Journal of Rural Development and Agriculture (2017) 2(1): 41-56

ORIGINAL PAPER

Ethnomedicinal uses of plants for blood purification in disitrict Swabi, Khyber Pakhtunkhwa, Pakistan

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Key Message The present study represents the first ethnobotanical study to record the indigenous knowledge of district Swabi about the use of sixty-six medicinal plants for blood purification.

ABSTRACT Medicinal plants act as a very important and accessible source of blood purification in the rural communities of district Swabi, Pakistan. Current study represents the first ethnobotanical study of district Swabi to keep the record of medicinal plants to be used as blood purification. Approximately, 190 informants including local people (88.95%) and local health practitioners (LHPs) (11.5%) were interviewed for ethno-medicinal data documentations using semi structured interviews. Quantitative ethno botanical indices like frequency citation (FC), relative frequency citation and family importance value (FIV) were used to analyze the data. Total 66 medicinal plants belonging to 41 families and 63 different genera have been reported as blood purifying plants. Results indicated that Zygophyllaceae, Asteraceae and Solanaceae are families with more number of species (each have 4 sub-species), herbs were documented as dominant life form (71%). Relative frequency citation value ranges from 0.11- 0.95 in the current study. *Azadirachta indica* A. Juss., *Fumaria indica* (Hausskn.) Pugsley, *Cuscuta reflexa* Roxb, *Mimosa pudica* Mill. and *Melia azedarach* are the mostly cited blood purifying plant species. Approximately 50 plant species were reported as blood purifying plant in district Swabi. The ethnobotanical information demonstrated in this study to be useful for a high level of diversity of medicinal plants. The study disclosed the popular knowledge of medicinal plants and their use for blood purification which is still alive in the study area. New medicinal plants reported will provide new research topics for chemical and activity studies.

Key words: Ethno botany, Blood purifying medicinal plants, Swabi, Pakistan

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To cite this article as: Rozina, Ahmad, M., Zafar, M., Qasim, M., & Zainulabidin, S. (2017). Ethnomedicinal uses of plants for blood purification in district Swabi, Khyber Pakhtunkhwa, Pakistan. *Journal of Rural Development and Agriculture 2*(1), 41-56

INTRODUCTION

Medicinal plants are used for curing and healing throughout the history of human beings and have been transferred from generation to generation (Perumal et al., 1998; Pieroni & Quave, 2005; Perumal & Ignacimuthu, 2000; Napar et al., 2012; Jan et al., 2015; Qasim et al., 2016). About eighty percent population of the word relies on plant remedies for their primary health (Riaz Ullah et al., 2010). Medicinal plants are main sources to cure most of the diseases practiced by herbal pharmaceuticals (Hamayun 2005; Rehecho et al., 2011). Various surveys have been conducted in different communities of the world (Kargoglu, et al., 2008; Ratnam & Raju 2008; Jamila & Mostafa, 2014). In Pakistan, ethnobotany is maturing gradually, and it is receiving attention of the people for good health (Bhatti et al., 2001; Qureshi, 2002; Khan & Khatoon, 2004). In Pakistan, about 400–600 medicinal plants have been listed by various reporters being practiced traditionally by the herbalists (Gupta et al., 1999; Bhatti et al., 2001; Hamayun, 2005; Qureshi & Bhatti, 2009; Qureshi et al., 2009; Shinwari & Qaiser, 2011; Bahadur, 2012; Abbasi et al., 2013; Ahmad et al., 2014).

Ethnobotany refers to people and their forest interaction defining an area of ecology necessary for rural development (Beg, 1978). Plants can be considered as biological factories for the production of various medicinal compounds. A number of toxins, microbes and other dangerous compounds are introduced in the blood stream of our body by our diet and the external environment. The removal of these toxins from the blood flow by various medicinal compounds is known as blood purification (Suzuki & Hirasawa, 2016).

Cleansing of blood is a safe way to improve immunity, prevent heart diseases, improve overall health and fight cancer. Current study aimed at documentation of indigenous knowledge of the local people regarding blood purifying plants of district Swabi, Pakistan and its compilation by applying quantitative index information (QII), relative frequency citation (RFC) and family importance value (FIV) to compare ethnobotanical data.

MATERIALS AND METHODS

Study area

District Swabi is located at 34° 7', 48" North and 72° 28', 11" East of Khyber Pakhtoon Khwa province of Pakistan sharing boundaries with river Indus (Fig. 1). It has alluvial fertile soil supporting rich phytodiversity. However, original plant cover has been prohibited by extreme biotic and abiotic stresses. District Swabi has severe climate. Rise in temperature is observed from May to September. Frequent dust storms at night are detected during May and June. A high raise in temperature i.e. 41.5 °C happens in the month of June. Decrease in phytodiversity, increase in soil errosion and soil compactness are resultants of these factors (Lyaruu, 2010). Disorganized usage of vegetation caused degradation to phytodiversity (Chaughtai et al., 1989). The valuable medicinal plants and indigenous knowledge are losing day by day in the area. Several vegetation studies were conducted in the past in district Swabi and other parts of KPK, Pakistan (Hussain & Taj-Malook, 1984; Chaughtai et al., 1989; Hussain et al., 1995; Heinrich et al., 2009). Dominant plant species of district Swabi include *Dalbergia sissoo*, *Melia azedarach*, *Ziziphus nummularia*, *Acacia modesta*, *Morus nigra*, *Morus alba*, *Calotropis procera, Cynodon dactylon, Cyperus rotundus* and *Treibulis rerristris.*

Socioeconomic conditions of the area

Approximately 85 percent of the population depends on farming. The cash crop of Swabi is tobacco. Other important crops are sugarcane, maize and wheat. Citrus fruits grow well in this area along with apricot, peaches and watermelons. Swabi is considered as the second district of KPK with high literary rate (70%). Although there are government health care centers, still local people practice medicinal plant remedies for curing diseases. There are a number of herbalists or hakims whom are visited and trusted by local people for the treatment of diseases. Some of these are very experienced and professional.

Data collection

The study was conducted during 2014-2015 using the methods of Heinrich et al. (2009). The plant specimens (66) were collected from the selected site. During this study, 190 informants, 435 locals and 15 traditional healers were interviewed. Before starting interviews, informant consent (IC) was obtained. The plant specimens were collected, dried, preserved and mounted on herbarium sheets using techniques suggested by Jain and Rao (1977). Preserved specimens were then identified with the assistance of Dr. Mushtaq Ahmad, Associate Professor, Department of Plant Sciences, Quaid- i- Azam University Islamabad, Pakistan and Flora of Pakistan. Preserved specimens were collected in the Herbarium of Pakistan, Quaid-i-Azam University, Islamabad. Ethnobotanical data were collected through semi-structured interviews and free listing open ended questions with some key witnesses as reported by Ghorbani et al. (2011). The views were required to expressive knowledge about the plants in the area such as where they grew and how they were used. Edwards et al. (2005) method was used to design questionnaire containing both open and closed ended questions on the use and method of preparation of ethnobotanicals and socioeconomic characteristics (age, ethnicity, spiritual opinion, nationality, education and occupation) of the local people were conducted during 2014-2015. Other information like plant name (both local and scientific), respective family, living habitat, nature, habit and relative abundance were also documented.

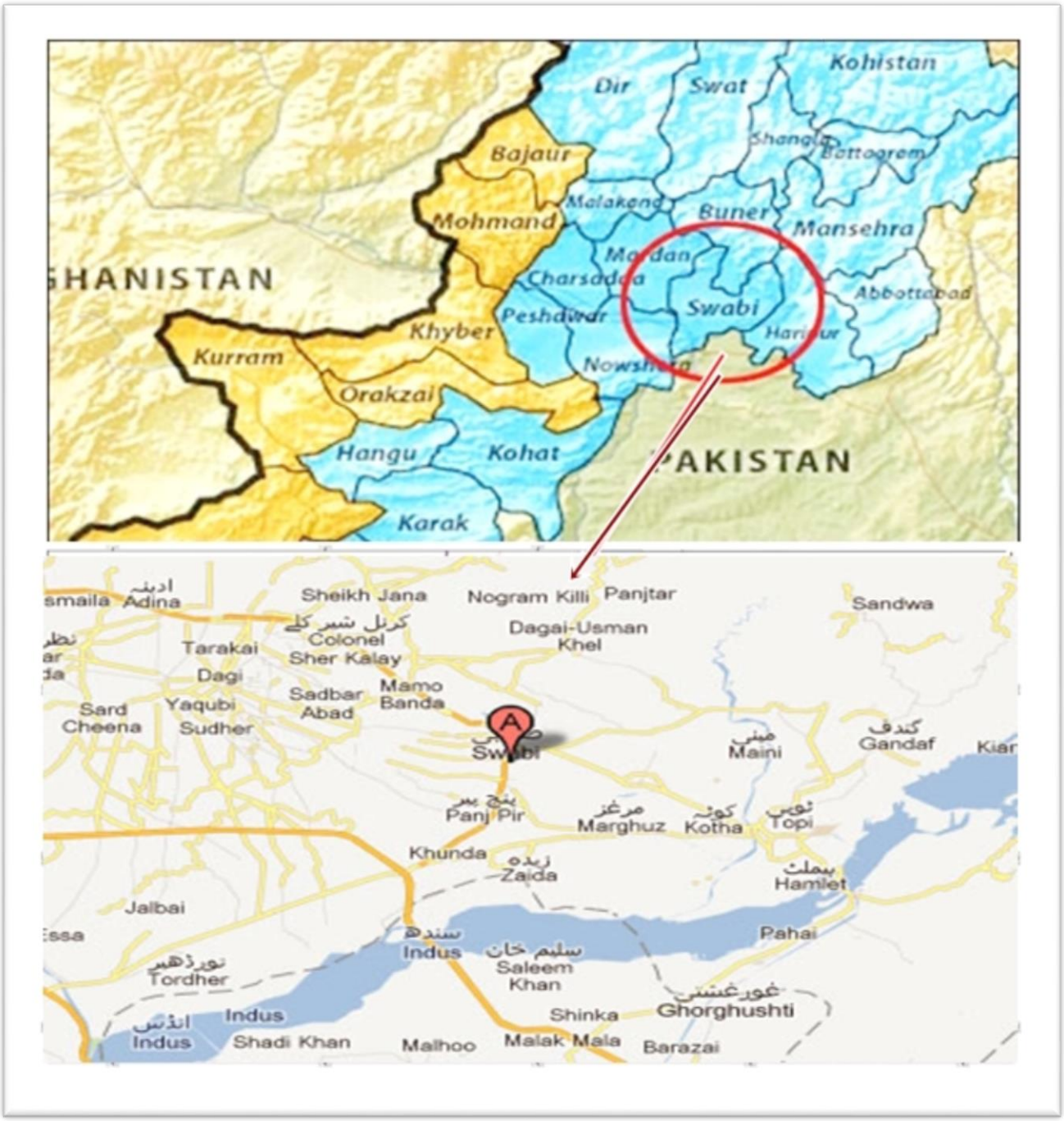

Fig. 1 Map of district Swabi

Botanical identifications

The local names of plants for identification were coordinated by local informants during the survey. Scientific names and classification was confirmed with the help of Flora of Pakistan (www.eflora.com), further name

correction was done by International Plant Name Index (www.ipni.gov.pk). Preserved specimens were deposited in the Herbarium of Pakistan, Quaid-i-Azam University, Islamabad.

Qualitative data analysis

The following parameters were used as qualitiative data:

Relative frequency citation (RFC)

Calculation of relative frequency citation was done with the help of following formula:
1. RFC=FC/N (0<RFC<1)
Every species had a certain local importance which was indicated by this relation. It was obtained by dividing frequency citation (FC) by the total number of informants participated in the survey (N). Where FC is the number of informants reporting species uses (Vitalini et al., 2013).

Family importance value (FIV)

FIV can be calculated to find out the informants harmony on the role of documented medicinal plant. Family importance value can be estimated by using formula given by Molares and Ladio (2009). Family importance value is computed utilizing the rule below:
2. FIV= FC (family)/N ×100
Whereas FC is the number of informants of the mentioned family and N is the total number of informants.

RESULTS AND DISCUSSION

Demographic data of informants

In current study, we interviewed a total of 190 informants comprising of local people (88.95%) and local health practitioners (LHPs) (11.5%) (Table 1) at different places randomly like homes, religious places (mosques etc.), fields and other meeting places like meeting rooms locally called as hujras or baitaks. Approximately, 57.89% of total informants were male and 42.11% were female. The less number of female informants was due to difficulty of access to them in various places, gender discrimination and other social restrictions. Some other reasons might be because females are generally involved in domestic life, while males perform the outside activities. In this study, the aged group of informants had more traditional knowledge about herbal remedies and liked to share it openly. Males were found to be more interested in sharing indigenous knowledge than that of females.

Considering the factor of age, it was classified into five groups (Table 1). The age group who was 50-60 years old contributed the highest indigenous knowledge (47.37%) followed by the second age group (40-50 years old) who shared 21.05% knowledge about ethnobotanicals, while the age group 30-40 years old shared only 18.42% of the total indigenous knowledge. Based on the education background, the highest indigenous knowledge (42.11%) about blood purifying medicinal plants was shared by illiterate people, while the highest educated group (higher education) shared only 2.63% of indigenous knowledge (Table 1).

Medicinal plant diversity

In the current study, a total of 66 blood purifying medicinal plants relating to 41 families and 63 different genera were documented (Table 2). Lameaceae, zygophyllaceae, asteraceae and solanaceae (each having 4 species) were most of the families used in this study followed by poaceae and rosaceae (each with 3 species) (Fig. 2). It has been observed that most of the plant species belonging to these families were easily accessible and abundant in the study area because of specific geographical distribution and their abundance. In previous studies family asteraceae was constantly reported in ethno-medicinal surveys in different parts of Pakistan (Sher et al., 2011; Bibi et al., 2014). The family asteraceae found as predominant in study area showed similarity with those described in previous literature (Blanco et al., 1999; Bano et al., 2012). Considering the growth/life form, the most dominant life form was that of herbs (71%) followed by trees (17%) and shrubs

(10%). In earlier ethno medicinal surveys, herbs were reported as dominant life form as these were generally employed in the chief source of medical specialty in several health maintenance systems (Murad et al., 2012). Ahmad et al. (2014) in their survey of Chail valley of Pakistan reported herbs as dominant life form. The common usage of herbs among indigenous people might be due to their abundance in various environments, easy availability, or more inexpensive at local grocery stores (Ayyanar & Ignacimuthu, 2005; Mukherjee & Wahile, 2006; Uniyal et al., 2006; Qureshi, 2012; Shah & Rozina, 2013).

Plant parts and their preparation for remedies

Various parts of plants were reported for blood purification during this survey (Fig. 3). The whole plant was reported to be the mostly used plant part followed by the leaves and the fruits. Generally, rural people use the whole plant for blood purification because they are herbaceous and can be picked up easily without any heavy work. Qureshi (2012) described the similar results and reported that the whole plant preparation for remedies is very common. However, any part or organ of a plant having active constituents and are pharmacologically active can be used as medicines (Verpoorte et al., 2002; Yesilada & Kupeli, 2007; Gurdal & Kultur, 2013; Ahmad et al., 2014). In the current study, no root part was found to be used as medicine in blood purification. The most dominantly used preparation is the decoction (27 reports) followed by the powder (20 reports) and infusion (10 reports) (Fig. 4). Our findings about the effects of widespread use of decoction and infusion were consistent with the results of Gurdal and Kultur (2013); Ahmad et al. (2014).

Quantitative ethnobotanical analysis

Relative frequency citations (RFC)

The RFC was calculated to determine the most commonly used medicinal plants for blood purification. Based on the RFC values, the most important plant species were *Azadirachta indica* A. Juss. (0.95), *Fumaria indica* (Hausskn.) Pugsley (0.79), *Cuscuta reflexa* Roxb (0.76), *Mimosa pudica* Mill. (0.53) *Melia azedarach* (0.52), *Mentha longifolia* L. (0.50), *Taraxacum officinale* F.H. Wigg (0.50), *Rosa indica* L. (0.47), *Cynodon dactylon* (L.) Pers. (0.45), *Lycopersicum esculentum* Mill. (0.45), *Aloe vera* (L.) Burm.f. (0.42), *Caralluma tuberculata* N.E.Br (0.42), *Allium sativum* L. (0.39), *Ziziphus nummularia* (Burm. f.) Wight & Arn (0.37), *Capsicum annuum* L. (0.35), *Punica granatum* L. (0.34), *Thymus serpyllus* L. (0.32), *Berberis lycium* Royle (0.29) and *Cymbopogon jwarancusa* (0.29) (Fig. 5; Fig. 6). The high RFC values reported the facts that these medicinal plant species were well recognized among the utmost number of sources. The plants having high RFC should be further evaluated phytochemical and pharmaceuticals to identify their active ingredients for drug discovery (Molares & Ladio, 2009). *Azadirachta indica* A. Juss., *Fumaria indica* (Hausskn.) Pugsley, *Cuscuta reflexa* Roxb, *Mimosa pudica* Mill. and *Melia azedarach* L. were the most popular plants in district Swabi that were reported by the majority of the informants.

Family importance value (FIV)

FIV was calculated to determine harmony among the informants on the role of medicinal plants. Based on the FIV values, the most important plant families were araliaceae (5), bombacaceae (5), molluginaceae (5), paeoniacea (5) and phyllanthaceae (5). The FIV of these five families was followed by apocynaceae (4.8), fabaceae (4.7), asphodelaceae (4.5), elaeagnaceae (4.3), myrsinaceae (4.2), polygonaceae (4.1), malvaceae (4), papilionaceae (4), salvadoraceae (4), zygophyllaceae (4), amaranthaceae (3.8), caryopyllacea (3.6), colchicaceae (3.6) and mimosaceae (3.4). Similar results were reported by Sher et al. (2011) from Chagharzai Valley, district Buner.

Table 1 Demographic data of the participants

Selected Characteristics	Categories	No. of persons	Percentage
Informants category			
	Local health practitioners	21	11.05
	Local people	169	88.95
Gender			
	Female	80	42.11
	Male	110	57.89
Age			
	Less than 20 years	0	0.00
	20-30 years	25	13.16
	30-40 years	35	18.42
	40-50 years	40	21.05
	50-60 years	90	47.37
Educational background			
	Illiterate	80	42.11
	Completed 5 years of education	10	5.26
	Completed 8 years of education	20	10.53
	Completed 10 years of education	20	10.53
	Completed 12 years of education	30	15.79
	Completed 16 years of education	25	13.16
	Graduate (Higher education)	5	2.63
Experience of the local health practitioners			
	Less than 2 years	40	21.05
	2-5 years	50	26.32
	5-10 years	40	21.05
	10-20 years	27	14.21
	More than 20 years	33	17.37

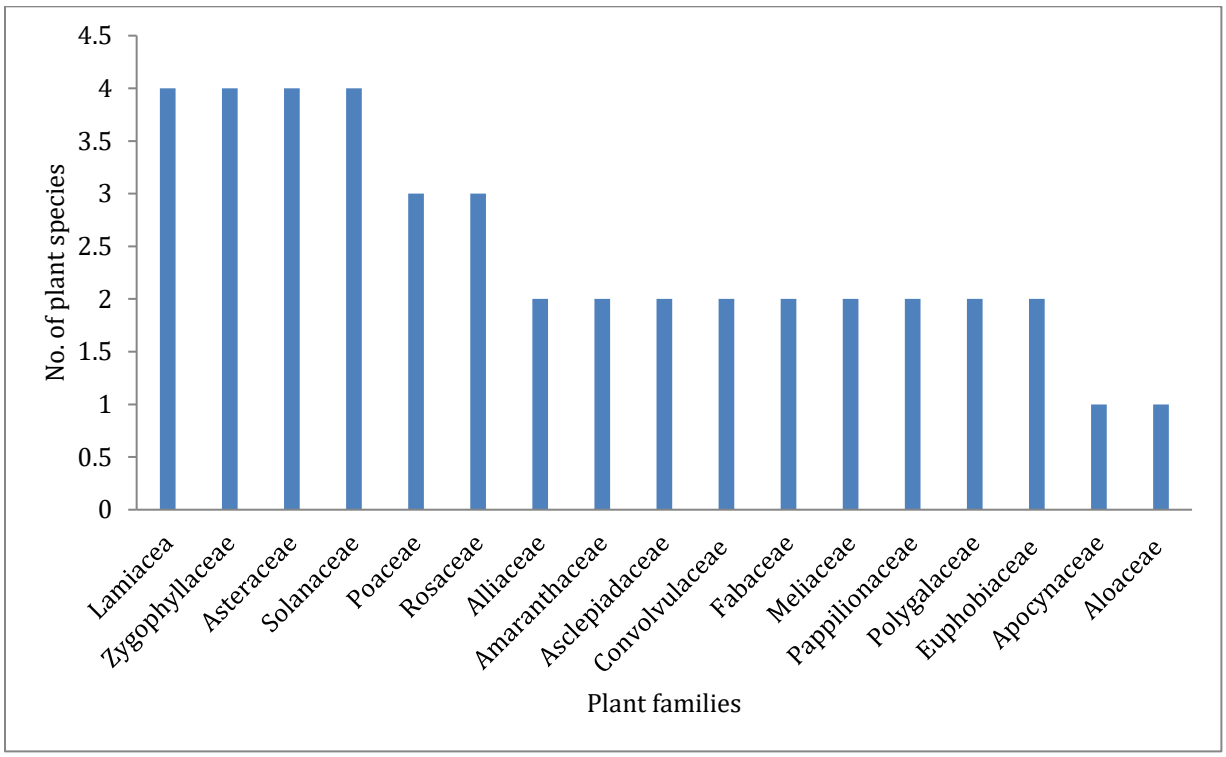

Fig. 2 Dominant families of medicinal plants in the study area

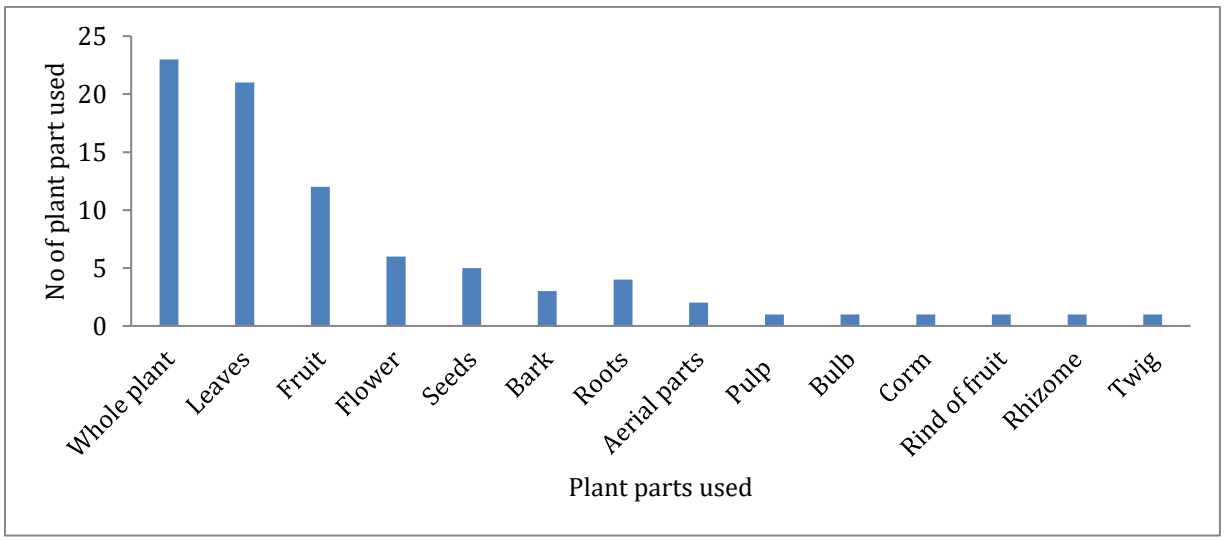

Fig. 3 Plant parts used for blood purification

Table 2 List of medicinal plants for blood purification found in Swabi, Pakistan

Plant species	Local name	Family	Habit	Mode of utilization	Part used	FC	RFC
Abutilon indicum (L.) Sweet.	Peeli buti	Malvaceae	Herb	Powder	Leaves and flowers	25	0.13
Achyranthes aspera Duss	Ghishkay	Amaranthaceae	Herb	Decoction	Whole plant	27	0.14
Acroptilon repens (L.) DC.	Alcohol, Sumbal	Asteraceae	Herb	Decoction	Whole plant	20	0.11
Agave americana L.	Kanwar Phara	Asparagaceae	Herb	Solid	Pulp	35	0.18
Ajuga bracteosa Wall ex Benth	Bootie, meaner, Qaimatgualla	Lamiaceae	Herb	Decoction	Leaves, Whole plant	26	0.14
Albizia lebbeck (L.) Benth.	Shirin	Mimosaceae	Tree	Decoction, Powder	Stem bark	29	0.15
Alhagi maurorum Medic.	Jawanha	Fabaceae	Shrub	Decoction	Whole plant	23	0.12
Allium sativum L.	Uga	Alliaceae	Herb	Extract	Bulb and leaves	75	0.39
Allium humile Kunth	Cherum	Alliaceae	Herb	Solid	Whole plant	50	0.26
Aloe vera (L.) Burm.f.	Quargandal	Aloaceae	Herb	Gel/extract	Leaves	80	0.42
Alternanthera pungens Kunth	Itsit Te Phakra	Amaranthaceae	Herb	Powder	Leaves	26	0.14
Anisomeles indica (L.) Kuntze(L.)	Sankhia	Lamiaceae	Herb	Decoction	Whole plant	27	0.14
Asphodelus tenuifolius Cav.	Piazi	Asphodelaceae	Herb	Powder	Whole plant	22	0.12
Azadirachta indica A. Juss.	Neem	Meliaceae	Tree	Decoction	Leaves	180	0.95
Berberis lycium Royle	Sumblu	Berberadaceae	Shrub	Powder	Root	55	0.29
Bombax ceiba L.	Sumbal	Bombacaceae	Tree	Decoction, powder	Flowers, roots, bark and seeds	20	0.11
Capparis decidua (Forssk.) Edgew	Karinh	Capparaceae	Tree	Solid fruit	Fruit, twig	33	0.17
Capsicum annuum L.	Shimla mirch	Solanaceae	Herb	Solid	Fruit	66	0.35
Caralluma tuberculata N.E.Br	Pamunkay	Asclepiadaceae	Herb	Chewed	Whole plant	80	0.42
Chrozophora plicata (Vahl) A.Juss. Ex Spreng.	Kharha vangai, Nilakari	Euphorbiaceae	Herb	Juice	Whole plant	25	0.13
Cichorium intybus L.	Kasini	Asteraceae	Herb	Powder	Whole plant	50	0.26
Citrullus colocynthis (L.) Schrad.	Kharengirirhi	Cucurbitaceae	Herb	Steam/Powder	Fruit	44	0.23
Citrus grandis Hassk	Chakotra	Rutaceae	Tree	Juice	Fruit	53	0.28

Colchicum luteum Baker	Qaimatguallay	Colchicaceae	Herb	Fried	Corm	28	0.15
Cuscuta reflexa Roxb	Maraz bootay	Convolvulaceae	Herb	Decoction	Whole plant	145	0.76
Cymbopogon jwarancusa	Lanjak	Poaceae	Herb	Decoction	Leaves	55	0.29
Cynodon dactylon (L.) Pers.	Khabbal gha	Poaceae	Herb	Decoction	Whole plant	86	0.45
Dalbergia sissoo Roxb.	Shawa, Shesham	Pappilionaceae	Tree	Extract	Leaves	30	0.16
Euphorbia prostrata J.Graham	Hazar dani	Euphobiaceae	Herb	Extract	Whole plant	47	0.25
Fagonia arabica L.	Karhkawa	Zygophyllaceae	Herb	Decoction	Whole plant	23	0.12
Fagonia cretica L.	Spelaghzai	Zygophyllaceae	Herb	Powder, Extract	Leaves, whole plant	26	0.14
Fumaria indica (Hausskn.) Pugsley	Papra, Murghipal, Shatira	Fumariaceae	Herb	Decoction, Juice	Aerial parts	150	0.79
Galium boreale Walter	_	Rubiaceae	Herb	Infusion	Flower	35	0.18
Glinus lotoides L.	_	Molluginaceae	Herb	Powder	Whole plant	20	0.11
Hedera nepalensis K.Koch	Prewata	Araliaceae	Herb	Juice	Leaves	20	0.11
Hippophae rhamnoides L.	_	Elaeagnaceae	Tree	Extract	Plant/fruit	23	0.12
Indigofera suffruticosa Mill.	Jantri	Papilionaceae	Herb	Decoction, infusion	Whole plant	20	0.11
Ipomea hederacea Jacq	Habbun-nil	Convolvulaceae	Herb	Powder	Seeds	22	0.12
Launaea nudicaulis Hook.f.	Thareeza	Asteraceae	Herb	Infusion	Whole plant	33	0.17
Lycopersicum esculentum Mill.	Tamatar	Solanaceae	Herb	Powder	Fruit	85	0.45
Melia azedarach L.	Dreik	Meliaceae	Tree	Juice	Leaves, seed, fruit	98	0.52
Mentha longifolia L.	Velanai	Lamiaceae	Herb	Infusion	Leaves, flowers	95	0.50
Mimosa pudica Mill.	chui mui	Leguminosae	Shrub	Juice	Leaves, flowers	100	0.53
Morus nigra L.	Tor toot	Moraceae	Tree	Solid	Fruit	40	0.21
Myrsine africana L	Khukan	Myrsinaceae	Shrub	Decoction	Leaves	24	0.13
Oxystelma esculentum (L.f.) Decne	Dudhani	Asclepiadaceae	Climber	Decoction, infusion	Whole plant	28	0.15
Paeonia emodi Wall.	Mamaik	Paeoniaceae	Shrub	Powder	Rhizome	20	0.11

Peganum harmala L.	Aspand	Zygophyllaceae	Herb	Powder	Seed	22	0.12
Phyllanthus emblica L.	Amla	Phyllanthaceae	Tree	Infusion	Fruit	20	0.11
Polygala erioptera DC.	Asmani Buti	Polygalaceae	Herb	Decoction, infusion	Whole plant	23	0.12
Potentilla nepalensis Hook	Mammarh	Rosaceae	Herb	Decoction, infusion	Roots	21	0.11
Potentilla supina L.	PushkunPhul	Rosaceae	Herb	Decoction	Leaves	24	0.13
Psoralea plicata Delile	Makka Buti	Fabaceae	Herb	Decoction, powder	Seeds	20	0.11
Punica granatum L.	Anar/ Daroona	Punicaceae	Tree	Solid fruit	Rind of fruit	65	0.34
Rhazya stricta Decne.	Aishar	Apocynaceae	Shrub	Powder	Leaves	21	0.11
Rheum australe D. Don	Chontal	Polygonaceae	Herb	Powder	Whole plant	26	0.14
Rosa indica L.	Gulab	Rosaceae	Shrub	Powder	Flower	90	0.47
Saccharum arundinaceum Retz.	Sarkanda	Poaceae	Herb	Juice	Stem, root	2	0.15
Salvadora oleoides Decne.	Pilu, Wan	Salvadoraceae	Tree	Decoction	Leaves	25	0.13
Silene inflata Sm.	Jangli gashoon	Caryopyllacea	Herb	Infusion	Whole plant	28	0.15
Taraxacum officinale F.H. Wigg	Zyar gulai	Asteraceae	Herb	Decoction	Root	95	0.50
Thymus serpyllus L.	Tumaro	Lamiacea	Herb	Decoction	Whole plant	60	0.32
Withania coagulans Dunal	Panirbank/Panirbad	Solanaceae	Herb	Infusion, Powder	Fruit and seeds	22	0.12
Withania somnifera (L.) Dunal	Panirbank/Panirbad	Solanaceae	Herb	Decoction	Fruit	21	0.12
Ziziphus nummularia (Burm. f.) Wight & Arn	Ber, Brunhi Unab	Rhamnaceae	Shrub	Decoction, Solid	Leaves, fruit, bark	70	0.37
Zygophyllum simplex L.	Lunak	Zygophyllaceae	Herb	Decoction, powder	Whole plant	30	0.16

FC = Frequency citation, RFC = Relative frequency citation. These plants have been reported by Yaseen et al. (2015); Parvaiz (2014); Amjad (2015); Kumar et al. (2014); Tene et al. (2007); Mosaddegha et al. (2012); Qureshi & Bhatti (2008); Shinwari & Khan (2000); Yabesh et al. (2014); Ahmad et al. (2014)

Table 3 Family importance values (FIV) of sampled families

S. No.	Family name	FIV*	S. No	Family name	FIV*	S. No	Family name	FIV*
1	Araliaceae	5	17	Caryopyllacea	3.6	33	Poaceae	1.8
2	Bombacaceae	5	18	Colchicaceae	3.6	34	Convolvulaceae	1.7
3	Molluginaceae	5	19	Mimosaceae	3.4	35	Alliaceae	1.6
4	Paeoniacea	5	20	Capparaceae	3.0	36	Punicacea	1.5
5	Phyllanthaceae	5	21	Asparagaceae	2.9	37	Rhamnaceae	1.4
6	Apocynaceae	4.8	22	Rubiaceae	2.9	38	Aloaceae	1.3
7	Fabaceae	4.7	23	Euphobiaceae	2.8	39	Meliaceae	1.0
8	Asphodelaceae	4.5	24	Moracea	2.5	40	Fumariaceae	1.0
9	Elaeagnaceae	4.3	25	Cucurbitaceae	2.3	41	Leguminosae	1.0
10	Myrsinaceae	4.2	26	Rosaceae	2.2			
11	Polygonaceae	4.1	27	Solanaceae	2.1			
12	Malvaceae	4.0	28	Asteraceae	2.0			
13	Papilionaceae	4.0	29	Lamiacea	1.9			
14	Salvadoraceae	4.0	30	Rutaceae	1.9			
15	Zygophyllaceae	4.0	31	Asclepiadaceae	1.9			
16	Amaranthaceae	3.8	32	Berberadaceae	1.8			

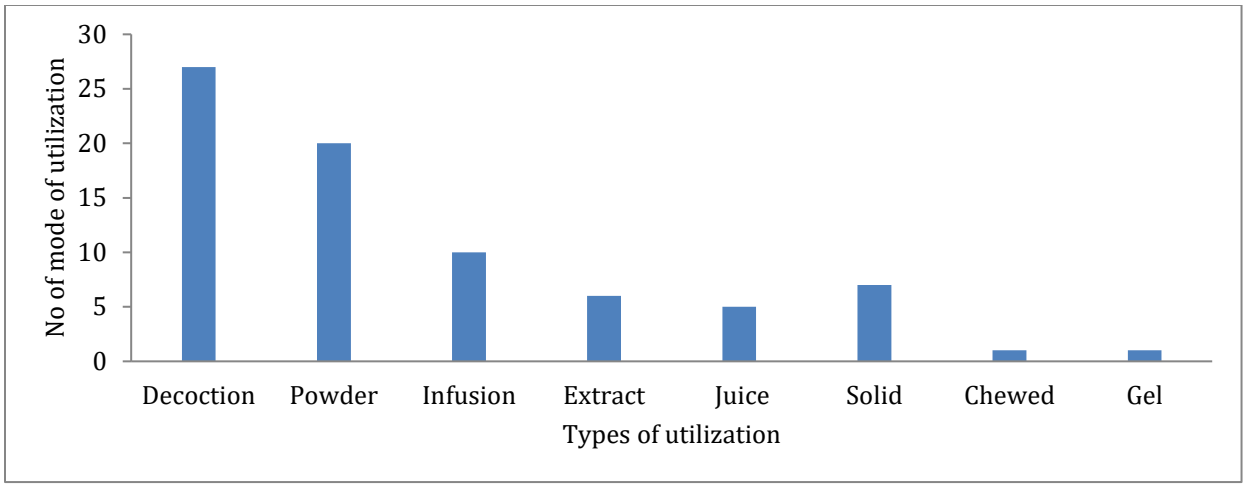

Fig. 4 Mode of utilization of medicinal plants

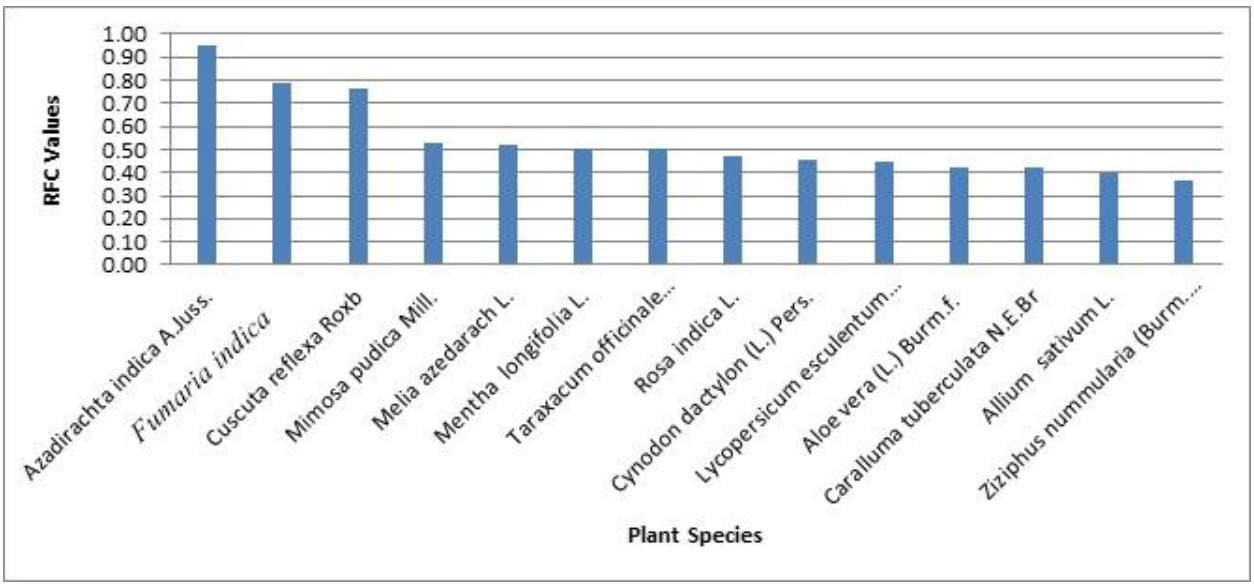

Fig. 5 The highest RFC values of some important medicinal plant

Fig. 6 Identification and collection of medicinally important plant species for blood purification in district Swabi

CONCLUSION

It is the first ethno medicinal study of traditional usage of blood purifying plants in district Swabi, Pakistan. The region is bestowed with medicinal plants and these plants are still commonly utilized for medicinal uses by people in their everyday lives. This study emphasized on the major role of herbal medicine for the blood purification. In aggregate, 66 plant species are covered. The highest RFC values ranked *Azadirachta indica* A. Juss. (0.95), *Fumaria indica* (Hausskn.) Pugsley (0.79), *Cuscuta reflexa* Roxb (0.76), *Mimosa pudica* Mill. (0.53) *Melia azedarach* (0.52) and *Mentha longifolia* L. (0.50). However, there is a gradual depletion of traditional knowledge about these plants in new generation. Hence it is important to document and reconstitute the rests of the ancient medical practices which exist in the region for future generations. Further strategies should be taken for conservation of these medicinal plants on priority. It will too provide various socioeconomic dimensions associated with the rural people.

Author Contribution Statement Mushtaq Ahmad generated the idea and supervised the research. Rozina conducted the research project and wrote the manuscript. Muhammad Zafar analyzed the data. Muhammad Qasim helped in survey and collecting information. Sheikh Zainulabidin contributed in plants collection and preservation. All the authors have read and approved the manuscript.

Conflict of Interest No conflict of interest is declared among the authors.

Acknowledgements We express gratitude to all the informants for providing information. We are cordially thankful to Rizwan Jamil for checking English grammar. We also want to thank to Samin Ullah and Sheraz Ahmad for their assistance in several interviews and herbarium samples.

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