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Herbal medicines used to cure various ailments by the inhabitants of Abbottabad district, North West Frontier Province, Pakistan

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Present survey was conducted in the hilly areas of Abbottabad district of North-West Frontier Province in order to inventorise the medicinal plants used in the folk medicine to treat various ailments by the local inhabitants. A total of 54 plant species belonging to 51 genera and 40 families were recorded for their therapeutic uses. The medicines were prepared from various plant parts of a single plant or multiple plants. The ethnomedicinal inventory is presented by plant name, local name, family and uses.

Keywords: Herbal medicine, Ethnomedicine, Folk medicine, Medicinal plants, Abbottabad, Pakistan, *Abbasies, Tareen, Jadoon, Syeds, Mashwani, Tanolis, Awans, Qureshis, Sardars, Sheikhs*

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The herbal medicines occupy distinct position right from the primitive period to present day. In Indo-Pak, first record of plant medicine was compiled in *Rigveda* between 4500-1600 BC and *Ayurveda* (2500-600 BC). This system traces its origin to Greek medicine, which was adopted by Arabs and then spread to India and Europe¹. Plant based medicines enjoy a respectable position today, especially in the developing countries. Indigenous remedies which are believed to be more effective, safe and inexpensive are gaining popularity among the people of both rural and urban areas. Information from ethnic groups or indigenous traditional medicine has played a vital role in the discovery of novel products from plants as chemotherapeutic agents². People living in tribal localities and in villages are using indigenous plants as medicines from time immemorial as this knowledge reaches them through generation, and is based on experience³. Pakistan is bestowed with a unique biodiversity, comprising of 9 major ecological zones. Due to its salubrious climate, Pakistan is quite rich in medicinal herbs which are scattered over a large area. The country has about 6,000 species of wild plants, of which about 400-600 are considered to be medicinally important⁴. In Pakistan, medicinal plants are primarily used by *Tibbi dawakhanas*

(medical centres of indigenous physicians known as *Hakims*). Unfortunately, very little attention has been paid to the ethnobotanical aspect of plants as *Hakims* are only concerned with the floral and vegetative parts of medicinal plants without any regard to their botanical characteristics, or distribution in the various ecological zones of Pakistan. The study of traditional uses of plants in Pakistan has been increasing during the last few years^{3,5-18}. Ethnobotanical research in different areas in North-West Frontier Province (NWFP) of Pakistan has been carried out^{4,19-31}. Compared to neighboring regions, particularly Mansehra, Swat, and Northern areas, Abbottabad have not been studied from an ethno-pharmacological point of view and there are no previous records on ethnobotanical knowledge from the study area. Hence, an attempt has been made to document plant species, medicinal formulation and treatment of particular diseases by inhabitants of the area.

The North-West Frontier Province (NWFP) is one of the four main provinces of Pakistan. Abbottabad named after Major James Abbott, the first Deputy Commissioner of Hazara (1849 - 1853), is one of the 24 districts of NWFP. Abbottabad lies from 33°50' to 34°23' North latitudes and 72°35' to 73°31' East longitude. It is surrounded by Mansehra district to the North, Muzaffarabad district and Nothren areas to the East, Haripur district to the West and Islamabad

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to the South (Fig. 1). The area is largely located on the Iranian plateau and Eurasian land plate, while peripheral eastern regions are located near the Indian subcontinent. Mean maximum temperature in June has been recorded as 32.41°C and mean minimum as 1.7°C in January. The average annual rainfall has been recorded as about 1,366.16 mm. The main tribes of the area are *Abbasies, Tareen, Jadoon, Syeds, Mashwani, Tanolis, Awans, Qureshis, Sardars* and *Sheikhs*³².

Methodology

The study was conducted during January 2006 to December 2006 in 35 remote villages of Abbottabad district. Frequent field trips were arranged in order to collect information about the folk knowledge of medicinal plants used by the rural inhabitants for the treatment of various ailments³³. The main target sites were Lora, Suma Garagha, Dheri Rakhala, Ghamir, Roper, Phallah, Nagri Totial, Dheri Kiala, Narhoter,

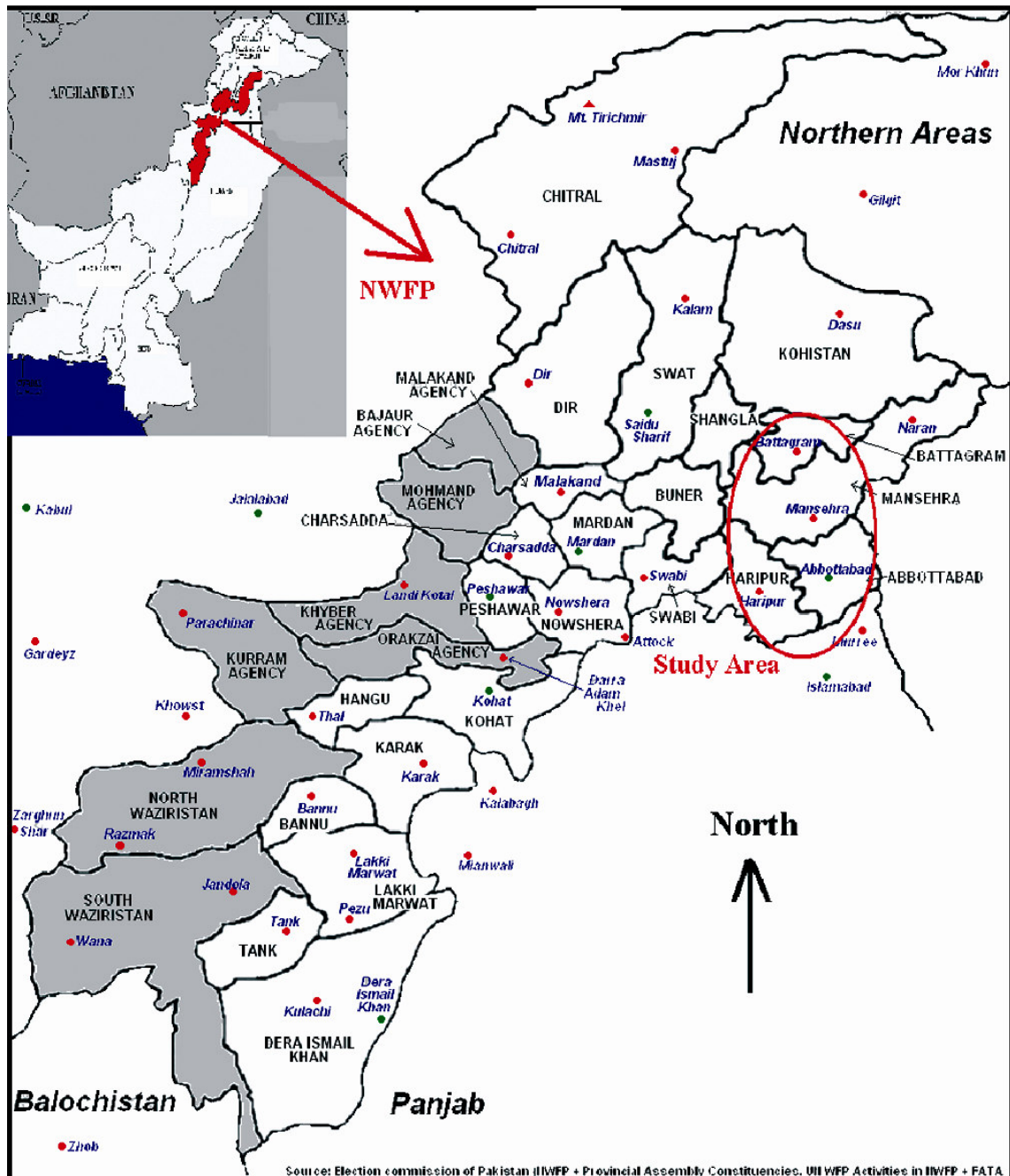


Fig. 1— Location map of the study area

Table 1— Herbal medicines used to cure various ailments

Plant name/Family	Local name	Uses
<i>Achyranthes aspera</i> L. Amaranthaceae	<i>Putkanda</i>	Two hundred gm of dried plant are burnt on a hot iron plate; ash powder is taken orally with honey twice a day for 8-10 days for the treatment of asthma and cough.
<i>Ajuga bracteosa</i> Wall. ex Benth Lamiaceae	<i>Ratti booti</i>	Fresh leaf extract is taken orally before breakfast for curing earache, eye ache, boils, mouth gums and throat pain.
<i>Allium cepa</i> L. Alliaceae	<i>Piaz</i>	Bulb extract is taken orally thrice a day for curing cholera. Sun dried fresh scale powder is taken orally with half cup of curd thrice a day for curing indigestion and diarrhoea. Scales of onion are warmed in mustard oil and the paste of these scales is applied over eruption and boils.
<i>Allium sativum</i> L. Alliaceae	<i>Thom</i>	Bulbs lets are fried in mustard oil; oil is dropped in the ear thrice a day for relieving earache.
<i>Aloe vera</i> L. Liliaceae	<i>Khunvar gandal</i>	Fresh leaf pulp, ghee, sugar and wheat flour are cooked together; sweet meal is given once a day at bedtime for the treatment of rheumatism, backache and constipation.
<i>Amaranthus viridis</i> L. Amaranthaceae	<i>Ganihar</i>	Powder of dried seeds of <i>A. viridis</i> , dried fruit of <i>Ficus carica</i> and sugar is taken orally with water twice a day for treating eye vision problem.
<i>Argyrobolium roseum</i> (Comb) Jaub & Spach. Papilionaceae	<i>Makhni booti</i>	Fresh leaf extract is taken orally once a day before breakfast for treating sexual debility, liver and bladder inflammation.
<i>Arisaema speciosum</i> (Wall) Mart. Araceae	<i>Adbes</i>	Powder of fresh tubers roasted in an air tight mud pot is taken orally along with grapes during bed time for treating asthma. Fresh tuber paste is tightened over infected skin and boils. During gas trouble, fruit grain is swallowed once daily.
<i>Berberis lycium</i> Royle. Berberidiaceae	<i>Sumbal</i>	Filtered bark infusion, soaked for a night in water is taken before breakfast for eye ache, mouth gums, toothache, earache, throat pain, boils and to purify blood. For treating rheumatism, ulcer and back problems, bark decoction with sugar, wheat flour and ghee is taken orally once before breakfast. Bark powder paste mixed with mustard oil is applied on joints, wounds and fracture.
<i>Bergenia ciliata</i> (Haw) Sternb. Saxifragaceae	<i>Batpia</i>	Dried rhizome powder is taken orally with milk twice a day for treating ulcer, backache, wound healing, dysentery and piles; powder is also sprinkled on external wounds.
<i>Cannabis sativa</i> L. Cannabinaceae	<i>Phang</i>	Fresh leaves extract with sugar is taken orally once at morning for treating indigestion, liver and stomach inflammation.
<i>Carissa opaca</i> Stapf. ex Haines. Apocynaceae	<i>Granda</i>	Decoction of <i>C. opaca</i> fresh leaves and <i>Segeratia brandrethina</i> fresh roots is taken orally with water and sugar twice a day for the treatment of asthma, jaundice and scanty urination.
<i>Cedrela toona</i> Roxb. ex Willd. Meilaceae	<i>Nem</i>	Dried leaf powder with table salt is taken orally with water once daily for treating diabetes, skin allergy, boils, wound healing and to purify blood.
<i>Cichorium intybus</i> L. Asteraceae	<i>Kasni</i>	Decoction of fresh plant material and sugar is taken orally with water twice a day for treating fever, jaundice, gas trouble and abdominal swelling.
<i>Cissampelos pareira</i> L. Menispermaceae	<i>Ghore sumi</i>	Extract of fresh leaves and sugar is given daily before breakfast for treating gleans and sexual debility.
<i>Clematis grata</i> Wall. Ranunculaceae	<i>Dhund</i>	Fresh leaf paste is applied on boils once daily.
<i>Colchicum luteum</i> Baker. Colchiaceae	<i>Phanphor</i>	Tablet prepared from paste of boiled and sun dried corms with <i>Aloe vera</i> and <i>Terminalia chebula</i> is taken with milk twice for treating rheumatism.
<i>Convolvulus arvensis</i> L. Convolvulaceae	<i>Liali</i>	Fresh plant extract with sugar is taken orally at night for treating constipation.
<i>Cynodon dactylon</i> L. Poaceae	<i>Khabbal</i>	Fresh plant paste is applied on bleeding wounds twice a day.
<i>Debregeasia saeneb</i> (Forssk) Hepper & Wood. Urticaceae	<i>Sandorri</i>	Fresh plant paste mixed with curd is taken orally thrice a day for 2-3 days during diarrhoea.
<i>Dodonaea viscosa</i> L. Sapindaceae	<i>Sanatha</i>	Fresh leaves are boiled in water; steamed paste is applied on joint swelling twice a day.

Contd.

Table 1— Herbal medicines used to cure various ailments--*Contd.*

Plant name/Family	Local name	Uses
<i>Euphorbia prostrata</i> Ait. Euphorbiaceae	<i>Lal booti</i>	Fresh plant paste mixed with sugar is given thrice a day for 2-3 days during dysentery.
<i>Ficus variegata</i> Wall. ex Roxb Moraceae	<i>Phagwara</i>	Paste prepared from fresh milky juice of the plant mixed with milk is applied on boils and affected skin thrice a day.
<i>Fumaria indica</i> (Hausskan) Pugsley. Fumariaceae	<i>Papra</i>	Decoction of dried plant with sugar is taken orally thrice a day for 4-5 days in fever, boils and constipation.
<i>Justicia adhatoda</i> L. Acanthaceae	<i>Bahker</i>	Powder of <i>Justicia adhatoda</i> dried leaves, <i>Trachyspermum ammi</i> seeds, <i>Foeniculum vulgare</i> seeds, <i>Terminalia bellerica</i> seeds and <i>Zingiber officinale</i> rhizome is taken thrice a day for 8-10 days in case of cough, tuberculosis, asthma and indigestion. Fresh leaf paste with salt is taken orally twice a day in case of diarrhoea, dysentery and gas trouble in cattle.
<i>Mallotus philippensis</i> (Lam) Muell. Arg. Euphorbiaceae	<i>Kimila</i>	Dried seed powder mixed with half cup of curd is given thrice a day for 1-2 days in case of constipation and to kill intestinal worms.
<i>Melia azedarach</i> L. Meliaceae	<i>Drek</i>	Tablet prepared from paste of dry fruit of <i>Melia azedarach</i> , <i>Phyllanthus emblica</i> and <i>Terminalia chebula</i> is given twice a day for 10-15 days during piles, boils and to purify the blood. Paste of fresh fruit and leaves is given to the cattle twice a day for 2-3 days in case of gas trouble and indigestion.
<i>Mentha longifolia</i> (L.) Huds. Lamiaceae	<i>Chitta podna</i>	Extract of <i>Mentha longifolia</i> dry leaves, <i>Punica granatum</i> dried seeds, <i>Allium cepa</i> fresh scales and table salt is taken orally thrice a day for 1-2 days during cholera, indigestion and vomiting.
<i>Myrsine africana</i> L. Myrsinaceae	<i>Khukan</i>	For intestinal worms, dried fruits powder is taken with a cup of curd once daily at bedtime for 3-4 days. Fresh leaf decoction is given orally twice a day for 6-7 days during scanty urination, skin allergy, boils and to purify blood.
<i>Olea ferruginea</i> Royle. Oleaceae	<i>Kahu</i>	Fresh leaf decoction is given thrice a day for the treatment of toothache, hoarseness, mouth gums and throatache.
<i>Otostegia limbata</i> (Benth) Boiss. Lamiaceae	<i>Koi booi</i>	Fresh leaf extract is taken orally twice a day for 3-4 days for mouth gums and throatache.
<i>Oxalis corniculata</i> L. Oxalidaceae	<i>Jandora</i>	Fresh leaf extract is taken orally at morning for 4-5 days during indigestion, liver and bladder inflammation. Leaf paste is also applied topically on wounds to kill worms.
<i>Phyla nodiflora</i> (L.) Greene. Verbenaceae	<i>Hifza phurii</i>	Fresh leaf extract along with black pepper and water is taken at morning for boils, mouth gum, earache, toothache, eye ache and to purify blood.
<i>Pimpinella diversifolia</i> D.C. Apiaceae	<i>Tarpakhi</i>	Dried leaf powder along with table salt is taken with water twice a day for 8-10 days during indigestion, leucorrhoea and gas trouble.
<i>Pistacia integerima</i> J.L. Stewart. ex Brand. Anacardiaceae	<i>Kanger</i>	Dried leaf galls are roasted on hot iron plate; ash mixed with honey is taken at bed time for 10-12 days in case of cough, asthma and diarrhoea.
<i>Prunus persica</i> (L.) Batsch Rosaceae	<i>Aru</i>	Fresh plant paste along with table salt and water is applied on affected skin twice a day to kill germs in wounds and fungal infection.
<i>Punica granatum</i> L. Punicaceae	<i>Durni</i>	Fresh root decoction is taken orally once at morning for 3-4 days for treating piles and to kill intestinal worms. Dried seed powder and sugar is taken with water thrice a day for 8-10 days during liver and bladder inflammation, indigestion, jaundice, diarrhoea and dysentery.
<i>Quercus leucotrichophora</i> A. Camus Fagaceae	<i>Rein</i>	Decoction of <i>Quercus leucotrichophora</i> bark and <i>Rumex hastatus</i> roots in water with wheat flour, sugar and ghee is taken twice a day for 4-5 days during asthma, backache and rheumatism.
<i>Ranunculus laetus</i> Wall. ex Hook. Ranunculaceae	<i>Chumbel booti</i>	Fresh leaf paste is applied on skin once per day for 1-2 days for treating skin infection.
<i>Rosa brunonii</i> Lindley. Rosaceae	<i>Tarni</i>	Fresh flower decoction is taken orally twice a day for 1-2 days during constipation.
<i>Rumex chalepensis</i> L. Polygonaceae	<i>Hula</i>	Fresh root paste with common salt is given to cattle twice a day for 2-3 days during diarrhoea, dysentery and to kill intestinal worms.
<i>Rumex hastatus</i> L. Polygonaceae	<i>Khatimal</i>	Decoction of <i>Rumex hastatus</i> roots and <i>Quercus leucotrichophora</i> bark cooked with wheat flour, sugar and ghee is given twice a day for 4-5 days during asthma, backache, rheumatism and weakness in cattle.

Contd.

Table 1— Herbal medicines used to cure various ailments--*Contd.*

Plant name/Family	Local name	Uses
<i>Sageretia brandrethiana</i> Aitch. J.L.S Rhamnaceae	<i>Gunger</i>	Fresh root decoction is taken orally with water twice a day for 7-8 days for treating asthma, jaundice and scanty urination.
<i>Salvia moorcroftiana</i> Wall. ex Benth. Lamiaceae	<i>Kaljari</i>	Dried root powder is taken with water thrice a day for 3-4 days during cough and diarrhoea.
<i>Solanum miniatum</i> Bernex. Solanaceae	<i>Kachmach</i>	Fresh leaf decoction is taken orally thrice a day for 6-7 days during abdominal swelling, boils and mouth gums.
<i>Solanum surattense</i> Burm. f. Solanaceae	<i>Mohri</i>	Decoction of fresh pieces of stem boiled in water along with black pepper and table salt is taken with bread twice a day for 6-7 days during indigestion, fever, cough and asthma.
<i>Tagetes minuta</i> L. Asteraceae	<i>Sadbarga</i>	Fresh leaf paste is applied on wounds twice a day for 3-4 days to kill germs in wounds.
<i>Taraxacum officinale</i> Weber. Asteraceae	<i>Hand</i>	Dried rhizome decoction in water along with sugar is taken orally twice a day for 6-7 days during jaundice.
<i>Trichodesma indicum</i> L. R.Br. Boraginaceae	<i>Handusi</i>	Fresh plant paste is given to cattle twice a day for 2-4 days during indigestion and to kill intestinal worms.
<i>Viola canescens</i> Wall. ex Roxb. Violaceae	<i>Phulnaqsa</i>	Fresh plant decoction along with sugar is taken once at bedtime for 3-4 days during fever, cold, cough, asthma, jaundice and headache.
<i>Vitex negundo</i> Linn. Verbenaceae	<i>Marwani</i>	Powder of <i>Trachyspermum ammi</i> seeds, <i>Vitex negundo</i> dried seeds and table salt is taken with water thrice a day during gas trouble and cholera.
<i>Verbascum thapsus</i> L. Scrophulariaceae	<i>Gider tumbacoo</i>	Fresh leaf paste with wheat flour, table salt is given to cattle twice a day during diarrhoea.
<i>Woodfordia fruticosa</i> (L.) S. Kurz. Lythraceae	<i>Tavi</i>	Dried flower powder with sugar is taken orally with milk twice a day for 2-3 days during diarrhoea and dysentery.
<i>Zanthoxylum armatum</i> DC. Prodr. Rutaceae	<i>Timer</i>	Powder of <i>Zanthoxylum armatum</i> dried fruit, <i>Mentha longifolia</i> dried leaves, <i>Trachyspermum ammi</i> seeds and black salt is taken with water thrice a day for 3-4 days during cholera and indigestion. Twigs are used as toothbrush during gum problems and toothache.

Noorpur, Rahi, Dakhan Paiser, Janjah, Khoinan and Satora. The questionnaires were used for documentation of folk indigenous knowledge. Interviews were conducted from the local inhabitants especially old age men and women, local physicians (*Hakims*), herbal sellers and farmers. Priority was given to old experienced people and *Hakims*, which were the real users and had a lot of information about the plants and their medicinal uses. In total, 50 informants including 20 male and 30 female were interviewed during study. Complete information about the local names of plants, parts used, diseases treated and mode of preparation/administration were carefully observed and recorded. Collected data was cross-checked in different areas from local *Hakims* either by showing the plant specimen or telling local names to the informants to verify the authenticity of claims. Plants were mostly collected in flowering and fruiting conditions and confirmed by the local inhabitants to ensure that the proper plants have been collected. Specimens were dried and pressed properly in between blotting papers. Dried specimens were

poisoned and mounted on herbarium sheets. All collected specimens were identified and deposited in Quaid-i-Azam University Herbarium, Islamabad^{34,35}.

Results and discussion

In the study, 54 ethnomedicinal plant species belonging to 40 families distributed in 51 genera have been recorded. The most dominant families in the study are Lamiaceae (4 species), Asteraceae (3 species), Amaranthaceae, Alliaceae, Euphorbiaceae, Meliaceae, Polygonaceae, Ranunculaceae, Rosaceae, Solanaceae and Verbenaceae (2 species each) and remaining families with one species each. For each species, botanical name, family, local name, parts used, method of preparation, dose and ailments treated are provided (Table 1). Fifty four remedies were those that use single plant and 12 use more than one plant. Local inhabitants use 33 remedies to treat stomach followed by 18 remedies for skin diseases, 13 remedies to cure respiratory problems, 12 recipes to alleviate pain, 7 remedies for rheumatism, 6 remedies to treat

jaundice, 5 remedies to purify blood, 4 remedies for each to cure kidney problem and sexual disorder and 3 remedies for each to treat piles and abdominal swelling (Fig. 2). The methods of preparation fall into 6 categories, viz. plant parts applied as paste (19 parts), powder made from dry parts (15), decoction of fresh and dry parts (15), extracts of fresh parts (12), ointment and infusion (1 part each) (Fig. 3). Treatment of ailments involves both external application and internal consumption.

Mostly remedies consisted of single plant part and more than one method of preparation. For example; bulbs extract of *Allium cepa* is used for cholera, dry bulb powder for indigestion and diarrhoea and paste of bulb scales is applied over boils; ash powder from fresh tubers of *Arisaema speciosum* is used to cure asthma and paste of tubers is used for boils; bark infusion of *Berberis lyceum* is used to treat earache, eyeache, toothache, throatache, boils and to purify blood, bark paste is used for rheumatism, bone fracture and to heal wounds and bark decoction is taken for ulcer and back problems; powder from leaves of *Justicia adhatoda* is used to cure cough, asthma, tuberculosis and indigestion and paste of leaves is used for diarrhoea, dysentery and gas trouble in cattle; leaves extract of *Oxalis corniculata* is used to treat indigestion, liver and bladder inflammation and leaf paste to kill worms in wounds. All these recipes are prepared using ingredients like water, salt, sugar, curd, mustard oil, ghee and wheat flour and are administered along with water, milk and honey. The ingredients during preparation may be used to enhance the effect of the herbal preparations or simply used to make the preparation palatable.

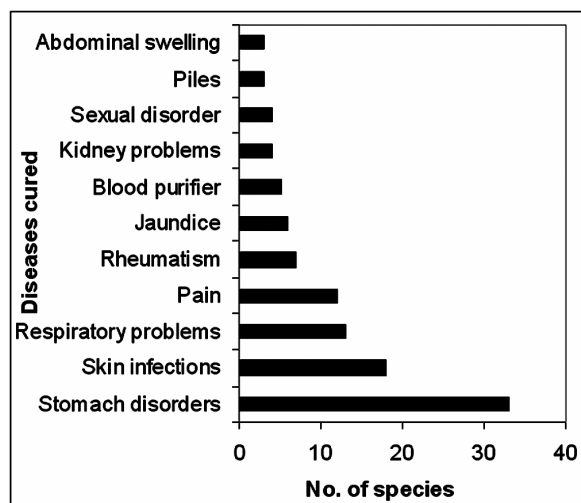


Fig. 2 — Remedies used to ourt various ailments

However, the exact role of these materials in curing the diseases is not clearly known³⁶.

Local inhabitants use different parts of the plants. Among these parts, leaves were most frequently used (26) for the treatment of various diseases followed by whole plant (7), stem (5), roots (5), seeds (4) fruit (3), bulb, flowers, bark (2) and latex (1). Moreover, a single plant is used to cure more than one ailment. For example; *Ajuga bracteosa* (earache, eye ache, boils, mouth gums and throat pain), *Allium cepa* cholera, indigestion, diarrhoea and boils), *Berberis lyceum* (eyeache, mouth gums, toothache, earache, throat pain, boils, to purify blood, ulcer, fracture, rheumatism and backache), *Bergenia ciliata* (ulcer, backache, dysentery, wound healing and piles), *Cedrela toona* (diabetes, skin allergy, boils, wound healing and to purify blood), *Cichorium intybus* (fever, jaundice, gas trouble and abdominal swelling), *Cissampelos pareira* (gleets, liver and bladder inflammation, and sexual debility), *Justicia adhatoda* (cough, asthma, tuberculosis, diarrhoea, dysentery and gas trouble), *Melia azedarach* (piles, boils, to purify blood, gas trouble and indigestion), *Myrsine africana* (intestinal worm, scanty urination, skin allergy, boils and to purify blood), *Olea ferruginea* (toothache, mouth gums, hoarseness and throatache), *Oxalis corniculata* (indigestion, liver and intestinal inflammation, and to kill worms in wounds), *Phyla nodiflora* (boils, mouth gum, to purify blood, earache, toothache and eyeache), *Punica granatum* (piles, to kill intestinal worms, indigestion, liver and bladder inflammation, jaundice, diarrhoea and dysentery), *Rumex hastatus* (asthma, backache, rheumatism and general weakness), *Solanum surattense* (indigestion, fever, cough, asthma) *Viola canescens* (fever, cold,

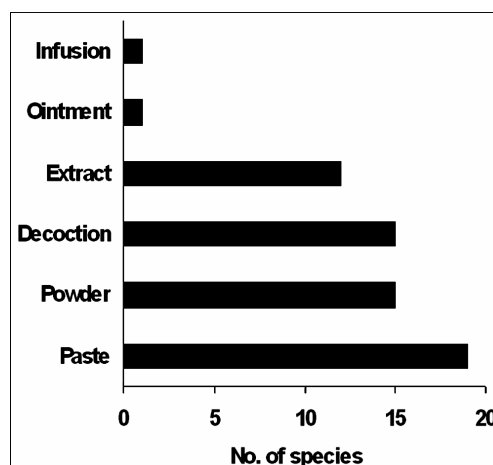


Fig. 3 — Methods used to prepare remedies

cough, asthma, jaundice, and headache), and *Zanthoxylum armatum* (cholera, indigestion, mouth gums and toothache).

Medicinal plant uses recorded in the study area were compared with the available ethnobotanical literature. However, it may be noted that traditional use of the plants in the study area for various ailments, may or may not be same as reported for neighboring areas and in other parts of the world. For example, present use of *Achyranthes aspera* is similar to that used in Margalla hills National Park, Islamabad in Rajasthan and Tamil Nadu states of India, this plant is used to cure pneumonia, cuts and wounds^{2,10,37}. Leaf extract of *Ajuga bracteosa* is used to treat earache, eyeache, boils, throat ache and mouth gums, but the decoction of same plant is used for malarial fever and jaundice³¹. Present use of *Allium cepa* is similar but bulb juice of the plant is used to cure diabetes and hypertension^{15,38}. Ointment of *Allium sativum* is used to treat earache, but the bulbs are stimulant, antiseptic, diaphoretic and diuretic, bulb juice and paste is used for urticaria, leprosy, scabies and abscess^{15,36}. Leaf pulp of *Aloe vera* is used to treat rheumatism, constipation and backache, the pulp is administrated against indigestion and diabetes^{2,18,38}. Seed powder of *Amaranthus viridis* is given for eye vision problem, whereas the plant is used to treat snakebite and scorpion sting^{8,21}. Rhizome powder of *Bergenia ciliata* is taken against the ulcer, backache, dysentery, piles and to heal wounds, but rhizome of the plant is used to treat diarrhoea, fever and as a tonic²². Fresh leaf extract of *Cannabis sativa* is used to cure indigestion, liver and bladder inflammation, whereas the leaf paste is applied on cuts, skin ulcer, insect bites and to cure abdominal swelling in cows and buffaloes^{10,39}. Whole plant decoction of *Cichorium intybus* is used to cure jaundice, fever, gas trouble and abdominal swelling, whereas the roots of the plant are used to cure fever, vomiting and diabetes^{17,21}. Corm paste of *Colchicum luteum* is used for rheumatism, whereas the corms are used for inflammation, pain, as carminative, laxative and sprinkled on wounds^{20,31}. Extract from whole plant of *Convolvulus arvensis* is taken for constipation, the leaves are used for skin burns; plant paste is applied on insect bite, inflammation and roots are purgative^{14,24,40}. Present use of *Cynodon dactylon* is same as used in Margalla hills National Park, Islamabad but the decoction of whole plant is used for cooling, cough, body swelling and eye pain^{10,18,37,40}.

The use of *Dodonaea viscosa* is same with earlier reports^{5,11,22,23}. Decoction from whole plant of *Fumaria indica* is taken to treat fever, constipation and boils, but the fresh juice of the plant is depurative and tonic, antipyretic, blood purifier and infusion is taken for skin diseases^{14,40}. Leaf powder of *Justicia adhatoda* is taken for cough, asthma, tuberculosis and indigestion but the leaf extract is administrated for boils, cough, asthma, bronchitis dysentery, diabetes, as antispasmodic, antiseptic and expectorant^{18,19,21}. Seed powder of *Mallotus philippensis* is taken during constipation and to kill intestinal worms but fruit cover is used for intestinal worms and skin infections the leaves of this plant are effective for cooling and constipation^{24,39}. *Myrsine africana* is used to treat intestinal worms, scanty urination, skin allergy, boils and to purify blood is same but leaves are used for stomach problems^{20,39}.

Leaf decoction of *Olea ferruginea* is used for toothache, mouth gums and throatache and leaves are used as, antiseptic, astringent, diuretic and tonic^{4,11,22}. Leaf extract of *Phylla nodiflora* is taken to treat skin diseases, mouth gums, earache, toothache, eyeache and to purify blood but the juice or powder of plant is used for piles, boils, as antipyretic, astringent, demulcent, diuretic, cooling, for knee joints pain and ulcer^{14,41}. Ash powder from leaf galls of *Pistacia integerrima* is given to cure cough, asthma and diarrhoea but galls extract is used for jaundice²⁵. *Prunus persica* leaf paste is used to kill worms in wounds, which is similar to earlier report⁴². Decoction from flowers of *Rosa brunonii* is taken to cure constipation but flowers are used for eye and skin diseases and as heart tonic³. Root paste of *Rumex chalepensis* is given to cattle for diarrhoea, dysentery and intestinal worms but the roots of the plant are astringent^{8,10}. Root decoction of *Rumex hastatus* is used to cure asthma, backache, rheumatism and for weakness in cattle, but the leaf paste is applied on fungal infection³⁹. *Salvia moorcroftiana* root powder is used for cough and diarrhoea but seeds are used for dysentery and roots for cough and cold¹⁰. Leaf decoction of *Solanum miniatum* is taken for abdominal swelling, boils and mouth gums; leaves are used for cleaning and washing wounds, skin diseases and as tonic²², while the leaf paste is used for rheumatism, fever and jaundice^{39,40}. Stem decoction of *Solanum surattense* is given to cure indigestion, fever, cough and asthma; roots are used for cough and asthma¹⁰, while leaf paste is used for jaundice and

high fever³⁹. Leaf paste of *Tagetes minuta* is applied on wounds to kill germs while leaf juice is used to cure earache³⁹. *Taraxacum officinale* rhizome decoction is taken for jaundice and the leaves are used for diabetes, jaundice, snakebite and rheumatism^{10,17,20,43,44}. Whole plant paste of *Trichodesma indicum* is given to cattle for indigestion and to kill intestinal while the whole plant is diuretic^{14,45}. Whole plant decoction of *Vilva canescens* is used to treat fever, cold, cough, asthma, jaundice and headache but the flowers and seeds are diaphoretic, diuretic, laxative and purgative^{10,40}. Seed powder of *Vitex negundo* is used for gas trouble and cholera, whereas the leaves are used for diabetes, jaundice, fever, headache, cold and cough^{37-39,46}. Leaf paste of *Verbascum thapsus* is given to cattle for diarrhoea but the leaves are used for blisters and ulcer^{31,39}.

Present medicinal uses of *Achyranthes aspera*, *Argyrobium roseum*, *Berberis lyceum*, *Clematis grata*, *Ficus variegata*, *Melia azedarach*, *Mentha longifolia*, *Otostegia limbata*, *Oxalis corniculata*, *Punica granatum*, *Prunus persica*, *Rumex hastatus*, *Woodfordia fruticosa* and *Zanthoxylum armatum* were found to be same as reported earlier^{3,4,10,11,15,18,21,22,24,25,31,38,42,46}. On the other hand, by comparing plants used in Abbottabad district with those reported for neighboring areas, it appears that traditional uses of *Carissa opaca*, *Cedrela toona*, *Debregeasia saeneb*, *Euphorbia prostata*, *Pimpinella diversifolia*, *Prunus persica*, *Quercus leucotrichophora*, *Ranunculus laetus*, *Sageretia brandrethiana*, *Tagetes minuta* and *Vitex negundo* are not present in other locations.

Conclusion

The survey indicated that the study area is rich in medicinal plants and the knowledge of medicinal plants is limited to traditional healers and elderly persons, who are living in the rural areas. Certain species like *Ajuga bracteosa*, *Argyrobium roseum*, *Berberis lyceum*, *Bergenia ciliata*, *Justicia adhatoda*, *Mentha longifolia*, *Myrsine africana*, *Pistacia integerrima*, *Punica granatum*, *Viola canescens* and *Woodfordia fruticosa* are being exploited by the local inhabitants, who are unaware of the importance of these plants. In order to conserve these useful medicinal plant species, there is a need to actively involve the acquiescence of local people in evaluation, planning, implementation and monitoring processes. Forest rules must be overhauled by taking villagers into confidence; collection of medicinal

plants carried out by collectors may be streamlined in such a manner to provide sufficient regeneration time to the plant, the area once used for collection may be declared as protected area and no more extraction may be allowed for a period of few years. In order to avoid further loss of endangered, endemic and rare species, conservation methods should be practiced as long term conservation programme involving research institutions like National Agriculture Research Institute (NARC), National Institute of Health (NIH) and Quaid-i-Azam University (QAU). Many people in the study areas of Abbottabad district still continuously depend on local medicinal plants. Due to lack of interest among the younger generation as well as their tendency to migrate to cities for lucrative jobs and modern life style, there is possibility of losing this wealth of knowledge in the near future. Thus, it is important to document and restore the remains of ancient medical practice, and preserve this knowledge for future generations.

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