in order to assimilate data (Figs. 1 & 2). During field trips investigation about medicinal plants was done through questionnaire by interviewing the 300 people including indigenous herbal doctors, herb sellers, land farmers, old women and men. Data was confirmed and verified by cross checking the people of different localities of arid areas. Medicinal plants were identified according to '*Flora of Pakistan*'<sup>6</sup>. Ethnotaxonomical profile of each medicinal plant followed by alphabetically order with family name, botanical name, vernacular name, English name, habit and habitat, parts used and traditional-folk formulas.

## Results

In a total of 59 plant species belonging to 50 genera of 30 families are reported to be used by local inhabitants for the treatment of various ailments. The highest number of plant species belongs to Soalanaceae which was 5 plant species followed by Amaranthaceae, Poaceae and Mimosaceae having 4 plant species each (Table 1).

Table 1—Folk medicinal uses of plants among local informants of arid areas of Pakistan

Name of plants species/ English name/Local name	Family	Parts used	Folk medicinal formulation/uses
<i>Acacia modesta</i> Wall./ Black wood/ <i>Phulai</i>	Mimosaceae	Bark	Sweetmeat is formed from gum which is effective for lumbago. First of all one-fourth kg wheat starch is fried in equal quantity of animal fat for 10 minutes and then equal quantity of gum (which is already roasted on fire in order to become soft) and sugar is added and again fried for 5-8 minutes. On cooling used by local people of area for lumbago and as vigorous. Ash of bark is used along with mercury for paralysis, asthma and as aphrodisiac. Powder of dry bark along with little quantity of salt and sugar is used to treat chest pains and dysentery.
<i>Acacia nilotica</i> (Linn.) Delile/Indian Babul/ <i>Kiker</i>	Mimosaceae	Fruits	The powder of dry pods and bark is effective for lumbago, kidney pains, diabetes, spermatorrhea, sexual disorders, phlegm, as tooth powder and as astringent. Leaves decoction is used to treat dysentery. Gum is used in the formation of sweet meal which is effective for lumbago and recipe is same as mentioned in case of <i>Acacia modesta</i> Wall.
<i>Achyranthes aspera</i> L./Prickly chaff plant/ <i>Puth kanda</i>	Amaranthaceae	Leaves, stem, spines	Ash of leaves and stem is recommended for piles, kidney stones, skin eruptions and asthma. Decoction of whole plant is used to treat pneumonia. Plant extract is used for dysentery and stomach-ulcer. Fried spines along with sugar are reported to be used in whooping cough by indigenous people.

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<i>Aerva javanica</i> (Burm.F.) Juss/Snow Bush/ <i>Bui booti</i> , <i>Sufaid Bui</i>	Amaranthaceae	Aerial parts	Twelve gram powder of dry leaves along with equal quantity of leaves of senna ( <i>sana maki</i> ), wild mint, nigella seeds ( <i>kalongi</i> ) and gugal ( <i>gugul</i> ) is ground and powder is used for epilepsy and insanity.(one table spoon twice a day). The same formula is ashed on coal and smoke is inhaled against insanity and epilepsy for 40 days.
<i>Albizia lebeck</i> (Willd.) Benth/Siris/ <i>Shirin</i>	Mimosaceae	Seeds, bark and leaves	Powder of dry seeds is effective for diabetes. Plant is antiseptic. Decoction of bark and seeds is effective for toothache and inflated gums, as astringent, piles and diarrhea. Leaves extract is effective for skin diseases and headache.
<i>Aloe vera</i> L./ Indian Aloe / <i>Kanwargandal</i>	Liliaceae	Leaves and sap	Fresh jelly or cooked jelly with mutton is reported to be used for phlegm, diabetes, Rheumatism, headache, lumbago, stomach ulcer, liver diseases. Jelly is astringent. Pickle of jelly is also recommended for diabetes. Powder of dry jelly along with bishop's weed and black salt is used against anorexia, constipation and carminative. Jelly along with egg and curd is used as conditioner or hair tonic. Jelly along with honey and turmeric is applied on face as a mask for 15-20 minutes as cleanser, refresher and as skin tonic. Jelly along with 2-3 drops of lemon and rose extract is also used against freckles, pimples and boils.
<i>Amaranthus spinosus</i> L./ Prickly amaranth/ <i>Khardar chulari</i>	Amaranthaceae	Whole plant	Ash of plant is used to treat kidney stones (half tablespoon twice a day). Fresh leaves or leaves and stem are cooked as vegetable ( <i>saag</i> ) which is used to kill thread worms within body. Fresh leaves are cooked along with equal quantity of leaves of chicory plant ( <i>kasni</i> ) and fenugreek ( <i>methi</i> ) and used against low blood pressure and black cataract on eye ( <i>kala motia</i> ).
<i>Amaranthus viridis</i> L./ Amaranth/ <i>Chulai</i>	Amaranthaceae	Leaves and stem	Stem and leaves are cooked as vegetable ( <i>saag</i> ) and used against cough, inflammation, high blood pressure and as urinitive. Leaves decoction is also used for the same purpose.
<i>Arachis hypogea</i> L./ Peanut/ <i>Phali</i>	Papilionaceae	Fruits	Fruit is used as caloric and vigorous. Oil is used in confectionery and ghee formation. Properties of oil are somewhat similar to olive oil.
<i>Boerhavia procumbens</i> Banks ex Roxb./ Hog weed/ <i>It-sit</i>	Nyctaginaceae	Whole plant	Garland is made by interlinking fresh slices of roots and put along neck of jaundiced person. With the improvement of disease length of garland is also increased. Paste of whole plant is used as antidote. Decoction of roots is used as refrigerant. The paste of fresh root along with equal quantity of cow ghee and henna is applied on hand and feet to relieve from irritation. Slightly warmed decoction of whole plant is applied on head of patient suffering from bleeding at the nose.
<i>Brassica alba</i> L./ White mustard/ <i>Chitti surian</i>	Brassicaceae	Oil, seeds, leaves, stem	Oil is pain killer, conditioner, cleanser and skin tonic and caloric. For fair complexion local people dip its seeds in goat milk after noon prayer and night prayer they mashed seeds and applied on skin for 15-20 minutes as mask up to 11 days. Leaves and stem is cooked as vegetable ( <i>saag</i> ) and effective for phlegm, constipation, flatulence, deficiency of iron and vitamin and used as diuretic.
<i>Bryophyllum pinnatum</i> Kurz/Air plant/ <i>Zukhum-e-Hayat</i>	Crassulaceae	Leaves	Fresh leaves are used against kidney stones. Slightly fried leaves are used as astringent and dresser. 13 gm of fresh leaves is ground with equal quantity of <i>mameikh</i> , <i>sumbloo</i> and <i>acacia</i> gum and used along with milk for external and internal hairs (twice a day).

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<i>Calotropis procera</i> (Willd.) R.Br./Swallow wort, Mudar./Akk	Asclepiadaceae	Whole plant	Leaves are used as antidote against snake and scorpion bite by local people of area. Latex is antidote against snake, wasp and scorpion bite, effective against wounds, astringent, asthma and piles. 2-3 drops of latex is mixed in mustard oil and used as anti lice. Leaves are also used as antidote, leaves are chewed within body when taste become bitter they are expelled out. Root paste and leaves as tissue paper is used externally for piles. 10 gm latex is mixed with 150 gram turmeric and pills are formed which are recommended for tuberculosis, hepatitis B and C and spitting of blood (twice a day). Slightly fried leaves are used as dresser for inflated parts of body and rheumatism. Extract of slightly fried leaves is used to treat earache. 12 gm is heated along with 7 gm turmeric and 7 gm borax, when milk dried then removed from fire and pills are formed which are effective for cough, phlegm, as astringent, pain killer. Seeds are prescribed for epilepsy by local people. Powder of dry leaves is also used for asthma and rheumatism.
<i>Cannabis sativa</i> L./ Indian hemp/Bhang	Cannabinaceae	Aerial parts	Whole plant is intoxicant, laxative, narcotic. Ash of plant is used to treat bleeding at the nose and hemorrhoids. Ash along with date sweetmeat is vigorous and refrigerant.
<i>Carthamus oxycantha</i> M.Bieb/Wild safflower/Poli	Asteraceae	Leaves, seeds	Roasted seeds or bread of its seed flour is used to treat jaundice, skin diseases, fever, scabies, abnormal eye sight and used as refrigerant and vigorous. Decoction of leaves is used against dysentery. Local people give it to milk producing animals after delivery of birth for two days and against dysentery.
<i>Cassia occidentalis</i> L./ Negro coffee/Kasundi	Caeselpinaceae	Aerial parts	Decoction of leaves along with pepper is effective for dropsy and cough. Diluted latex is used as eye drops which is effective for night blindness.
<i>Chenopodium album</i> L./ Goose foot plant/Bathu	Chenopodiaceae	Whole plant	Decoction of leaves or leaves and stem is cooked as vegetable ( <i>saag</i> ) and used against tuberculosis, jaundice, warm fevers, glottis pain, blood purification, flue, phlegm, dropsy, inflammation, diuretic, as caloric and against kidney and gall bladder stones.
<i>Cicer arietinum</i> L./ Chickpea/Kalay Cholay, Churnray	Papilionaceae	Seeds and aerial parts	Decoction of fruit, roasted fruit or turgid fruit is used to treat flue, cough, jaundice, diabetes, as vigorous, tuberculosis, phlegm, piles, kidney and liver diseases, blood purification, as refrigerant and as aphrodisiac. Flour of its pulse is mixed with milk, turmeric, lemon. and mustard oil and ubtan is formed which is used as cleanser, skin tonic and refresher. Decoction of fruit along with honey is used to treat abnormal menses and throat pains. Bread made by its flour is also effective against diabetes.
<i>Cichorium intybus</i> L./ Chicory/Kasni	Asteraceae	Leaves	Hadiths "There is chicory for you. On this plant dew drops of paradise fall every day". Extract of leaves along with lemonade is used against chronic gastritis, and as liver tonic, diuretic, jaundice, dropsy.
<i>Citrullus colocynthis</i> Schrader/ Bitter apple/Tumba	Cucurbitaceae	Fruits	Fruit pulp along with almond oil and tragacanth is effective for rheumatism, dropsy, dysentery, paralysis, distortion of mouth, back ache (pain from back to two little toes) and diabetes. Pulp along with sugar or honey is effective for chronic flue and sunstroke. Pickle of pulp is effective for diabetes. Fresh pulp along with black salt and bishop's weed is given to animals when suffered from anorexia. For cooling purposes local people put slices of 1-2 kg of fruit in a clay pot and pressed them with feet when tongue taste become bitter they removed feet from clay pot. For diabetes the same formula is used for seven days.
<i>Cleome viscosa</i> L./ Wild mustard, Dog mustard/Jangli gawara	Capparidaceae	Aerial parts	Local people mixed it in fodder and give to animals for more production of milk and as vigorous.

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<i>Convolvulus arvensis</i> L./ Bind weed, Deer's foot/ <i>Lehli, Vehri</i>	Convolvulaceae	Whole plant	Whole plant is cooked as vegetable ( <i>saag</i> ) and used against skin diseases and as blood purifier. Decoction of whole plant is also used for the same purpose. Decoction of leaves is effective for constipation.
<i>Cynodon dactylon</i> (L.) Pers/Dog grass, Bahama grass/ <i>Khuble ghaas</i>	Poaceae	Whole plant	Decoction of root is effective against dysentery. Powder of dry plant is used as astringent. The whole plant is vigorous so local people give it to animals as fodder to milk producing animals for more production of milk.
<i>Datura innoxia</i> Mill./ Thorn apple/ <i>Datura</i>	Solanaceae	Aerial parts	Whole plant is intoxicant. Fresh or slightly fried leaves are used as dresser. Seed paste is effective for piles. Whole plant is burnt and smoke is inhaled for asthma. Seeds along with water are effective for chronic headache. Local people pored fruit with cloves and kept it for 15 days. After 15 days they remove cloves and ground them with exact quantity of pepper and coconut and pills are formed which are used for tension, depression, urine problems, phlegm and during pregnancy for easy delivery of birth.
<i>Echinops echinatus</i> Roxb. /Globe thistle <i>Untkatara</i>	Asteraceae	Roots	Paste of root is applied on the belly of pregnant woman at child birth for easy delivery of birth. Plant extract along with milk is used against anorexia, rheumatism, kidney stones, as caloric and digester.
<i>Eruca sativa</i> Millergard/ Rocket/ <i>Taramaera,</i> <i>Jumian</i>	Brassicaceae	Oil, seeds, leaves	Oil is used as hair and skin tonic, effective for blood purification and against intestinal worms. Oil is boiled till it become sweet and given to animals as caloric. The paste of leaves along with water is drunk for fair complexion and as cleanser. Seeds are effective for rheumatism (twice a day). 1 kg flour of it is boiled along with 5 kg of water, 1 kg of milk and 1 kg of sugar. When only 1kg water is left then removed from fire and given to animals for more production of milk and to increase fat in milk.
<i>Euphorbia hirta</i> L./ Snake weed/ <i>Dudhi</i>	Euphorbiaceae	Aerial parts	Milky latex is applied on cuts. Diluted latex is used as eye drops against eye complaints such as redness of eyes.
<i>Euphorbia prostrata</i> Aiton /Prostrate spurge/ <i>Hazar dani</i>	Euphorbiaceae	Whole plant	Plant extract is effective for piles. Decoction of plant is used for ring worms. Paste of plant is externally used against skin diseases.
<i>Fagonia indica</i> Burm.f./ <i>Fagonia/</i> <i>Dhumian</i>	Zygophyllaceae	Aerial parts	The extract of whole plant is antidiabetic, used against chicken pox, anticanceric, refrigerant and skin diseases, scabies, toothache and blood purification. The powder of dry plant is carminative and digester.
<i>Ficus bengalensis</i> L./ Banyan tree/ <i>Bohr</i>	Moraceae	Latex	Latex from aerial roots is vigorous and used to fill cracking of feet. Milky latex along with little quantity of honey is used before fasting as ant diabetic. In case of sterility (un productive) decoction of leaves, bark and root is used by local people up to two-three week.
<i>Ficus palmata</i> L./Wild fig/ <i>Khabara, Angeer</i>	Moraceae	Fruits	Fruit is used for constipation, fair complexion, asthma, diabetes, as cordial, flatulence, cough, liver diseases and inflammation. Fruit along with walnut is used as aphrodisiac, against kidney and gall bladder stones, rheumatism, phlegm and piles. Latex of branches and powder of dry bark is used as toothpowder for toothache. Latex is used as massage for epilepsy and paralysis. Diabetic patients of the area pressed its leaves under foot to control sugar level.
<i>Ficus religiosa</i> L./ Sacred fig/ <i>Pipal</i>	Moraceae	Fruits and leaves	Fruit is laxative, astringent, refrigerant, used against asthma and constipation. Use of leaves decoction for 40 days is the complete cure or treatment of gonorrhoea.
<i>Hordeum vulgare</i> L./Barley/ <i>Joa</i>	Poaceae	Fruits	Fruit is roasted and powder is formed called barley flour ( <i>sattu</i> ) which is dipped in water and next day after sieving and along with sugar is used against fever, dysentery and as refrigerant. Bread of its flour is effective for blood purification, typhoid, heart diseases, as vigorous, cough, tuberculosis and to fulfill iron deficiency. Fruit is mashed and cooked in milk along with honey and used against chronic constipation.

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<i>Justicia adhatoda</i> L./ Vasaka, Malabar nut/ <i>Bhekar, Arusa, Bansa</i>	Acanthaceae	Whole plant	Leaves are insecticidal. Decoction of leaves is used to cure diabetes, blood purification and fever. Extract or powder of 25 gm dry leaves along with little quantity of honey or sugar is given during cough, asthma, spitting of blood and abnormal menses. Ash of whole plant is also effective for phlegm, cough and asthma by local people.
<i>Lallemantia royleana</i> Benth / <i>Salvia</i> <i>seeds/Tukhm-malanga</i>	Lamiaceae	Seeds	Local people dipped seeds in water or milk in a clay pot and next day used this solution for dyspepsia, against high blood pressure, jaundice, as refrigerant and chest pain.
<i>Malva parviflora</i> Wall./ Mallow/ <i>Sonchal</i>	Malvaceae	Aerial parts	Leaves and stem decoction or cooked as vegetable ( <i>saag</i> ) and used against phlegm, constipation and diabetes.
<i>Melia azedarach</i> L./ Barbadose lilac/ <i>Daraik</i>	Meliaceae	Leaves and fruits	Leaves extract and powder of dry leaves is effective for leprosy, constipation, allergy, skin diseases, jaundice, piles, as astringent, blood purifier and pain killer. Leaves are boiled in 1 liter water when one-fourth water is left then it is used for bathing against allergy and itching. One cup extract of leaves along with one cup extract of <i>Rhazya stricta</i> (verian) leaves is effective for diabetes before fasting. Extract of leaves is mixed with egg and curd and applied on non-pigmented or white hairs for one hour as hair tonic. Leaves are given to animals as fodder in order to relieve them from inflammation.
<i>Mentha longifolia</i> (L.) Huds/Horse mint / <i>Pari poodna, chitta</i> <i>poodna</i>	Lamiaceae	Aerial parts	In case of dysentery local people used powder of its dry leaves along with black salt and bishop's weed (one table spoon twice a day). Decoction of leaves or coffee is used for dysentery, colic pain, asthma, jaundice, phlegm, as emetic, diuretic, against intestinal worms and liver and stomach diseases.
<i>Mirabilis jalapa</i> L./ Four o'clock plant/ <i>Gul Basi</i>	Nyctaginaceae	Aerial parts	The slightly fried leaves are used as dressing or ointment for wounds. The leaves are cooked as vegetable ( <i>saag</i> ) and used with bread against jaundice and dropsy. The powder of dry seeds is used to treat abnormal menses. Powder of dry flowers is effective for piles. Extract of Flowers is used as refresher and cleanser.
<i>Momordica dioca</i> Roxb. Ex. Willd./ Small bitter gourd/ <i>Jangli karaila</i>	Cucurbitaceae	Fruits	Fresh juice is recommended for diabetes. Powder of dry fruit along with dry leaves of <i>Peganum harmala</i> L. is recommended for jaundice, irritation, kidney stones, worms, paralysis and against intestinal worms and gonorrhoea.
<i>Morus alba</i> L./White Mulberry/ <i>Chitta toot</i>	Moraceae	Fruits	Fruit is vigorous. Fruit extract along with jam of quince seeds is used for sexual disorders and weakness for 25 days. The same formula is used for heart diseases and chest pain for 20 days.
<i>Morus nigra</i> L./Black Mulberry/ <i>Kala toot</i>	Moraceae	Fruits	Fruit extract along with water and sugar is used as tonic for cough, throat diseases including inflammation and tonsils. Fruit is used for power. Decoction of leaves and root is also as gargle for throat diseases.
<i>Opuntia monacantha</i> Haw /Prickly pear/ <i>Thor, Nag</i> <i>phani</i>	Cactaceae	Fruits	Mucilage or ripe fruit is effective for gonorrhoea and syphilis. Slightly fried leaf is used as astringent, dressing and ointment for wounds. 4-6 drops of latex along with 10 drops of honey is effective for constipation. Ash of stem is also act as cathartic. Mucilage along with turmeric is externally used for piles, pox strains, rheumatism, leprosy. Mucilage is effective for phlegm. Seeds are recommended for piles.

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<i>Peganum harmala</i> L./ Syrian tree, Wild rue/ <i>Harmal</i>	Zygophyllaceae	Aerial parts and seeds	MythsPlant is used to remove evil spirits and genii from street if wrapped in blue cloth and hang in street. According to local people if this plant is grown wildly on the grave of dead person than it means that person was very pious and every seed read spiritual pray for that person. Decoction of leaves is effective for paralysis, blood purification, epilepsy, insanity, cough, phlegm, against intestinal worms, as aphrodisiac, back ache (pain from back to two little toes) cephalic and muscle tonic. Seeds are decocted in olive oil and used to treat deafness. Fumigation of whole plant is used to treat toothache, chicken pox, measles, to save from evil sprits and against sharply spreading diseases in plants, animals and human beings. Leaves are insecticidal. Seeds are intoxicant.
<i>Plantago ovata</i> Forssk./Spogel seeds, Plantain seeds/ <i>Ispagol</i>	Plantaginaceae	Husk	Two tablespoon fruit bark of fruit dipped in one-fourth liter water, curd or milk and next day before fasting used it along with little sugar for dyspepsia. One table spoon of fruit bark along with 25 gram tragacanth and 12.5 gram basil seeds is effective for urine problems and as refrigerant.
<i>Prosopis cineraria</i> (Linn.) Druce/Mesquite/ <i>Kikri</i> , <i>Jand</i>	Mimosaceae	Fruits	Its honey is effective for kidney stones and kidney wounds. 12 gm its honey along with 12 gm kuthseereen and 12 gm wild mint is grinded and used (half table spoon twice a day) for freckles, asthma, cough, fair complexion and against boils and pimples. Branches are also used as tooth brush.
<i>Rhazya stricta</i> Dcne/ <i>Rhazya/Veriana</i>	Apocynaceae	Leaves	The extract of leaves is used for blood purification, diabetes, allergy, as muscle tonic and skin diseases. Dry powder of leaves along with equal quantity of <i>Justicia adhatoda</i> ( <i>Bhekar</i> ) leaves is recommended for indigestion. Its dry leaves along with equal quantity of chicory plant ( <i>kasni</i> ) and bishop's weed ( <i>ajwai-i-kharasani</i> ) is mixed, grinded and used for menstruation problems, diabetes, cancer, irritation and white cataract on eye.
<i>Ricinus communis</i> L./Castor oil plant/ <i>Arand</i> , <i>harnoli</i>	Euphorbiaceae	Seeds, roots & leaves	Seeds are cathartic. Oil is used as massage for paralysis, as muscle tonic, inflammations. Root decoction or paste is used for piles. Leaves are used as dresser. Leaves decoction is effective for asthma and cough.
<i>Rumex dentatus</i> L./ Wild Spinach/ <i>Jangli</i> <i>Palak</i>	Polygonaceae	Whole plant	Leaves and stem are cooked as vegetable ( <i>saag</i> ) and used against flatulence. Root paste is used as astringent.
<i>Salvia moorcroftiana</i> Wall. ex Benth/ Wild sage/ <i>Gadkan</i>	Lamiaceae	Aerial parts	Slightly fried leaves are used as astringent and as dresser. Plant is given to animals as vigorous.
<i>Solanum nigrum</i> L./ Black night shade/ <i>Mako, Kanch manch</i>	Solanaceae	Aerial parts	Fresh leaves or leaves and stem after cooking ( <i>saag</i> ) are used for diabetes, abnormal eye sight, inflammation, hysteria, smartness, as vigorous and against low blood pressure. Fruit sauce is used as carminative. Decoction is used as throat tonic and to treat inflammation of hands and feet.
<i>Solanum surattense</i> Burm.f /Wild egg Plant/ <i>Mokri, Kandiari</i>	Solanaceae	Aerial parts	Fruit is given to animal for more production of milk and against anorexia. Decoction of leaves, stem and root is used as refrigerant. Powder of dry fruit is used as toothache against intestinal worms, stomach diseases, diabetes, constipation boils and pimples. Fruit is fried in mustard oil and used against earache and toothache. Fruit is cooked and given in typhoid. Decoction of flowers is effective in influenza or cold. Fruit is warmed on spoon and fumigation is given against teeth worms. After some time mouth is washed and all worms are removed.

Table 1—Folk medicinal uses of plants among local informants of arid areas of Pakistan

Name of plants species/ English name/Local name	Family	Parts used	Folk medicinal formulation/uses
<i>Tinospora cordifolia</i> (Willd.) Miers./Heart leaved moon seed/ <i>Gillo</i>	Menispermaceae	Aerial parts	Decoction of fresh leaves and stem is used to kill worms present on the body of animals. Extract of leaves is used as astringent. Extract of fresh leaves and stem along with milk is recommended for anorexia, blood purification, as vigorous and as aphrodisiac. Local people drink extract of 25 gm fresh leaves and stem along with 6 gm bishop's weed ( <i>Ajwain-i-desi</i> ) and 12 gm salt ( <i>Khurdani namak</i> ) in a clay pot having half liter water and kept it open whole day in sun light. Next day they mashed it well and used against chronic fever and malaria for one week. Local people mix it in flour and give to animals suffering from fever.
<i>Tribulus terrestris</i> L/ Small Caltrops/ <i>Bukhra</i>	Zygophyllaceae	Fruits	25 gram powder of dry fruit is ground along with 62 gram of bael fruit ( <i>bael geri</i> ) and used against dyspepsia, abnormal menses, as vigorous and as aphrodisiac. Powder of dry fruit along with milk is used for urine problems, gonorrhoea, colic pains, leprosy. Very effective for kidney stones. One dose containing Powder of dry fruits along with dead firefly and date ( <i>chawara</i> ) is recommended for kidney stones (one dose containing powder of two dry fruits, one dead firefly and one date). Seven doses are the complete cure of kidney stones by the local people.
<i>Triticum aestivum</i> L./ Wheat/ <i>Kanak, Gandum</i>	Poaceae	Fruits	Poultice of fruit is slightly warmed and applied on belly to treat bellyache and carminative. Bread of flour is used to treat inflammations, diabetes and piles. Bread is also effective for pregnant women, urinate, vigorous and caloric. Fruit and stem is vigorous so given to poultry for more production of eggs and meat and milk producing animals for more production of milk. Wheat fibers are dipped in water and next day after sieving used for diabetes by local people. Local people made a special food called sure ed(also a best food of our Holy Prophet) by cooking wheat meal with meat and milk and used it as aphrodisiac, vigorous and against sexual disorders. Wheat starch is used in the formation of sweetmeat which is effective for lumbago and formula is same as mentioned in case of <i>Acacia modesta</i> Wall. Bread of unsieved flour of wheat is effective for constipation. Ash of one-fourth of wheat is mixed with 6 gm turmeric and used along with fresh water against asthma which is due to phlegm (twice a day). For lumbago 4 ft long and 3 ft broad mattress is formed by which is filled with wheat seeds.
<i>Vitex negundo</i> L./Five- leaved Chaste tree/ <i>Marvan</i>	Verbinaceae	Aerial parts	Flowers are astringent. Fresh roots are used as dresser or ointment to relieve pain of back. Whole plant is given to animal suffered from eye complaints. Branches are used as tooth brush.
<i>Withania coagulans</i> (Stocks.) Dunal/ <i>Withania/Paneer doda,</i> <i>Ashwagandha</i>	Solanaceae	Fruits	Dry seeds along with equal quantity of nigella seeds are effective for diabetes. Local people dipped seeds in water on night and used solution next day before fasting against diabetes. 4-5 seeds are mashed in water or milk and then people kept them for half an hour and used along with sugar as digester and against spermatorrhoea.
<i>Withania somnifera</i> (L.) Dunal/Winter Cherry/ <i>Aksin, Asghand</i>	Solanaceae	Roots	Roots are mixed in flour and given to animals suffering from dysentery. Decoction of leaves is recommended for itching, allergy and leprosy. Fresh or slightly fried leaves are used as dresser and astringent.
<i>Zizyphus nummularia</i> (Burm.f) Wight and Arn/ Wild jujube/ <i>Jahri Beri,</i> <i>Beri</i>	Rhamnaceae	Fruits	Powder of dry fruit is effective against vomiting and given to women before pregnancy. Poultice of fresh leaves along with soap and flax leaves are used as dresser and astringent. Leaves are used as conditioner. One-fourth kg fresh leaves of ( <i>beri</i> ) along with one-fourth kg leaves of emblic- myrobalan ( <i>amla</i> ), 12 gm ( <i>sika kai</i> ) and one-eight kg of soap nut ( <i>retha</i> ) are boiled in 4 kg water and used as hair tonic. Local people applied this formula 3 times in a month for best result. Local People dipped leaves in water and used it to bath the dead body.

## Discussion

The indigenous traditional knowledge (ITK) of herbal plants of communities where it has been transmitted orally for many years is fast disappearing from the face of world due to transformation of traditional culture. The collection of information about natural flora, classification, management and use of plants by the people holds importance among the Medicinal plant Botanists. The local people and researcher face the challenging task of not only recording knowledge of the indigenous plants, but also applying the results of their studies to biodiversity conservation and community development with the passing of each generation, more and more knowledge of medicinal plants is being lost despite the continuing importance of the relevance of the knowledge, for the traditional local communities. As we have seen and we know this knowledge forms the basis of healthcare<sup>9</sup>. The major loss of indigenous knowledge in the rural population of arid areas is the disruption of traditional channel of oral communication due to shift to written exchange of communications. This made it difficult for the older generation to pass their knowledge on to younger generation. This is especially true for women in rural areas of arid zones who are largely illiterate and have less access to education.

Plants involved in the normal functioning of every living thing and even non living things. They are natural cleanser of atmosphere, enhance the beauty of nature, used in ceremonies, provide food, wood for timber, lumber and formation of cultural products and used as medicines. Traditional folk formulas are mostly plant based and natural and have more guarantee against diseases as compared to allopathic medicines which have many side effects. Plant based remedies are the world's primary therapeutic arsenal to fight diseases. Western medicines needs to understand the botanical and cultural problems inherited in traditional medicines<sup>10</sup>.

Pakistan is a famous historical region situated in the South Asia. Due to its unique location it has very useful resources based area of medicinal plants. The local people of the area have always used medicinal plants for their common ailments by traditional methods. Indigenous knowledge of local people about medicinal plants is linked to their culture and history. However encroaching industrialization and modern cultural changes in their life style and responsible for decrease of ethno pharmacological practices. It is

therefore felt worth while to record the indigenous knowledge about the plant based remedies before the information is lost. Most of the plants are used for diabetes, asthma, flue, digestive disorders. It was found that plant based remedies were often tested effective prescriptions simple, inexpensive and acceptable to local inhabitants<sup>11</sup>.

Keeping in view 58 plant species belonging to 50 genera and 30 families are reported to be used by local people for medicinal purpose. It is reported that % use of herbs as medicinal plants is high among local inhabitants as compared to shrubs and trees. Local people used various parts of plants such as roots, stem, bark, gum, leaves, fruits, seeds, flowers and milky latex for medicinal purpose. It is reported that medicinal plants are multi functional; the same plant is used in a number of different ways. The milky latex of *Calotropis procera* is used to treat asthma, wounds, as astringent and for piles. The gum of *Acacia modesta* and *Acacia nilotica* is effective for lumbago. The leaves of *Aerva javanica* are used for insanity. The leaves of *Datura innoxia* are used for depression and urine problems. The roots of *Boerhaavia procumbens* are used against jaundice (Fig. 5). The *Withania coagulans* is medicinally used by the local people for diabetes and blood purification (Fig. 6). Medicinal efficacy of some of the plants is restricted to ethnoveterinary purposes as *Cleome viscosa* for more production of milk and as vigorous<sup>2</sup>.

The people of the area ethnotaxonomically classify plants according to their needs, demands, shape of plants, medicinal function of plants. Locally they named "Unkatara" to *Echinops echinatus* (Fig. 3) because it is the best food of camel Gadkan to *Salvia moorcroftiana* due resemblance of its leaves to donkey ears. Peoples have myths about plants and used some plants for magic. They called *Ficus bengalensis* a house of genii and used *Datura innoxia* for magics. People are religious; it was reported that Holy Prophet said about chicory "There is a chicory for you. On this plant dew drops of paradise fall every day" Some of the plants becoming extinct as *Fagonia indica*, *Citrullus colocynthis* and *Peganum hermala*, in Attock, Salt Range and Mianwali due to unawareness, overpopulation, unbalanced collection of medicinal plants by herbal doctors, overgrazing and use of plants as fuel wood and introduction of exotic plant species.

The main aim of this study was to bring to screen the types of plants does the people of the area use



Fig. 1— A-View of Arid Hills; Fig. 2— *Prosopis cineraria* a dominant species of Arid Zone; Fig. 3— *Echinops echinatus* (Ount Katara) a medicinal species; Fig. 4— View of nomadic life in arid areas; Fig. 5— *Boerhaavia procumbens*; Fig. 6— *Withania coagulens*

medicinally. During study it was noted that the medicinal plant wealth of Salt Range is not fully exploited. Some plants are exploited on very large scale while other is unexploited. Some medicinally important plant species are fast dwindling due to human interference. The only way to protect these plant species is to make the local communities aware of their well-managed propagation and regeneration techniques. Yet the species density in the areas is satisfactory and can be sustained if other pressures like cut down for fuel, fodder, construction and furniture are removed (Fig. 4). They are particularly needed to be conserved by domestication, regeneration techniques and conservation programmed with the help of local people.

### Conclusion

In view of present study of indigenous uses of medicinal plants among the local communities inhabitant the arid areas of Pakistan, it is found in total of 59 species belonging to 50 genera of 30

families were commonly utilized for various diseases. The utilization of indigenous plant resources will increase the importance of local industry on the one hand and will minimize the expenditure incurred on the purchase of foreign drug on the other. It is concluded that for sustainable long term conservation of herbal resources of the area, there is a need to actively involve the local communities in evaluation, planning, implementation and monitoring process of medicinal plants conservation and intellectual property rights of local communities.

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