



Research Article

Systematic Diversity with Quantitative Study of Medicinal Weeds of Tehsil Sarai Naurang, District Lakki Marwat, KP-Pakistan

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Abstract | District Lakki Marwat is a highly rich profile and diverse flora in southern districts of Khyber Pakhtunkhwa, Pakistan. The present study was conducted during 2018-19 in Tehsil Sarai Naurang District Lakki Marwat in order to investigate the taxonomic diversity and medicinal importance of weeds flora. A total of 42 weed species belonging to 20 families were investigated from research area. The dominant families in terms of species richness were Asteraceae and Poaceae with 6 species (14.28%) each, followed by Brassicaceae and Papilionaceae with 4 species (9.52%), Apiaceae and Solanaceae with 3 species (7.14%), Amaranthaceae and Polygonaceae having 2 species (4.76%), while remaining families (Apocynaceae, Asclepiadaceae, Asphodelaceae, Chenopodiaceae, Convolvulaceae, Euphorbiaceae, Fumariaceae, Lamiaceae, Malvaceae, Oxalidaceae, Plantaginaceae and Salvadoraceae) have 1 specie (2.38%) each. Based on plant parts used, leaves were the topmost part used of 21 species (50%), followed by whole plant 18 species (42.85%), seeds of 9 species (21.42%), stem of 8 species (19.08%), root of 5 species (11.90%), latex, shoots of 2 species (4.76%) and flowers of 1 specie. The most significant number of plant species that helped alleviate digestive problems was 12 (58.57%) of the total, followed by intestinal problems with 8 species (19.04%), abdominal pain with 7 species (16.66%). Different quantitative indices like Use Value (UV), Relative Frequency Citation (RFC) and Family Important Value (FIV), were used to find out comparative significance of plant species. The species with high Used Value were *Mentha longifolia* 0.93, *Coronopus didymus* 0.90, *Sonchus asper* 0.89. *Calotropis procera* 0.22, *Euphorbia helioscopia* 0.21, *Cynodon dactylon* 0.20 are species with high RFC. The Families with high FIV were Poaceae 74.7, Asteraceae 69.9, Brassicaceae 50.7, Papilionaceae 39.7 and Solanaceae 35.6.

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Keywords | Ethnobotany, Khyber Pakhtoonkhwa, Lakki Marwat, Medicinal weeds, Sarai Naurang, Systematic diversity, Quantitatives study



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Introduction

Tehsil Sarai Naurang is located in District Lakki Marwat, Khyber Pakhtunkhwa province Pakistan, with 32°49' N latitude and 70°46' E longitude having 278 meters height from sea level. Sarai Naurang tehsil is located at northern side of district Lakki Marwat. Location of Sarai Naurang is in such a way that in the north side there is district Bannu, in the east district Karak, in the west district North Waziristan and in the south it is separated by tehsil Ghazni Khel. The overall 100% population speaking Pashto language and all are muslims (Hussain *et al.* 2016).

Different authors in different areas documented and explored the plants natural resources with respect to their medicinal values. The whole plant of weeds is mostly used for medicinal purposes. Weeds can be used for many things, but their presence in food crop cultivation is considered as pests. Ethno-medicine and their traditional knowledge is a good illustration of poor communities living in the remote areas, fighting even incurable diseases through the traditional methods and even for their livestock through these traditional herbal medicines (Raut *et al.* 2012). Medicinal plants constitute the base of health care systems in many societies. Globally, about 85% of the traditional medicines used for primary health care derived from plants (Farnsworth, 1988). Some weeds are called, "beneficial plants or herbs" as they are edible, use for food or herbal medicine. Other advantage of such beneficial herbs may be the keeping away of some insects' pests of crops (Ediriweera, 2007). Weeds are also used as medicines; however, there have been no reports of the use of wild plants as medicines in this region (Des *et al.* 2018). Weeds are still used as traditional medicinal plants and have the potential to be used as medicines (Rizki *et al.* 2019). Many herbaceous plants can be used as food, medicines and also used in religious festivals (Mesfin *et al.* 2013). Medicinal weeds not only contain nutritional potential which are vital for human health but it can be used as defense against infectious diseases. This study aims to investigate the weeds used indigenously by the local inhabitants for treatment of different diseases. The medicinal weed *Imperata cylindrica* L. is used for Tonic, cut and wounds, urodynia, hypertension, and febrifuge in Hafizabad district, Punjab-Pakistan (Umair *et al.*, 2017). The overall plant of *Oxalis corniculata* L. and leaves of *Euphorbia hirta* L. are used as traditional medicinal source. The important medicinal weeds

Avena fatua L. *Solanum nigrum* L., *Malva neglecta* Wall. *Mentha longifolia* (L.) Huds. *Rumex dentatus* L. have high potential against throat infection, heart burn, diarrhea, laxative and abdominal pain (Islam *et al.* 2006).

Materials and Methods

Geographical information was obtained from the Department of Geography, University of Peshawar. Map of the study area, note book, pencil, plant presser, newspaper, polythene bags, knife, compass and digital camera were used during research work. Plants were collected, pressed in newspapers with the help of plant presser. During field visits, interviews were taken from people of different age groups (30-45 years; 46-55 years; 56-70 years) through semi structured questionnaire to record the indigenous knowledge and ethnobotanical information about the plants. The artifact method (*ex-situ* sampling) and inventory method (*in-situ* sampling) were used for data authenticity (Thomas and Shengji, 2003). The collected weed species were dried, pressed and identified with help of available literature and various volumes of Flora of Pakistan (Ali and Nasir, 1989-1991; Ali and Qaiser, 1993-2021). The voucher specimens were numbered and deposited in Herbarium of Department of Botany, University of Peshawar.

The current research study included three quantitative indices: Family important value (FIV), Relative frequency citation (RFC) and Use Value (UV).

Family important value (FIV): It indicated the important of plant family by informants.

$$FIV = \frac{FC}{N} 100$$

N: All the informants participating in the survey
FC: the number of informers, indicating the family. (Shah *et al.*, 2020).

Relative frequency citation (RFC): The relative value of plant species identified by informants was assessed using the relative frequency of citations (RFC) (Shaheen *et al.* 2017).

$$RFC = \frac{FC}{N} (0 < RFC < 1)$$

N is total number of informants participated in the survey **FC** is the number of informants mentioning the usage of the species.

Used Value (UV): The use value (UV) was determined using the method provided by (Rokaya *et al.* 2010) in order to assess the significance of each specific plant species.

$$UV = \sum U_i / N$$

N is the sum of informants, U_i is the number of uses mentioned by each information for a given species

Results

The present research area has very high medicinal

weeds diversity. The research work was conducted during 2018-19 in Tehsil Sarai Naurang explore the medicinal diversity of weeds flora. The total of 42 weed species belonging to 20 families was investigated from research area (Table 1) The dominant famimilies with respect to species richness were Asteraceae and Poaceae with 6 species (14.28%) each, followed by Brassicaceae and Papilionaceae with 4 species (9.52%), Apiaceae and Solanaceae with 3 species (7.14%), Amaranthaceae and Polygonaceae having 2 species (4.76%), while remaining families have 1 specie (2.38%) each (Table 3; Fig. 2).

Table 1: Ethno-medicinal description of weedy medicinal plants of Tehsil Sarai Naurang, District Lakki Marwat.

S.#	Family	Species name	Local name	Habit	Part used	Ethno-medicinal uses
1	Apiaceae	<i>Ammi visnaga</i> (L.) Lam.	Lewanai gajara	Herb	Seeds	Used for wound, as diuretic
		<i>Anethum graveolens</i> L.	Sowey	Herb	Seeds, leaves	Seeds used for wound as antiseptic, used as a tonic
		<i>Torilis leptophylla</i> (L.) reichenb. f.	Jungli dhanrhia	Herb	Leaves, stem	Used for increase in animal milk production
2	Amaranthaceae	<i>Amaranthus viridis</i> (L.) Medik	Ranjaka	Herb	Leaves, shoot	Reduced diabetes rate and cholesterol level, used as pain killer and diuretic
		<i>Achyranthes aspera</i> L.	Duzaro Wash-kai	Herb	Whole Plant	Laxative, diuretic, cough, asthma and toothache
3	Apocynaceae	<i>Nerium oleander</i> L.	Surgulai	Shrub	Leaves, flowers, roots	Used for high blood pressure, digestive system and itching
4	Asclepiadaceae	<i>Calotropis procera</i> (Willd) R.Br.	Spalmaka	Shrub	Leaves, stem	latex used in asthma, cough, stomach burn and dysentery
5	Asteraceae	<i>Carthamus oxyacantha</i> M. Bieb	Kunjal	Herb	Leaves, seeds	Leaves used for milk production in cattle, seeds used for urinary swelling
		<i>Erigeron bonariensis</i> L.	Aspee ghash	Shrub	Leaves, stem, roots	Leaves used for rheumatism and wound healing
		<i>Cirsium arvense</i> (L.) Scope	Bizogee	Herb	Whole plant	Chewed for toothache
		<i>Sonchus asper</i> (L.) Hill	Thareza	Herb	Leaves, roots, latex	Used to cure warts and inflammation
		<i>Sonchus oleraceus</i> (L.) Hill	Catasaree	Herb	Leaves, roots, latex	Used for bronchial infection, digestive disturbance and tonic
		<i>Taraxacum officinale</i> Weber	Zerh gulai	Herb	Whole plant	Laxative, diuretic, constipation
6	Asphodelaceae	<i>Asphodelus tenuifolius</i> Cav.	Pazakai	Herb	Roots, leaves	Used for hair loss, antidandruff
7	Brassicaceae	<i>Eruca sativa</i> Mill.	Jamao	Herb	Leaves, seeds	Used for skin diseases, blood purification, kidney disorder, hairless and diuretic
		<i>Eruca vesicaria</i> (L.) Cav.	Salaad	Herb	Leaves, seeds	Leaves used for digestion, stomach relief and blood purification, seeds oil used for cooking
		<i>Malcolmia Africana</i> (L.) R.Br.	Khatoal	Herb	Leaves, seeds	Seeds oil used for bone pain; leaves used for abdominal relief
		<i>Coronopus didymus</i> (L.) sm.	Gand butai	Herb	Leaves, shoots	Reducing blood pressure

8	Chenopodiaceae	<i>Chenopodium murale</i> L.	Tor Bathu	Herb	Leaves, stem	Used as diuretic, tonic for liver, digestive, laxative, peptic ulcer and dyspepsia
9	Convolvulaceae	<i>Convolvulus arvensis</i> L.	Perkhatun	Herb	Whole plant	Treat skin ulcer, wounds, swellings, abdominal pain, also used for muscular weakness
10	Euphorbiaceae	<i>Euphorbia helioscopia</i> L.	Parparai	Herb	Whole plant	Root is anthelmintic, cathartic, seeds mixed with paper mint or honey used against cholera
11	Fumariaceae	<i>Fumaria indica</i> (Hausskn.) Pugsley	Spanda	Herb	Leaves, stem, seeds	Used as a exorcise and for stomach pain
12	Lamiaceae	<i>Mentha longifolia</i> L.	Velanai	Herb	Leaves, stem	Used for digestive, abdominal pain, cough, cold and asthma
13	Malvaceae	<i>Malva neglecta</i> Wall.	Pochkai	Herb	Whole plant	Highly medicinal, nutritive and digestive
14	Oxalidaceae	<i>Oxalis corniculata</i> L.	Malkhoza	Herb	Seeds	Seeds used for backache and joint pain
15	Papilionaceae	<i>Astragalus scorpiurus</i> Bunge	Kasterai	Herb	Leaves	Very highly medicinal (Ethnoveterinary)
		<i>Melilotus indica</i> (L.) All.	Shinghzai	Herb	Whole plant	Used for stomach and heart burn
		<i>Medicago polymorpha</i> L.	Kundey	Herb	Leaves, stem	Aphrodisiac
		<i>Vicia sativa</i> L.	Jangli mattar	Herb	Whole plant	Fodder, fruit are used in pickle, leaves used for digestive purpose
16	Polygonaceae	<i>Emex spinosus</i> (L.) Campd	Perkhatun	Herb	Leaves, stem	Used for worms killing in cattle, highly medicinal
		<i>Rumex dentatus</i> L.	Turukai	Herb	Whole plant	Stomach and abdominal relief
17	Plantaginaceae	<i>Plantago lanceolata</i> L.	Speghol	Herb	Seeds, leaves	Used for abdominal pain and dhirrea
18	Poaceae	<i>Cynodon dactylon</i> (L.) Pers	Drab	Herb	Whole plant	Used to cure fresh wounds, chronic dhirrea, rheumatism and diuretic
		<i>Avena fatua</i> L.	Kiranrha	Herb	Whole plant	Used as diuretic, anti-inflammatory and wound healing
		<i>Avena sativa</i> L.	Jaudar	Herb	Leaves, Seeds	Leaves are used for skin diseases, tonic and antispasmodic
		<i>Imperata cylindrica</i> L.	Sermaghza	Herb	Whole plant	Used as diuretic, tonic, wound healing, nose bleeding and digestive disorders
		<i>Cymbopogon jwarancusa</i> (Jones) Schult.	Sargarai	Herb	Whole Plant	Used for cough, cold, fever, stomach burn and vomiting
		<i>Rostraria cristata</i> (L.) Tzvelev.	Washkai	Herb	Whole Plant	Used for animal abdominal pain, increase milk production
		<i>Salvadora oleoides</i> Decne.	Plaman	Shrub	Whole plant	Used for mouth diseases and cleanliness
20	Solanaceae	<i>Physalis divaricata</i> D. Don	Sqand	Herb	Whole plant	Seeds used for high fever, roots used for animal, dhirrea and abdominal pain
		<i>Solanum nigrum</i> L.	Mamanrha	Herb	Whole plant	Used for rheumatism, skin diseases, cough and laxative
		<i>Solanum surattense</i> L.	Maraghoon	Herb	Whole plant	Seeds and fruit cover used for abdominal pain, fruit used for digestion and roots for dhirrea

Table 2: *Phytogeography of weedy medicinal plants of Tehsil Sarai Naurang, District Lakki Marwat.*

S.#	Family	Spp no.	Species name	Flowering & fruiting phenology	Collection site	Distribution/Location	
						Khyber Pakhtunkhwa	Pakistan
1	Apiaceae	1	<i>Ammi visnaga</i> (L.) Lam.	Apr-May	Nawab Kaly (Lakki Marwat)	Swat, Dir, Peshawar, Charsada, Sawabi, Bannu, Lakki Marwat, Kohat	Murree, Zhob, Ziarat, Rawalpindi, Islamabad, Lahore
		2	<i>Anethum graveolens</i> L.	Apr-May	Kot Kashmir (Lakki Marwat)	Peshawar, Mardan, Charsada, Dir (L), Bannu, Lakki Marwat, Kohat	Karachi, Islamabad, D. I Khan, Mianwali, Jhelum
		3	<i>Torilis leptophylla</i> (L.) reichenb.f.	Apr-May	Kot Kashmir (Lakki Marwat)	Hazara, Peshawar, Bannu, Lakki Marwat, Kohat, D. I Khan, Bajaur, Dir,	Islamabad, Rawalpindi, Attock, Murre
2	Amaranthaceae	4	<i>Amaranthus viridis</i> (L.) Medik	June-July	Kot Kashmir, Sparli kalai, (Lakki Marwat)	Charsadda, Swabi, Swat, Peshawar, Bannu, Lakki Marwat, Kohat, D. I Khan, Karak, Chitral, Malakand, Bannu	Chiniot, Sailkot,
		5	<i>Achyranthes aspera</i> L.	Feb-Apr	Nawab Kaly, Kot Kashmir, Gandhi Khan Khel, (Lakki Marwat)	Charsada, Bajaur, Dir, Swat	Kamber (Sindh), Nara
3	Apocynaceae	6	<i>Nerium oleander</i> L.	Mar-Apr	Kot Kashmir, Bahawal Klai (Lakki Marwat)	Swat, Dir, Bajaur, Malakand	Khuzdar, Kalat, Poonch,
4	Asclepiadaceae	7	<i>Calotropis procera</i> (Willd)R.Br.	Throughout Year	Kot Kashmir, Bagi Adam Khan (Lakki Marwat)	Peshawar, Charsada, Sawabi, Mardan, Bajaur, Dir, Malakand, Kohat, D.I. Khan	Rawalpindi, Chakwal, Attock, Murre, Abbottabad
5	Asteraceae	8	<i>Carthamus oxyacantha</i> M. Bieb	May-June	Chandu Khel, Jangi khan klai, passani, Kot Kashmir (Lakki Marwat)	Malakand, Dir, Swat, Buner, Charsadda, Swabi, Peshawar, Kohat, Karak, Bannu, Lakki Marwat, D. I Khan	Islamabad, Mainwale
		9	<i>Cirsium arvense</i> (L.) Scop	Apr-May	Kot Kashmir (Lakki Marwat)	Bajaur, Dir, Swat, Malakand, Charsada, Mardan, Peshawar, Kohat, Bannu, Waziristan	Bhimbar Kashmir, Kasur, Peshawar
		10	<i>Erigeron bonariensis</i> L.	Mar-May	Fields along the sides of river tochi (Kot Kashmir) Lakki Marwat)	Bajaur, Dir, Swat, Malakand, Charsada, Chitral Peshawar, Kohat, Bannu, Kurram	Potohar, Kashmir, Mandi Bahaudin
		11	<i>Sonchus asper</i> (L.) Hill	Apr-June	Kot Kashmir, Jangi Khan klai, Bahawal klai (Lakki Marwat)	Bajaur, Dir, Swat, Malakand, Charsada, Mardan, Peshawar, Kohat, Bannu, Waziristan, Kaghan	Kasur, Islamabad,
		12	<i>Sonchus oleraceus</i> (L.) Hill	Apr-June	Kot Kashmir, Jangi Khan klai, Bahawal klai (Lakki Marwat)	Bajaur, Dir, Swat, Malakand, Charsada, Mardan, Peshawar, Kohat, Bannu, Waziristan	Chang manga, Rawalpindi, Bahawalnagar
		13	<i>Taraxacum officinale</i> Weber	Apr-June	Kot Kashmir (Lakki Marwat)	Mardan, Mansehra	Poonch valley, Kashmir,
6	Asphodelaceae	14	<i>Asphodelus tenuifolius</i> Cav.	Nov-Apr	Fields along the sides of river tochi (Kot Kashmir) Lakki Marwat)	D. I Khan, Bannu, Tank, Lakki Marwat, Karak, Nowshera, Peshawar.	Islamabad, Rawalpindi, Jhelum, Attock

7	Brassicaceae	15	<i>Eruca sativa</i> Mill.	Apr-June	Kot Kashmir (Lakki Marwat)	Mardan, Sawabi, Lakki marwat, Bannu, karak, Charsada, Lower Dir.	Jhelum, Islamabad, Rawalpindi,
		16	<i>Eruca vesicaria</i> (L.) Cav.	Apr-June	Kot Kashmir (Lakki Marwat)	Mardan, Sawabi, Lakki marwat, Bannu, karak, Charsada, Lower Dir.	Jhelum, Rawalpindi, South Punjab
		17	<i>Malcolmia africana</i> (L.) R.Br.	Mar-June	Kot Kashmir (Lakki Marwat)	Mardan, Charsada, Dir, Swat, Nowshera, Malakand, D.I. Khan, Bannu	Rawalpindi, Quetta, Mianwali, Hafizabad
		18	<i>Coronopus didymus</i> (L.) sm.	Mar-June	Machan Khel, Kot Kashmir (Lakki Marwat)	Charsada, Bajaur, Sawabi, Peshawar,	Mirpur, Sukkar, Lahore, Kasur, Nankasahib
8	Chenopodiaceae	19	<i>Chenopodium murale</i> L.	Jan-July	Kot Kashmir (Lakki Marwat)	Peshawar, Tank	Mankial, Quetta, Kasur,
9	Convolvulaceae	20	<i>Convolvulus arvensis</i> L.	Throughout Year	Kot Kashmir (Lakki Marwat)	Chitral, Kaghan, Parachinar, Peshawar, Bajaur,	Quetta, Rawalpindi, Jhelum, Mirpur
10	Euphorbiaceae	21	<i>Euphorbia helioscopia</i> L.	Jan-July	Kot Kashmir (Lakki Marwat)	Bajaur, Dir, Swat, Charsada, Peshawar, Bannu, Kohat,	Muree, Islamabad, Hasan abdal
11	Fumariaceae	22	<i>Fumaria indica</i> (Hausskn.) Pugsley	Mar-June	Kot Kashmir (Lakki Marwat)	Bajaur, Swat, Charsada, Peshawar, Bannu, Kohat. North Waziristan	Rawalpindi, Attock Islamabad
12	Lamiaceae	23	<i>Mentha longifolia</i> L.	May-Nov	Kot Kashmir, Gandi, Sparli kalai (Lakki Marwat)	Bajaur, Swat, Charsada, Peshawar, Bannu, Kohat. North Waziristan	Jhelum, Islamabad, Rawalpindi, Attock, Lahore
13	Malvaceae	24	<i>Malva neglecta</i> Wall.	May-July	Kot Kashmir (Lakki Marwat)	Bajaur, Dir, Swat, Kohat, Mohmand, Abbottabad,	Rawalpindi, Jhelum, Chakwal
14	Oxalidaceae	25	<i>Oxalis corniculata</i> L.	Mar-Dec	Kot Kashmir, Machan Khel (Lakki Marwat)	Bajaur, Dir, Swat, Kohat, Mohmand, Abbottabad,	Quetta, Rawalpindi, Jhelum, Chakwal
15	Papilionaceae	26	<i>Astragalus scorpiurus</i> Bunge	Mar-Apr	Nawab Kaly, Kot Kashmir (Lakki Marwat)	Bajaur, Bannu, Peshawar	Kashmir, Gilgit-Baltistan
		27	<i>Melilotus indica</i> (L.) All.	Mar-Aug	Shah Tora, Kot Kashmir, Bahawal kalai (Lakki Marwat)	Charsada	Baluchistan, Kausar, Lahore
		28	<i>Medicago polymorpha</i> L.	Mar-May	Kot Kashmir (Lakki Marwat)	Malakand, Swat, Nowshera, Buner	Kausar, Sakkur
		29	<i>Vicia sativa</i> L.	Mar-Apr	Kot Kashmir, Passani (Lakki Marwat)	Lakki Marwat, Chitral, Malakand	Kashmir, Baluchistan, Rawalpindi, Jhelum
16	Polygonaceae	30	<i>Emex spinosus</i> (L.) Campd	Mar-May	Kot Kashmir (Lakki Marwat)	Malakand, Nowshera, Swabi, Dir, Charsada, Abbottabad.	Kashmir, Faridabad
		31	<i>Rumex dentatus</i> L.	May-June	Kot Kashmir (Lakki Marwat)	Bajaur, Dir, Abbottabad, D.I. Khan, Galiyat, Sawabi	Kashmir, Kausar
17	Plantaginaceae	32	<i>Plantago lanceolata</i> L.	May-June	Kot Kashmir (Lakki Marwat)	Peshawar, Mallam Jaba, Nowshera	Rawalkot, Murree, Sudhan Gali, Baluchistan,
18	Poaceae	33	<i>Cynodon dactylon</i> (L.) Pers	Throughout Year	Kot Kashmir, Gandi (Lakki Marwat)	Peshawar, Swat, Dir, Bajaur, Nowshera, Swabi, Bannu, Buner	Kashmir, Murree, Baluchistan, Rawalpindi,

		34	<i>Avena fatua</i> L.	Mar-Apr	Wheat fields of Kot Kashmir (Lakki Marwat)	Peshawar, D.I. Khan, Bannu	Sarghoda, Toba Tek Singh, Bahawalpur
		35	<i>Avena sativa</i> L.	Mar-Apr	Kot Kashmir (Lakki Marwat)	Kohat, Bajaur,	Faisalabad, Sarghoda, Potohar, Mansehra
		36	<i>Imperata cylindrica</i> L.	Apr-June	Kot Kashmir (Lakki Marwat)	Bannu, Karak, Nowshera	Bahawalnagar, Bahawalpor, Potohar,
		37	<i>Cymbopogon jwarancusa</i> (Jones) Schult.	June-July	Kot Kashmir (Lakki Marwat)	Pubbi, Nowshera	Baluchistan, Cholisthan, Thal, Duki, Potohar,
		38	<i>Rostraria cristata</i> (L.) Tzvelev.	Apr-July	Kot Kashmir (Lakki Marwat)	Bannu, Sawabi, Sari Naurang, Mohmand	Balochistan
19	Salvadoraceae	39	<i>Salvadora oleoides</i> Decne.	Mar-June	Kot Kashmir (Lakki Marwat)	Karak, North Waziristan, D. I. Khan,	Karachi Sindh, Bahawalpur,
20	Solanaceae	40	<i>Physalis divaricata</i> D. Don	Oct-Nov	In Fields along the bank of river Tochi	Sawabi, Dir, Sawabi, Malakand	Sibi, Karachi,
		41	<i>Solanum nigrum</i> L.	Apr-June	Kot Kashmir (Lakki Marwat)	Bajaur, Dir, Swat, Malakand, Abbottabad	Mianwali, Sibi, Kashmir, Islamabad, Muzafarabad, Hafizabad
		42	<i>Solanum surattense</i> L.	Throughout Year	Kot Kashmir (Lakki Marwat)	Bajaur, Peshawar, Swat, Bannu	Potohar, Cholisthan, Mianwali, Hafizabad

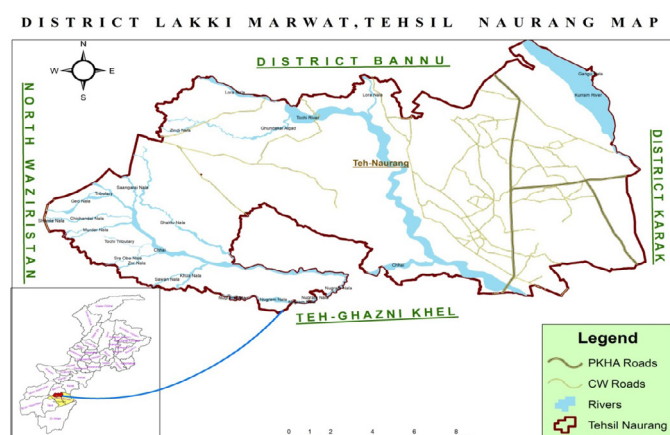


Figure 1: Map of the study area.

Based on plant parts used, leaves were the topmost part used of 21 species (50%), followed by whole plant 18 species (42.85%), seeds of 9 species (21.42%), stem of 8 species (19.08%), root of 5 species (11.90%), latex, shoots of 2 species (4.76%) and flowers of 1 specie (Table 4; Fig. 4).

Indigestion were solved by highest numbers of weeds with 12 species (58.57%), followed by intestinal problems with 8 species (19.04%), abdominal pain with 7 species (16.66%), skin diseases with 5 species (11.90%), while kidney, muscular, respiratory, fever

and diabetes were treated by 4, 3, 2 and 1 specie each respectively (Table 5; Fig 5).

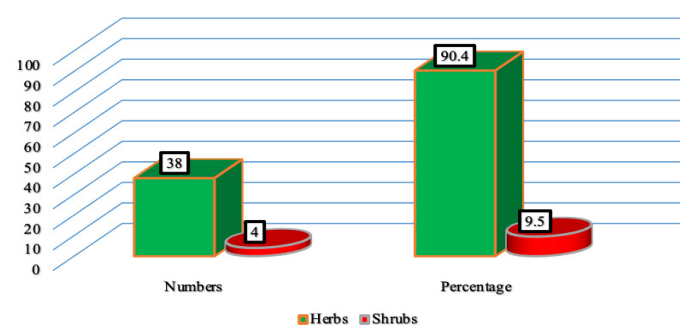


Figure 2: Graph representing numbers and percentages of weedy families.

Table 3: Numbers and percentage major families of weedy medicinal plants.

S.No	Family	No. Species	Percentage
1	Asteraceae	6	14.28
2	Poaceae	6	14.28
3	Brassicaceae	4	9.52
4	Papilionaceae	4	9.52
5	Apiaceae	3	7.14
6	Solanaceae	3	7.14
7	Amaranthaceae	2	4.76
8	Polygonaceae	2	4.76

Table 4: Summaries of weedy medicinal plants of Tehsil Sarai Naurang.

S. No	Families/Habits/Part Used	Numbers	Percentage
A. 1	Families	20	
2	Herbs	38	90.4
3	Shrubs	4	9.5
B 1	Leaves	21	50
2	Whole plant	18	42.85
3	Seeds	9	21.42
4	Stem	8	19.04
5	Roots	5	11.90
6	Latex	2	4.76
7	Shoots	2	4.76
8	Flowers	1	2.38

The demographics of the respondents

146 participants in all were interviewed regarding the local flora in the study area. Among them, male were 138 and female were eight. People from different age groups shared their own knowledge about the plants and the region (Table 7).

Table 5: Numbers and percentage of diseases treated.

S.No	Disease treated	Numbers	Percentage
1	Digestive problems	12	58.57
2	Intestinal problems	8	19.04
3	Abdominal pain	7	16.66
4	Skin problems	5	11.90
5	Kidney problems	4	9.52
6	Muscular pain	4	9.52
7	Respiratory problems	3	7.14
8	Fever	2	4.76
9	Diabetes	1	2.38

Table 6: Quantitative indices of weedy medicinal plants of Tehsil Sarai Naurang, District Lakki Marwat.

Family/ Species Name	Part used	Ethno-medicinal uses	FC	RFC	UV	FIV
Apiaceae						32.9
<i>Ammi visnaga</i> (L.) Lam.	Seeds	Used for wound, as diuretic	10	0.07	0.7	
<i>Anethum graveolens</i> L.	Seeds, leaves	Seeds used for wound as antiseptic, used as a tonic	14	0.10	0.79	
<i>Torilis leptophylla</i> (L.) reichenb. f.	Leaves, stem	Used for increase in animal milk production	24	0.16	0.71	
Amaranthaceae						29.4
<i>Amaranthus viridis</i> (L.) Medik	Leaves, shoot	Reduced diabetes rate and cholesterol level, used as pain killer and diuretic	29	0.20	0.83	
<i>Achyranthes aspera</i> L.	Whole plant	Laxative, diuretic, cough, asthma and toothache	14	0.10	0.71	
Apocynaceae						11.0
<i>Nerium oleander</i> L.	Leaves, flowers, roots	Used for high blood pressure, digestive system and itching	16	0.11	0.69	
Asclepiadaceae						21.9
<i>Calotropis procera</i> (Willd) R.Br.	Leaves, stem	latex used in asthma, cough, stomach burn and dysentery	32	0.22	0.84	
Asteraceae						69.9
<i>Carthamus oxyacantha</i> M. Bieb	Leaves, seeds	Leaves used for milk production in cattle, seeds used for urinary swelling	21	0.14	0.67	
<i>Erigeron bonariensis</i> L.	Leaves, stem, roots	Leaves used for rheumatism and wound healing	14	0.10	0.64	
<i>Cirsium arvense</i> (L.) Scop	Whole plant	Chewed for toothache	11	0.08	0.64	
<i>Sonchus asper</i> (L.) Hill	Leaves, roots, latex	Used to cure warts and inflammation	19	0.13	0.89	
<i>Sonchus oleraceus</i> (L.) Hill	Leaves, roots, latex	Used for bronchial infection, digestive disturbance and tonic	18	0.12	0.72	
<i>Taraxacum officinale</i> Weber	Whole plant	Laxative, diuretic, constipation	19	0.13	0.84	
Asphodelaceae						5.5
<i>Asphodelus tenuifolius</i> Cav.	Roots, leaves	Used for hair loss, antidandruff	8	0.05	0.75	
Brassicaceae						50.7

<i>Eruca sativa</i> Mill.	Leaves, seeds	Used for skin diseases, blood purification, kidney disorder, hairless and diuretic	16	0.11	0.75
<i>Eruca vesicaria</i> (L.) Cav.	Leaves, seeds	Leaves used for digestion, stomach relief and blood purification, seeds oil used for cooking	19	0.13	0.74
<i>Malcolmia Africana</i> (L.) R.Br.	Leaves, seeds	Seeds oil used for bone pain; leaves used for abdominal relief	18	0.12	0.67
<i>Coronopus didymus</i> (L.) sm.	Leaves, shoots	Reducing blood pressure	21	0.14	0.90
Chenopodiaceae			15.1		
<i>Chenopodium murale</i> L.	Leaves, stem	Used as diuretic, tonic for liver, digestive, laxative, peptic ulcer and dyspepsia	25	0.17	0.88
Convolvulaceae			18.5		
<i>Convolvulus arvensis</i> L.	Whole plant	Treat skin ulcer, wounds, swellings, abdominal pain, also used for muscular weakness	27	0.18	0.85
Euphorbiaceae			21.2		
<i>Euphorbia helioscopia</i> L.	Whole plant	Root is anthelmintic, cathartic, seeds mixed with paper mint or honey used against cholera	31	0.21	0.81
Fumariaceae			14.4		
<i>Fumaria indica</i> (Hausskn.) Pug-sley	Leaves, stem, seeds	Used as a exorcise and for stomach pain	21	0.14	0.86
Lamiaceae			19.2		
<i>Mentha longifolia</i> L.	Leaves, stem	Used for digestive, abdominal pain, cough, cold and asthma	28	0.19	0.93
Malvaceae			18.5		
<i>Malva neglecta</i> Wall.	Whole plant	Highly medicinal, nutritive and digestive	27	0.18	0.85
Oxalidaceae			16.4		
<i>Oxalis corniculata</i> L.	Seeds	Seeds used for backache and joint pain	24	0.16	0.88
Papilionaceae			39.7		
<i>Astragalus scorpiurus</i> Bunge	Leaves	Very highly medicinal (Ethnoveterinary)	17	0.12	0.76
<i>Melilotus indica</i> (L.) All.	Whole plant	Used for stomach and heart burn	12	0.08	0.75
<i>Medicago polymorpha</i> L.	Leaves, stem	Aphrodisiac	14	0.10	0.5
<i>Vicia sativa</i> L.	Whole plant	Fodder, fruit are used in pickle, leaves used for digestive purpose	15	0.10	0.73
Polygonaceae			25.3		
<i>Emex spinosus</i> (L.) Campd	Leaves, stem	Used for worms killing in cattle, highly medicinal	11	0.08	0.82
<i>Rumex dentatus</i> L.	Whole plant	Stomach and abdominal relief	26	0.18	0.81
Plantaginaceae			13.7		
<i>Plantago lanceolata</i> L.	Seeds, leaves	Used for abdominal pain and dhirrea	20	0.14	0.85
Poaceae			74.7		
<i>Cynodon dactylon</i> (L.) Pers	Whole plant	Used to cure fresh wounds, chronic dhirrea, rheumatism and diuretic	29	0.20	0.83
<i>Avena fatua</i> L.	Whole plant	Used as diuretic, anti-inflammatory and wound healing	17	0.12	0.82
<i>Avena sativa</i> L.	Leaves, Seeds	Leaves are used for skin diseases, tonic and antispasmodic	19	0.13	0.63
<i>Imperata cylindrica</i> L.	Whole plant	Used as diuretic, tonic, wound healing, nose bleeding and digestive disorders	12	0.08	0.75
<i>Cymbopogon jwarancusa</i> (Jones) Schult.	Whole	Used for cough, cold, fever, stomach burn and vomiting	18	0.12	0.61
<i>Rostraria cristata</i> (L.) Tzvelev.	Whole plant	Used for animal abdominal pain, increase milk production	14	0.10	0.57
Salvadoraceae			21.2		

<i>Salvadora oleoides</i> Decne.	Whole plant	Used for mouth diseases and cleanliness	15	0.10	0.6
<i>Physalis divaricata</i> D. Don	Whole plant	Seeds used for high fever, roots used for animal, dhirrea and abdominal pain	16	0.11	0.69
Solanaceae					35.6
<i>Solanum nigrum</i> L.	Whole plant	Used for rheumatism, skin diseases, cough and laxative	26	0.18	0.88
<i>Solanum surattense</i> L.	Whole plant	Seeds and fruit cover used for abdominal pain, fruit used for digestion and roots for dhirrea	26	0.18	0.85

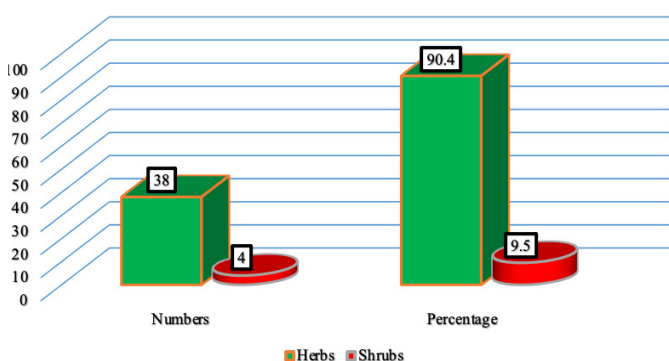


Figure 3: Graph representing numbers and percentages of plant habits

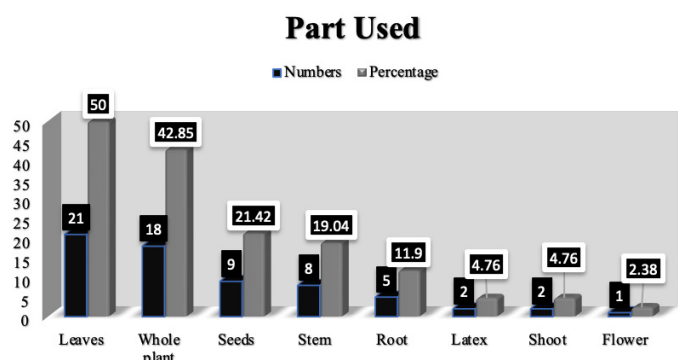


Figure 4: Graph representing parts of plants used.

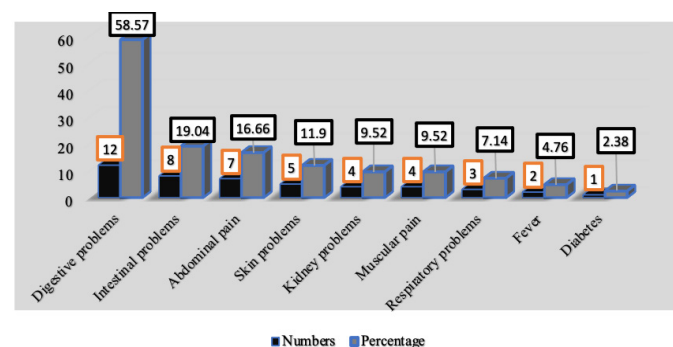


Figure 5: Graph representing numbers and percentages of diseases treated.

Quantitative indices

Use Value (UV), Relative Frequency Citation (RFC) and Family Importance Value (FIV) were among the parameters used to statistically evaluate indigenous knowledge and ascertain the informants' quantitative protocol regarding the use of native plants.

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Table 7: Demographic table of informants.

Factor	Category	No.
Gender	Male	138
	Female	8
Age	<35	9
	25-35	22
	35-45	35
	45-65	62
	>60	18
Occupation	Employees	27
	Farmer	53
	Labors	17
	Herbal Practitioner	49

Used Value (UV)

In the current study the UV value ranged from 0.5 to 0.93. *Medicago polymorpha* is the species with Lowest UV (0.5) value. The species with high Used Value were *Mentha longifolia* 0.93, *Coronopus didymus* 0.90, *Sonchus asper* 0.89, *Chenopodium murale* 0.88, *Solanum nigrum* 0.88, *Oxalis corniculata* 0.88 and *Fumaria indica* 0.86.

Relative Frequency Citation (RFC)

In the present study the RFC value ranged from 0.5 to 0.22. *Asphodelus tenuifolius* has the lowest RFC Value (0.5). The species with high RFC were *Calotropis procera* 0.22, *Euphorbia helioscopia* 0.21, *Cynodon dactylon* 0.20, *Amaranthus viridis* 0.20 and *Mentha longifolia* 0.19.

Family Important Value (FIV)

In the current study FIV value ranged from 5.5 to 74.7. Asphodelaceae has the family with the lowest FIV value (5.5). The Families with high FIV were Poaceae 74.7, Asteraceae 69.9, Brassicaceae 50.7, Papilionaceae 39.7 and Solanaceae 35.6.

Discussions

The weeds divers' profile is reported from wide range

of Pakistan (Jakhar *et al.* 2005). The research area has been largely overlooked, and there has been inadequate documentation of the local communities' knowledge about plants and their uses. A review of the literature reveals that there are no research studies available on research area. The current result about dominant family in line with Ahmad and Dastagir (2023); Elfrida *et al.* (2021); Hosseini *et al.* (2021); Mechaala *et al.* (2022). Our results are also in line with (Abat *et al.* 2017) in which they treated the rheumatism and kidney disorders by some common medicinal weeds. Similar result obtained by (Rizki *et al.* 2019) in which they utilize *Euphorbia hirta* (L.) and *Mimosa pudica* (L.) for respiratory disorder Asthma. According to their proportional importance, plant species with more references typically have a greater UV than those with less mentions (Katiri *et al.*, 2017). A lower Use Value indicates a lack of knowledge about the particular plant species among the informants (Ashfaq *et al.*, 2019). In a particular area, it sheds light on the importance of locally recognised plant species. Assists in evaluating the relative significance of several plant species in the surrounding flora (Malik *et al.*, 2019). Plants with high RFC values are well-known and well-liked by the locals in the vicinity. The plants with low RFC values are not particularly well-known or preferred, among the locals living in the area (Ahmad *et al.*, 2017). By evaluating the relative frequency of citations, the utility of the plant is ascertained (Cordero *et al.*, 2022). The plant family's FIV value is determined by how many species are present and how those species are used locally (Chaachouay *et al.*, 2019).

Author's Contribution

Tariq Zaman designed and carried out the research. Both Tariq Zaman and Fawad Khan were collected the data and did fieldwork. Atta Ur Rahman provided logistical support, while Alia Mehsud performed the data analysis. Sajjad Ahmad wrote the manuscript. Muskaan Zaman and Sumaira Noor conducted the literature review necessary for writing the manuscript.

Novelty Statement

Previously, there is no research work done on weeds medicinal in this research area tehsil Sarai Naurang, district Lakki Marwat, Pakistan. Additionally, a novel approach was employed by applying quantitative indices to analyze the collected data, providing new insights into the medicinal potential of these weeds.

Conflict of interest

The authors have declared no conflict of interest.

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