

Full Length Research Paper

Indigenous knowledge and folk use of medicinal plants by the tribal communities of Hazar Nao Forest, Malakand District, North Pakistan

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Regular field surveys were conducted for two consecutive years in the villages of Brah, Totay, pir khel, Mekhband, Kot and Haryankot of Hazar Nao forest. Hazar Nao is located at about 23 km west of the tribal zone of Dargai, Malakand District, Pakistan. Although, majority of the local inhabitants in the study area depend on plants to treat human ailments, the indigenous knowledge is still not documented. Therefore, the present study is carried out to enlist plant species of this un-explored area and record their medicinal uses before the ethnomedicinal information are lost. Informations about medicinal plants were gathered through formal and informal interviews and questionnaires were filled from local people. The folk medicinal uses of 75 plant species were recorded for various human ailments.

Key words: Hazar Nao, Malakand, human ailments, medicinal plant, Pakistan.

INTRODUCTION

The tribal region of Malakand is the gateway to Dir, Chitral, Swat Districts; Mahmand and Bajaur Agencies - federally administered tribal areas (FATA) which are very famous for tourism. It extends from the rugged and partly glaciated mountain ranges of the Hindukush down to northern edge of the Peshawar basin. It is bounded on the north by Dir, on the north east by Swat, on the east by Buner District, on the south by Mardan and Charsadda Districts and on the west by Mohmand and Bajaur Agencies (Chaghtai and Ghawas, 1976 and Figure 1). The people of the area mostly depend on agricultural products for their subsistence. However, agricultural products are too less to meet the expenditure of the tribal communities. Therefore, the people have to resort to alternative methods for earning their livelihood. A sizeable number of people work in civil armed forces and in other parts of the country while the women perform house hold duties and make handicrafts items like caps, bed sheets, baskets etc. It is a large hilly area and

women support their men by taking care of cattle, cutting fuel wood as well as in the fields.

Traditional health care systems as well as international herbal and pharmaceutical markets are dependent on medicines derived from plants. Nearly 80% of the world populations rely on the use of traditional medicines to meet their primary health care needs (Sandhya et al., 2006) whereas; up to 90% of the developing world relies on the use of medicinal plants (WHO, 2002). Out of the total 4, 22,000 flowering plants reported from the world, more than 50,000 are used for medicinal purposes (Gavaerts, 2001; Schippmann et al., 2002). The multi purpose use and increasing demands for plants have resulted in over-exploitation and over-harvesting of medicinal plants.

Pakistan has a varied climate and is quite rich in medicinal herbs scattered over a large area. A total of 1572 genera and 5521 species are identified (Ali, 2008) but only 600 plant species are documented and used for medicinal uses. Ethnobotany is a virgin field in Pakistan and few papers have been published. The first person who worked in the subject area is, Hocking (1958), and he reported that about 85% of Pakistan's population is

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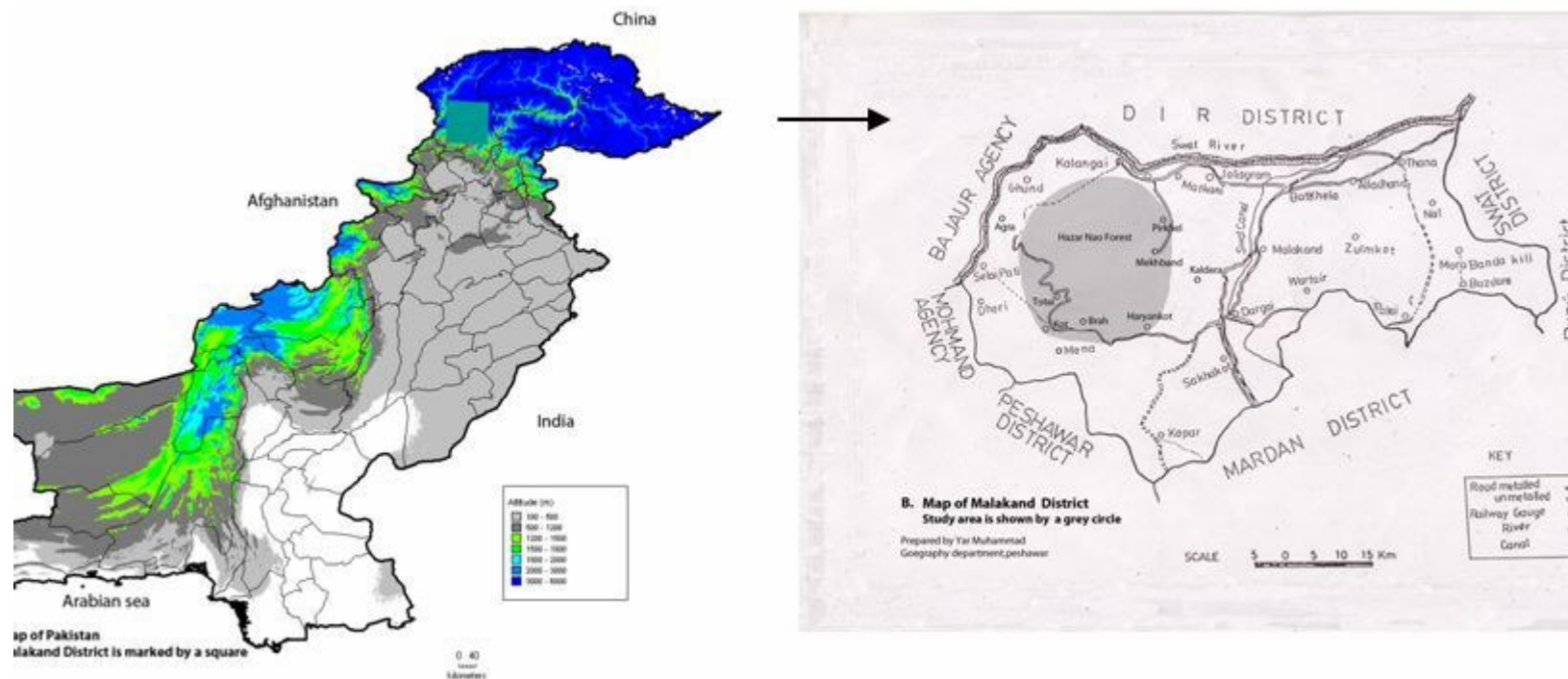


Figure 1. Please provide figure legend.

dependent on traditional medicines for all or most of their medicinal need. Shinwari (1996) reported the present status of ethnobotany in Pakistan and emphasized on the need of investigation, documentation and application of traditional knowledge in the use of natural resources. Shinwari *et al.* (2002) gave an account of more than 300 medicinal plants to be traded in Pakistani herbal markets. Gilani and Shinwari (2003) compiled the review of ethnobotanical literature of Pakistan. Shinwari *et al.* (2003) reported 275 medicinal plants from the District of Swat, which are locally used. Gilani and Khan (2003) reported 87 threatened plants from Swat,

23 from Buner and 31 species from Chitral. Shinwari and Gilani (2003) reported local uses of medicinal plants from Astore, Pakistan. Ethnomedicinal survey in Kot Manzary Baba valley was conducted by Zabihullah *et al.* (2006) and they reported 82 plant species for different ethnobotanical purposes.

As mentioned above, many workers have documented the ethnobotanical uses of medicinal plants from different parts of Pakistan but the tribal area of Hazar Nao is still unexplored. Therefore, a need was felt to document and conserve the traditional knowledge of the area before the information is lost for ever. The aim of

the present study was to enlist plant species of the area, record and explore their herbal remedies.

METHODOLOGY

Regular field trips were arranged in different seasons of 2003 to 2004. Information on the traditional uses of plants found in Hazar Nao inhabited villages of Brah, Totay, Pir khel, Mekhband, Kot and Haryankot were gathered through formal and informal interviews and questionnaires from local people. All the people living in Hazar Nao forest are ethnically Pashtoon tribe and speak Pashto language. Communication with the local community through Pashto language led us to mix with the people of the area easily.

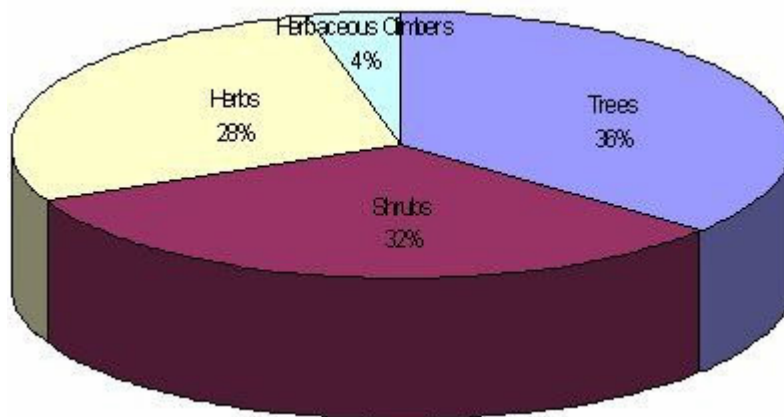


Figure 2. Habitat of medicinal plant species.

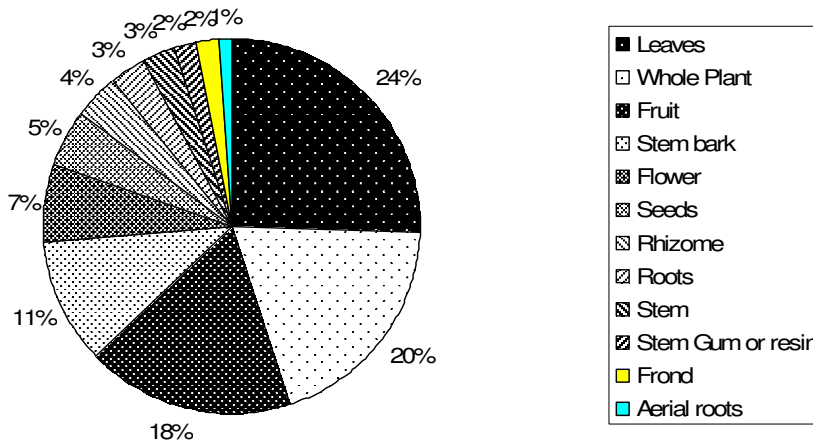


Figure 3. Medicinal plant parts used for different diseases.

Before going through formal and informal interviews for herbal recipes with the local people, we took interest in their daily lives, social and religious activities because first intervention into the community was difficult. The interviews were based on informal small talks with individuals and groups and 300 formal interviews including filling of both closed and open ended questionnaires was conducted. We collected medicinal values of many plants but concentrated on those herbal recipes which were at least repeated by 5 people. For a cross verification, we gave priority to local elder people and two herbal practitioners of the area. Voucher herbarium specimens were collected, dried and identified with help of local available literature, using the herbarium of Biological Sciences, Quaid-e-Azam University, Islamabad.

They were accessioned and submitted in the herbarium, Department of Biological Sciences, Quaid-e-Azam University, Islamabad.

RESULTS AND DISCUSSION

The results of the field surveys and interviews are

presented below in enumeration. They are arranged alphabetically by family with plant scientific name, local name, habit, part use, flowering season, voucher herbarium number and folk medicinal uses. Medicinal remedies of 75 plant species belonging to 50 families were obtained. Out of 75 plants, majority of the species are trees 27 (36%), followed by shrubs 24 (32%), herbs 21 (28%) and herbaceous climbers 3 (4%) (Figure 2).

Usually, all parts of the plant such as leaves, stem, flower, bark, roots, fruits and seeds are utilized by traditional healers. However, it relies on the need of the user and type of plant. Herbs are used as whole but in case of shrubs and trees a particular part is used. Leaf is the most frequently used part in the preparation of medicinal remedies. The common use of leaf (24%) followed by whole plants (20%) and fruit (18%) reveals that these parts might have strong medicinal properties but it requires chemical screening (Figure 3). The maximum use of leaf in the preparation of remedies is

partly expected due to its relative ease of finding. The leaves are green and available in most part of the year. The common use of leaves in the preparation of remedies is also reported by Muthu et al. (2006) and Kala et al. (2005). A total of 71 (95%) medicinal plants are used for human ailments, 1 (01%) for livestock and 3 (04%) to treat both human and livestock ailments. Data analysis indicates that gastro-intestinal disorders, respiratory diseases, skeleto-muscular problems, dematological complaints and circulatory diseases are very common in the area (Table 1). A total of 39 species are used to treat gastro-intestinal disorders such as diarrhea, dysentery, constipation and stomach-ache. 17 species are used for the treatment of respiratory illness such as asthma and cough. 17 species are used against skeleto-muscular problems like rheumatism, backache and muscular pain. Similarly, 19 species are used to treat dematological diseases, thirteen for cardio vascular complaints and circulatory diseases, 11 to treat fever, headache and sweating of body, 10 for urinary complaints, 7 for dental problems, 6 for ear, nose and throat (ENT) complaints, 5 for nerve disorders, 8 for genital and sexual diseases, 8 species for others (wounds, cuts, narcotic, tonic, anticancer and goiter) and 1 species (*Pinus roxburghii*) is used against snake bite (Table 1).

Different substances like water, juices, sugar, soap, wheat flour, mustard oil, honey, desi ghee (Butter) and milk are added to plant materials during the preparation of medicinal remedies. The remedies are mostly administered through oral (64%), dermal (11%) and both oral and dermal (24%). Only 1% is used through auricular and nasal routes (See enumeration). Remedies of specific doses prescribed by traditional healers lack precision and might be dangerous in cases of over dose. Majority of the plants have multiple uses for curing different diseases (Table 1).

The present study reveals that the inhabitants of the research area are rich in indigenous knowledge of plants and their uses to treat many diseases. During the study period, we found that all informations on the use of medicinal plants were gathered from elder resource persons (above 40 to 90 years of age) who have real knowledge about the utilization of medicinal plants. The younger generation (below 40 years of age) does not rely on traditional treatments due to modern cultural changes. It is, therefore, felt worthwhile to record the traditional knowledge of medicinal plants in the area before the information are depleted.

ACANTHACEAE

Botanical name: *Justicia adhatoda* Linn.
Local name: Baiker
Habit: Shrub
Part use: Leaves and flowers
Flowering period: April-May.

Voucher specimen No. 01.

Folk medicinal uses: For cough, asthma, bronchitis and tuberculosis, about 1 kg flowers and leaves are mixed in 150 ml water, heated for 1 h and juice is extracted, which is kept in earthen pot. Then, 40 g of "Naushadar" (NH₄Cl) and 20 ml aqueous extract of *Datura stramonium* is added. The drug is administered to the patient for 1 week, thrice in a day. For rheumatism, about 300 g of leaves are crushed and boiled in 1 l water in an iron vessel, till it is left to half and given to the patient with honey for 2 weeks, 4 times daily.

ADIANTACEAE

Botanical name: *Adiantum capillus-veneris* Linn
Local name: Sumbal
Part use: Fronds
Voucher specimen No. 02

Folk medicinal uses: The juice extracted from frond is used as expectorant, emetic and diuretic.

Botanical name: *Adiantum incisum* Forsk.
Local name: Sumbal
Part use: Fronds
Voucher specimen No. 03

Folk medicinal uses: The frond is used for curing skin diseases, fever, cough and diabetes.

AMARANTHACEAE

Botanical name: *Achyranthes aspera* Linn.
Local name: Nari Ghishkay
Habit: Herb
Part use: Whole plant.
Flowering period: April to August.
Voucher specimen No. 04

Folk medicinal uses: The paste from fresh leaves is prepared, mixed with gur (Sugarcane product) and soap, applied to blisters twice a day for 5 consecutive days to drain off the pus from the abscess and boils. The plant paste is applied with cotton bandage for fractured bones. Freshly prepared paste of the root is applied externally twice a day for 1 week in case of tonsillitis.

Botanical name: *Amaranthus viridis* Linn.
Local name: Chalwerae
Habit: Herb
Part use: Whole plant
Flowering period: April to May
Voucher specimen No. 05

Folk medicinal uses: The boiled soft roots are used as

Table 1. Medicinal plants and their uses for different diseases.

Disease category name	Plants used
Gastrointestinal disorders	<i>Adiantum capillus-veneris, Ailanthus altissima, Ajuga bracteosa, Amaranthus viridis, Asparagus plumosus, Berberis lycium, Buxus wallichiana, Butea monosperma, Calotropis procera, Celtis australis, Chenopodium ambrosoides, Colebrookia oppositifolia, Echinops echinatus, Ficus carica, Ficus glomerata, Ficus religiosa, Ficus palmata, Ficus benghalensis, Helicteres isora, Lantana camara, Morus alba, Myrsine africana, Myrtis communis, Nannorrhops ritchiana, Oxalis corniculata, Periploca aphylla, Phoenix dactylifera, Pinus roxburghii, Platanus orientalis, Punica granatum, Pyrus pashia, Ricinus communis, Rubus fruticosus, Rumex hastatus, Sarcococca saligna, Solanum nigrum, Solanum surratense, Vitis Jacquemotii, Viola canescens</i>
Dermatological and topical diseases	<i>Achyranthes aspera, Amaranthus viridis, Berberis lycium, Cuscuta reflexa, Debregeasia salicifolia, Dodonaea viscosa, Euphorbia prostrata, Euphorbia helioscopia, Ficus carica, Fumaria indica, Mallotus philippensis, Melia azedarach, Periploca aphylla, Pinus roxburghii, Platanus orientalis, Trichodesma indica, Verbascum thapsus, Woodfordia fruticosa, Ziziphium numularia</i>
Respiratory illness	<i>Ammi visnaga, Bauhinia variegata, Berberis lycium, Calotropis procera, Chenopodium ambrosoides, Echinops echinatus, Ficus carica, Ficus religiosa, Ficus palmata, justacia adhatoda, Punica granatum, Rubus fruticosus, Solanum nigrum, Solanum surratense, Tinospora cordifolia, Verbascum thapsus, Woodfordia fruticosa</i>
Skeletal-muscular problems	<i>Acacia modesta, Achyranthes aspera, Berberis lycium, Buxus wallichiana, Butea monosperma, Cannabis sativa, Chenopodium ambrosoides, Daphne mucronata, Dodonaea viscosa, justacia adhatoda, Lantana camara, Olea ferruginea, Pistacia chinensis, Quercus incana, Rhazya stricta, Sarcococca saligna, Verbascum thapsus</i>
Cardiovascular complaints and circulatory diseases	<i>Adiantum incisum, Asparagus adscendens, Cynodon dactylon, Echinops echinatus, Ficus benghalensis, Fumaria indica, Lantana camara, Oxalis corniculata, Punica granatum, Sageretia thea, Sarcococca saligna, Solanum nigrum, Tinospora cordifolia</i>
Fever, headache and sweating of body (diaphoretic)	<i>Adiantum incisum, Buxus wallichiana, Fumaria indica, Lantana camara, Punica granatum, Pyrus pashia, Rubus fruticosus, Solanum surratense, Tinospora cordifolia, Viola canescens, Xanthium strumarium, Adiantum capillus-veneris, Arundo donax, Asparagus adscendens,</i>
Urinary complaints	<i>Ficus carica, Ficus religiosa, Ficus palmata, Origanum vulgare, Quercus incana, Rumex hastatus, Solanum surratense</i>
Dental problems	<i>Calotropis procera, Ficus glomerata, Nerium oleander, Olea ferruginea, Origanum vulgare, Otostegia limbata, Platanus orientalis,</i>
ENT complaints	<i>Achyranthes aspera, Acacia nilotica, Ajuga bracteosa, Calotropis procera, Origanum vulgare, Woodfordia fruticosa</i>
Nerve disorders (hysteria, epilepsy, sedative)	<i>Colebrookia oppositifolia, Convolvulus arvensis, Echinops echinatus, Pyrus pashia, Solanum nigrum</i>
Genital and sexual diseases	<i>Butea monosperma, Convolvulus arvensis, Cuscuta reflexa, Phoenix dactylifera, Rhazya stricta, Ricinus communis, Solanum surratense, Tinospora cordifolia</i>
Others (wounds, cuts, narcotic, tonic, anticancer and goiter)	<i>Cannabis sativa, Colebrookia oppositifolia, Cynodon dactylon, Mallotus philippensis, Myrtis communis, Otostegia limbata, Rubus fruticosus, Viola canescens</i>
Snake bite	<i>Pinus roxburghii</i>

laxative. The upper surfaces of the leaves are smeared with mustard oil, warmed gently and are applied to the abscesses and boils for ripeness.

Anacardiaceae

Botanical name: *Pistacia chinensis* Bunge.
Local name: Ashnay
Habit: Tree
Part use: Stem gum
Flowering period: August to September
Voucher specimen No. 06

Folk medicinal uses: The stem gum is added to the mustard oil, warmed and mixed. The prepared poultice is then applied to the ruptured heels at night.

Apiaceae

Botanical name: *Ammi visnaga* (L) Lam.
Local name: Spairkai
Habit: Herb
Part use: Dry fruit
Voucher specimen No. 07

Folk medicinal uses: The fruits are used in whooping cough and asthma.

Apocyanaceae

Botanical name: *Nerium oleander* Linn.
Local name: Gander
Habit: Herb
Part use: Leaves
Flowering period: April to May
Voucher specimen No. 08

Folk medicinal uses: The fresh leaves are washed, crushed, and then 3 cups of water is added. The filtrate is given to the patients suffering from dental pain or bleeding gums.

Botanical name: *Rhazya stricta* Decene
Local name: Ghandaray
Habit: Shrub
Part use: whole plant
Flowering period: April to May
Voucher specimen No. 09

Folk medicinal uses: The plant is used for the treatment of syphilis, chronic rheumatism and old joint infections.

Arecaceae

Botanical name: *Phoenix dactylifera* Linn.

Local name: Khajora
Habit: Tree
Part use: fruit.
Flowering period: March to April
Voucher specimen No. 11

Folk medicinal uses: Fruits are tonic, aphrodisiac, digestive and laxative.

Botanical name: *Nannorrhops ritchiana* Griff
Local name: Mazari
Habit: Shrub
Part use: leaves
Flowering period: April to May
Voucher specimen No. 12

Folk medicinal uses: The leaves are used for curing dysentery, diarrhea. Young leaves are recommended as purgative in veterinary medicine.

Asclepiadaceae

Botanical name: *Calotropis procera* (Willd.) R. Br.
Local name: Spalmae
Habit: Shrub
Part use: Whole plant
Flowering period: August to September
Voucher specimen No. 13

Folk medicinal uses: The plant is used in asthma, cholera, dental cleaning and earache; the latex collected from the leaves and stem is mixed with Bajra (*Pennisetum typhoides*) in the ratio of 1:2. They are then kept in the earthen pot and given in the quantity of 2 g with green tea to asthmatic patient twice a day; about 15 g of roots latex is mixed with *Pennisetum typhoid* (Bajra) in 1:2 ratios. It is kept in earthen pot, heated and tablets of 1 g are prepared. The tablets are given thrice daily to the patient suffering from asthma; the juice extracted from about 15 gram of roots is given to the patient suffering from cholera, thrice daily, for 5 days; mature leaves of the plant are warmed and tied over the temporal bone to alleviate earache; regular use of Maswak (tooth paste) prepared from the stem of the plant is used to cure pyorrhea.

Botanical name: *Periploca aphylla* Linn.
Local name: Barara
Habit: Shrub
Part use: Whole plant
Flowering period: April to May
Voucher specimen No. 14

Folk medicinal uses: The plant decoction is used as purgative, while the milky juice is applied to tumors and swellings.

Asteraceae

Botanical name: *Echinops echinatus* Roxb.
 Local name: Ount Katara
 Habit: Shrub
 Part use: Whole plant
 Flowering period: March to April
 Voucher specimen No. 84

Folk medicinal uses: The plant is recommended in jaundice, hysteria, dyspepsia, hoarseness of throat and cough. The powdered root is used as antilice and also applied to wounds of cattles for killing maggots.

Botanical name: *Xanthium strumarium* Linn.
 Local name: Ghut ghiskay
 Habit: Shrub
 Part use: Leaves
 Flowering period: February to April
 Voucher specimen No. 15

Folk medicinal uses: Leaf decoction is used in long-standing malarial fever.

Berberidaceae

Botanical name: *Berberis lycium* Royle
 Local name: Ziar largay
 Habit: Shrub
 Part use: Rhizome
 Flowering period: April to June
 Voucher specimen No. 16

Folk medicinal uses: About 100 g of the powdered rhizome is mixed with the same weight of black pepper (*Piper nigrum*) and 1000 g of desighee, the paste so prepared is applied over the affected parts especially for backache. The root decoction is used as gargle for pharyngitis and intestinal colic wounds.

Boraginaceae

Botanical name: *Trichodesma indica* (Linn.) R. Br.
 Local name: Ghowa-jabbai
 Habit: Perennial Herb
 Part use: Roots
 Flowering period: March to August
 Voucher specimen No. 20

Folk medicinal uses: To relieve swelling of body, roots are finely powdered to make a paste and applied over the affected part of the body twice a day till recovery.

Buxaceae

Botanical name: *Buxus wallichiana* Baill

Local name: Shamshad
 Habit: Shrub or small tree
 Part use: Whole plant
 Flowering period: April to June
 Voucher specimen No. 18

Folk medicinal uses: The plant is used as antirheumatic, diaphoretic, purgative and febrifuge.

Botanical name: *Sarcococca saligna*. (D. Don) Muell.
 Local name: Ladan
 Habit: Shrub
 Part use: Leaves and shoots
 Flowering period: September to May
 Voucher specimen No. 19

Folk medicinal uses: The leaves and shoots are used as laxative, blood purifier and to relieve muscular pains.

Caesalpinaceae

Botanical name: *Bauhinia variegata* Linn.
 Local name: Kuryal or Kachnar
 Habit: Tree
 Part use: Bark, Seeds
 Flowering period: February to April
 Voucher specimen No. 21

Folk medicinal uses: For scrofula, seeds are powdered, little sulphur is added and a poultice is made in the mustard oil. It is applied on the affected part of the body. After 1 or 2 h bath is taken with warm water. About 50 g of the bark is grinded in rice water to make a paste. It is also applied on the affected part twice daily for 1 week.

Canabaceae

Botanical name: *Canabis sativa* Linn.
 Local name: Bhang
 Habit: Shrub
 Part use: Leaves and flowers
 Flowering period: April to August
 Voucher specimen No. 22

Folk medicinal uses: The leaves are antispasmodic, narcotic. They are boiled and the warmed leaves are tied over the affected parts of the body for the treatment of spasm. For narcotic action, the leaves are used in two forms; bhang and charas.

Bhang

The larger leaves are crushed, mixed with milk or juice of some other fruits and poppy seeds, and taken as a drink for their narcotic action.

Charas

The resinous exudation that collects on the leaves and flowering tops is taken and is smoked.

Habit: Herb
Part use: Leaves and fruits
Flowering period: March to April
Voucher specimen No. 86

Chenopodiaceae

Botanical name: *Chenopodium ambrosoides* Linn
Local name: Chelwai
Habit: Herb
Part use: Leaves and stem
Flowering period: March to April
Voucher specimen No. 24

Folk medicinal uses: The paste of leaves and stem is applied to relieve backache. Dried powdered leaves with chicken soup are used for cough and motions in infants.

Folk medicinal uses: The leaves and fruits are used as vermifuge for cattle.

Botanical name: *Euphorbia prostrata* Linn.
Local name: Warmaga
Habit: Herb
Part use: Whole plant
Flowering period: March/April
Voucher specimen No. 27

Folk medicinal uses: The decoction and its paste are used against ringworms. The paste is applied in skin diseases.

Convolvulaceae

Botanical name: *Convolvulus arvensis* Linn.
Local name: Priwathai
Habit: Herb
Part use: Whole plant
Flowering period: Whole year
Voucher specimen No. 25

Folk medicinal uses: For sexual debility, about 10 g of the plant is finely crushed, boiled in milk, filtered and is given to the patient for about 10 days. For epilepsy, fresh leaves are crushed and the extract is given to the patient till recovery.

Botanical name: *Euphorbia helioscopia* Linn.
Local name: Mandanro
Habit: Herb
Part use: Whole plant
Flowering period: March to April
Voucher specimen No. 28

Folk medicinal uses: For the treatment of eczema, equal quantity of the plant with *Cuscuta reflexa* is made into paste and applied on the affected parts twice a day.

Cuscutaceae

Botanical name: *Cuscuta reflexa* Roxb.
Local name: Banoshah
Habit: Herbaceous Climber
Part use: Whole plant
Flowering period: August to September
Voucher specimen No. 26

Folk medicinal uses: For the treatment of scabies, the whole plant is crushed and boiled in water. It is strained out and the patient is asked to take bath with the decoction without using soap. The patient must avoid *Capsicum annum* in his food. For inducing sterility, 10 to 15 ml juice of the plant is given to women once only. For eczema, a paste is made from taking equal quantity of *Cuscuta reflexa* and *Euphorbia helioscopia* and applied over the affected part, thrice a day till cure.

Botanical name: *Mallotus philippensis* (Lam) Muell.
Local name: Kambela
Habit: Shrub or small tree
Part use: Bark and leaves
Flowering period: February to November
Voucher specimen No. 29

Folk medicinal uses: The paste of the bark and juice of fleshy leaves is applied for wounds, cuts and bruises, 3 times a day.

Botanical name: *Ricinus communis* Linn.
Local name: Arhanda
Habit: Herb
Part use: Leaves and seeds
Flowering period: Throughout the year
Voucher specimen No. 31

Folk medicinal uses: The oil extracted from seeds is used as purgative. A dose of 1 tea spoonfull with milk is given to elders and ½ spoonfull for children. The small quantity of oil is rubbed on the abdomen, which is slowly and gradually absorbed through sweat glands to release constipation. For the treatment of leucorrhoea, fresh leaves are crushed and are boiled in 200 ml of milk. It is filtered and taken for 1 month in divided doses. For the treatment of piles, the castor oil is applied locally for 1 week.

Euphorbiaceae

Botanical name: *Andracne cordifolia* (Done) Muell.
Local name: Gulpinsa

Fagaceae

Botanical name: *Quercus incana* Roxb.
 Local name: Seray
 Habit: Tree
 Part use: Bark and fruits.
 Flowering period: March to April
 Voucher specimen No. 32

Folk medicinal uses: Bandages of bark are used for cracked bones. The half roasted, powdered fruits are mixed with Desi ghee and used in urinary infections.

Fumariaceae

Botanical name: *Fumaria indica* (Hauskn.) H.N.
 Local name: Papra
 Habit: Herb
 Part use: Whole plant
 Flowering period: March to May
 Voucher specimen No. 34

Folk medicinal uses: The decoction of fresh leaves is taken twice a day for blood purification which results in the treatment of skin diseases. The plant decoction is used for the treatment of goiter and fever.

Lamiaceae

Botanical name: *Ajuga bracteosa* Wall. Ex. Benth.
 Local name: Dagherbooti, Spinabooti
 Habit: Herb
 Part use: Whole plant
 Flowering period: March to December
 Voucher specimen No. 35

Folk medicinal uses: The plant decoction is taken before breakfast for the treatment of dyspepsia and sore throat.

Botanical name: *Colebrookia oppositifolia* Smith
 Local name: Puddher
 Habit: Shrub
 Part use: Leaves and roots
 Flowering period: January to April
 Voucher specimen No. 87

Folk medicinal uses: Leaves are used as antiseptic for ulcers and applied to wounds. Roots extract is used in epilepsy.

Botanical name: *Origanum vulgare* Linn.
 Local name: Shamakay
 Habit: Herb
 Part use: whole plant

Flowering period: June to September
 Voucher specimen No. 36

Folk medicinal uses: The plant is used for toothache, earache and diuretic.

Botanical name: *Otostegia limbata* (Benth.) Boiss.
 Local name: Spin azghay
 Habit: Shrub
 Part use: Leaves.
 Flowering period: April-June
 Voucher specimen No. 37

Folk medicinal uses: The leaves are used for gum diseases and curing of wounds.

Liliaceae

Botanical name: *Asparagus plumosus* Linn
 Local name: Tendorai
 Habit: Herb
 Part use: root tubers
 Flowering period: October to November
 Voucher specimen No. 38

Folk medicinal uses: The root tubers are given together with boiled milk and sugar for diarrhea and dysentery.

Botanical name: *Asparagus adscendens* Linn
 Local name: Shal gwati
 Habit: Herb
 Part use: stem and leaf
 Flowering period: October to November
 Voucher specimen No. 39

Folk medicinal uses: It is diuretic and is also used to cure jaundice and congestive liver.

Lythraceae

Botanical name: *Woodfordia fruticosa* (L) S. Kurz.
 Local name: Zangli Anar
 Habit: Shrub
 Part use: Flower and bark
 Flowering period: April to May
 Voucher specimen No. 40

Folk medicinal uses: The juice of flowers is given twice a day in the dose of 8 to 10 ml for the treatment of sun stroke.

The fresh juice of flowers is also poured in the nostril of the patient, to check bleeding from the nose which is locally called "Naksir or Aspa". For the treatment of cold, the decoction of the bark of the plant is given in the dose of 10 to 12 ml daily for 5 days.

Meliaceae

Botanical name: *Melia azedarach* Linn.
 Local name: Tora bukayanra
 Habit: Tree
 Part use: young branches and leaves
 Flowering period: March to May
 Voucher specimen No. 41

Folk medicinal uses: The extraction of leaves is used by women for the removal of hair lice. The farmers place the leaves in the cereals such as wheat, rice and pulses for the repelling of insects and other pests. The young branches and leaves are used as carminative for cattle. When their abdomen or belly swells up, by gas accumulation due to over eating, the leaves, young branches or fermented, fruits are given.

Menispermaceae

Botanical name: *Tinospora cordifolia* Miers
 Local name: Praiwatay
 Habit: Herbaceous climber
 Part use: Leaves and stem
 Flowering period: March to May
 Voucher specimen No. 88

Folk medicinal uses: The leaves and stem are used for cold, cough, fever, jaundice and as a sexual tonic.

Mimosaceae

Botanical name: *Acacia modesta* Wall.
 Local name: Palusa
 Habit: Tree
 Part use: Bark
 Flowering period: April to May
 Voucher specimen No. 42

Folk medicinal uses: The Gum obtained from the bark is crushed, mixed with wheat flour and is fried in desi ghee. The mixture so obtained is tonic for backache especially for women after delivery. It is given before breakfast with a cup of milk or warm water for a month.

Botanical name: *Acacia nilotica* Linn.
 Local name: Kikar
 Habit: Tree
 Part use: flowers
 Flowering period: July to August
 Voucher specimen No. 43

Folk medicinal uses: About 30 flowers are burnt in 10 ml mustard oil and filtered. 2 to 4 drops of the oil is poured in the patient's ear for 5 days in cases of earache.

Moraceae

Botanical name: *Ficus carica* Linn.
 Local name: Inzar
 Habit: Tree
 Part use: leaves, fruit
 Flowering period: March to April
 Voucher specimen No: 44

Folk medicinal uses: Fresh leaves are crushed and boiled in milk. It is filtered and given to the patient thrice daily for the treatment of measles, dysentery and bladder problems. Milk juice of the petioles is used to clear warts when applied on them.

The latex is applied to make possible the removal of spines and thorns easily. The fruit is used for the cure of piles.

Botanical name: *Ficus glomerata* Linn.
 Local name: Oormal
 Habit: Tree
 Part use: Bark, leaves and fruits
 Flowering period: April to May
 Voucher specimen No. 45

Folk medicinal uses: An infusion of the leaves is useful in mouthwash for spongy gums. Stem latex is applied in piles and diarrhea. Fruits are stomachic and carminative.

Botanical name: *Ficus religiosa* Linn.
 Local name: Peepal
 Habit: Tree
 Part use: Bark and fruits.
 Flowering period: October to November
 Voucher specimen No. 47

Folk medicinal uses: Bark and fruits are used against asthma, weakness of urinary bladder and constipation. Decoction of bark is used for vomiting.

Botanical name: *Ficus benghalensis* Linn
 Local name: Barh
 Habit: Tree
 Part use: Aerial roots
 Flowering period: April to May
 Voucher specimen No. 48

Folk medicinal uses: Aerial roots are used to treat diarrhea. It is used to control increase in blood sugar of diabetic patient.

Botanical name: *Ficus palmata* Forssk.
 Local name: Ormal
 Habit: Tree
 Part use: fruits
 Flowering period: May
 Voucher specimen No. 49

Folk medicinal uses: Fruit is laxative and also used in diseases of lungs and urinary bladder.

Botanical name: *Morus alba* Linn.
Local name: Speen Thooth
Habit: Tree
Part use: fruits and leaves
Flowering period: February to March
Voucher specimen No. 50

Folk medicinal uses: The leaves and fruits are used as purgative.

Myrsinaceae

Botanical name: *Myrsine africana* Linn
Local name: Manroo
Habit: Shrub or small tree
Part use: Leaves and fruits
Flowering period: February to April
Voucher specimen No: 51

Folk medicinal uses: The fruits are used as spices, carminative, appetizer and flavoring agent. The leaves are used as tea.

Myrtaceae

Botanical name: *Myrtis communis* Linn. Myrtle
Local name: Manroogan
Habit: Shrub or small tree
Part use: Leaves and fruits
Flowering period: May
Voucher specimen No. 52

Folk medicinal uses: The green, dried fruits are used for stomach diseases. Myrtle oil, obtained from the leaves by distillation, is used as tonic.

Oleaceae

Botanical name: *Olea ferruginea* Royle
Local name: Khoona
Habit: Tree
Part use: Leaves and fruits
Flowering period: April to May
Voucher specimen No. 54

Folk medicinal uses: The decoction of fresh leaves is kept in the mouth at night till recovery. This strengthens gums and relieves toothache. The oil extracted from the fruits is used as massage in the treatment of rheumatism and dislocation of bones. The patient will avoid bath with cold water during the treatment for 1 week.

Oxalidaceae

Botanical name: *Oxalis corniculata* Linn.
Local name: Threwakay
Habit: Herb
Part use: Whole plant
Flowering period: March to April
Voucher specimen No. 53

Folk medicinal uses: The juice extraction from the fresh plant is used for stomach troubles. It is also used for the cleaning of rusted vessels.

Papilionaceae

Botanical name: *Butea monosperma*. (Lam) P. Kuntra
Local name: Palay
Habit: Tree
Part use: Whole plant
Flowering period: March to April
Voucher specimen No. 61

Folk medicinal uses: The gum of the plant is (Kamar Kas) fried in desi ghee (butter), mixed with carbohydrate, locally called "Nashasta" (extraction from the grains of wheat) and is given in the dose of 2 to 4 g, twice a day for 20 days, in backache and weakness caused after delivery in women. Equal quantity of pods and root is dried and powdered.

A dose of 20 g of the mixture is given once daily for 1 week to expel worms. In cases of children, the dose should be reduced to half. The flowers, bark and gum of the plant are mixed in equal quantity, powdered and is taken in the dose of 5 g twice a day for the treatment of gonorrhoea;

Pinaceae

Botanical name: *Pinus roxburghii* Sergeant
Local name: Nakhtar
Habit: Tree
Part use: stem
Voucher specimen No. 63

Folk medicinal uses: The resin (locally called ganda baroja) extracted from the main stem is used against ulcer, snake bites and skin diseases.

Platanaceae

Botanical name: *Platanus orientalis* Linn.
Local name: Chinar
Habit: Tree
Part use: Bark
Flowering period: April to May

Voucher specimen No. 64

Folk medicinal uses: For blisters, powdered bark is mixed with wheat flour and soap to make a poultice. It is applied with cotton cloth on the affected parts of the body. The bark is given for toothache and diarrhea.

Polygonaceae

Botanical name: *Rumex hastatus* D. Don
 Local name: Tarookay
 Habit: Shrub
 Part use: Leaves, young shoots.
 Flowering period: April to August
 Voucher specimen No. 65

Folk medicinal uses: The leaves and young shoots are used as flavoring agents, carminative, purgative, diuretic and for stomach problems.

Poaceae

Botanical name: *Arundo donax* Linn
 Local name: Kana Bans
 Habit: Shrub
 Part use: rhizome
 Voucher specimen No. 66

Folk medicinal uses: Decoction of rhizome is emollient and diuretic.

Botanical name: *Cynodon dactylon* (Linn) Pers.
 Local name: Kabal
 Habit: Herb
 Part use: Whole plant
 Flowering period: April to June
 Voucher specimen No. 67

Folk medicinal uses: The plant is used against bleeding. About 10 ml juice of plant is added with crystalline sugar and given 3 times a day for 20 days to check bleeding through nose and urine. The plant is crushed, grinded and applied externally on any body part to stop bleeding. It is also used along with rose flower in jaundice.

Punicaceae

Botanical name: *Punica granatum* Linn.
 Local name: Anar, Ananghori
 Habit: Tree
 Part use: Leaves, bark, fruits and seeds
 Flowering period: April to May
 Voucher specimen No. 71

Folk medicinal uses: The peel of the fruit is dried, soaked and grinded. The powder so formed, called "Narsaway", is mixed in small quantity in a cup of curd; which is used twice in a day till recovery for the treatment of external bleeding and dysentery. Fruit (Juicy seeds) is blood purifier and has cooling effects. The bark of stem and root is anthelmintic, antipyretic and expectorant. The dried seeds, locally called anar dana, is used in condiments for its taste.

Rhamnaceae

Botanical name: *Sageretia thea* Linn
 Local name: Momanra
 Habit: Shrub
 Part use: Root
 Voucher specimen No. 72

Folk medicinal uses: The extraction of roots is used as cooling agent in jaundice.

Botanical name: *Ziziphus numularia* (Burm. f.) Wight and Arn.
 Local name: Kurkanda
 Habit: Tree
 Part use: leaves
 Voucher specimen No. 73

Folk medicinal uses: Leaves are used in scabies and boils.

Rosaceae

Botanical name: *Rubus fruticosus* Linn
 Local name: Karwara or Baganra
 Habit: Shrub
 Part use: Leaves, fruits
 Flowering period: June
 Voucher specimen No. 74

Folk medicinal uses: The leaves are useful for diarrhea, coughs and fevers. A glass of sweet extract from the fruits is drunk daily before breakfast for 4 days for asthma and as tonic.

Botanical name: *Pyrus pashia* Ham. Ex. D. Don.
 Local name: Tanga
 Habit: Tree
 Part use: Fruits
 Flowering period: February to March
 Voucher specimen No. 76

Folk medicinal uses: The fruits are febrifuge, sedative and laxative.

Sapindaceae

Botanical name: *Dodonaea viscosa* (L.) Jacq.
 Local name: Ghwraskay
 Habit: Shrub
 Part use: Leaves
 Flowering period: March
 Voucher specimen No. 46

Folk medicinal uses: The leaves are warmed and kept on joints to relieve pains, swellings and also for softening boils.

Scrophulariaceae

Botanical name: *Verbascum thapsus* Linn.
 Local name: Kharghwug
 Habit: Herb
 Part use: leaves, flowers
 Flowering period: May to August
 Voucher specimen No. 56

Folk medicinal uses: About 40 g of dried leaves and flowers are boiled in 1000 g of Cow's milk for 10 min, strained and the filtered milk is given to the patient thrice daily in cases of asthma. The leaves are warmed, tightly tied on the joints to relieve pain and also used for softening boils.

Simarubaceae

Botanical name: *Ailanthus altissima* (Mill) Swingle
 Local name: Angrizai backyanara
 Habit: Tree
 Part use: bark
 Flowering period: April to May.
 Voucher specimen No. 77

Folk medicinal uses: Bark juice is mixed with milk for curing dysentery and diarrhea.

Solanaceae

Botanical name: *Solanum nigrum* Linn
 Local name: Kachmachu
 Habit: Herb
 Part use: Whole plant.
 Flowering period: April to June
 Voucher specimen No. 57

Folk medicinal uses: It is used in diabetes, diarrhea and also acts as expectorant and sedative.

Botanical name: *Solanum surratense* Burm. f.

Local name: Manraghonay
 Habit: Herb
 Part use: Whole plant
 Flowering period: February to March
 Voucher specimen No. 58

Folk medicinal uses: The plant is expectorant, diuretic and anti-asthmatic. It is also used for stomachache, coughs, fever pains in the chest and gonorrhoea.

Sterculiaceae

Botanical name: *Helicteres isora* Linn.
 Local name: Chamyaray
 Habit: Shrub or small tree
 Part use: Flowers and seeds
 Flowering period: February to March
 Voucher specimen No. 60

Folk medicinal uses: Seeds are used for colic infections and dysentery.

Thymeleaceae

Botanical name: *Daphne mucronata* Royle
 Local name: Laighonai
 Habit: Shrub
 Part use: Fruits
 Flowering period: April to May
 Voucher specimen No. 78

Folk medicinal uses: The fruit poultice is used against rheumatism.

Ulmaceae

Botanical name: *Celtis australis* Linn
 Local name: Tagha
 Habit: Tree
 Part use: Fruits
 Voucher specimen No. 89

Folk medicinal uses: The fruits are applied in colic infections and allergy.

Urticaceae

Botanical name: *Debregeasia salicifolia* (Forssk).
 Local name: Ajlai
 Habit: Shrub
 Part use: Aerial part
 Flowering period: April to May
 Voucher specimen No. 79

Folk medicinal uses: The powdered aerial parts are mixed with mustard oil and used as an antifungal for curing skin rashes, dermatitis and eczema.

Verbenaceae

Botanical name: *Lantana camara* Linn
 Local name: Amrud gulay
 Habit: Shrub
 Part use: Whole plant
 Flowering period: April to July
 Voucher specimen No. 80

Folk medicinal uses: The plant is diaphoretic, carminative, anti spasmodic and useful for diabetic patients. Decoction is given in tetanus, rheumatism and malaria.

Violaceae

Botanical name: *Viola canescens* Wall. Ex. Roxb.
 Local name: Banafsha
 Habit: Herb
 Part use: Whole plant
 Flowering period: March to May
 Voucher specimen No. 81

Folk medicinal uses: It is used as purgative, diaphoretic, febrifuge and an anticancer.

Vitaceae

Botanical name: *Vitis Jacquemotii* R. Parker
 Local name: Gedar kwar
 Habit: Herbaceous climber
 Part use: Fruits
 Flowering period: April to May
 Voucher specimen No. 82

Folk medicinal uses: Fruits are laxatives.

CONCLUSION

The study area is endowed with a wealth of traditional uses of plants. The inhabitants of the area are very poor and have no or insufficient knowledge about proper time of collection, preservation and storage of medicinal plants. The medicinal plants are collected without any scientific approach. They uproot the herbs, cut the shrubs and large trees without any care, making their recovery very hard. Preservation (drying) is done by local inhabitants (traditional healers) by very crude forms. The women spread the plants/ plant part on the floor for 3 to 6 days for drying which are exposed and contaminated

easily. There is no proper place for storage and plants may be infected by fungi and insects. Consequently, the area faces intense deforestation, overgrazing, agricultural expansion, and soil erosion. The local people have to collect the common medicinal plants from remote forests which were once easily available close to their villages. *Acacia modesta*, *Acacia nilotica*, *Asparagus plumosus*, *Bauhinia variegata*, *Berberis lycium*, *Calotropis procera*, *Olea ferruginea*, *Pinus roxburghii*, *Phoenix dactylifera*, *Rhazya stricta*, *Viola canescens* and *Ziziphus numularia* are likely to be wiped out, if no conservation strategy is adapted for the area. Hence, there is a dire need for awareness, to educate and train the local inhabitants regarding the proper use and cultivation of available medicinal resources. In-situ and ex-situ conservation method can be practiced to avoid further depletion of rare plants. Local people can be involved to cultivate sustainable species, control regular grazing and to apply conservation strategies.

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