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Herbal Traditions: Gynecological health practices among local communities in District Karak, KPK Pakistan

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Medicinal plants play a crucial role in the healthcare practices of tribal communities, specifically in addressing various gynecological issues. This study aims to document significant medicinal flora utilized by indigenous individuals residing in the Karak district for treating gynecological problems. The primary objective of the research was to establish a comprehensive profile of indigenous knowledge and practices within this unexplored tribal territory. Data collection involved semi-structured interviews and group discussions, and the data were analyzed through Use Value.A total of 32 medicinal plants were identified in the area, with the most widely acknowledged ones being *Withania somnifera* (Use Value of .94), *Paeonia emodi* (Use Value of .93), *Lotus corniculatus* (Use Value of .91), *Curcuma longa* (Use Value of .90), *Trachyspermumammi* (Use Value of .85), Nigella sativa (Use Value of .80), and Acacia modesta (Use Value of .89). There was a high consensus factor recorded for issues related to menstruation (0.94). It was noted that women across all areas predominantly utilized herbs (53%) and trees (41%). Local females in the region prepared medicines using various plant parts, with seeds (28%), leaves (21%), fruit (15%), and resin (8%) being the most frequently utilized for treating different disorders. Most of the plants were used for addressing menstrual issues (8) and leucorrhea (7). Knowledge pertaining to ethnomycological treatments is confined to midwives and traditional healers. In conclusion, the documented flora, particularly those significant to medicinal plants, may serve as a subject for future research aimed at discovering novel pharmaceutical, nutraceutical, and other pharmacological agents to address gynecological complaints.

Keywords: Ethno medicines ,Menstrual problems, Use value

INTRODUCTION

Ethnogynecology represents a traditional approach dedicated to addressing women's healthcare issues. Various medicinal plants play a crucial role in treating women's conditions related to menstruation, abortion, menopause, gonorrhea, leucorrhea, delivery complications, and infertility. Global reports indicate that sexual and reproductive health problems contribute to 18% of the total disease burden worldwide (Kaingu et al. 2011). In contemporary societies, allopathic medicines, surgery, and non-steroidal anti-inflammatory drugs are commonly used to manage gynecological problems, despite their associated risks during pregnancy (Lawal et al. 2013). Menstrual disorders, often overlooked by global health organizations, can significantly impact women's daily lives, necessitating effective and safe treatments. In many regions, including Latin America, Africa, and Asia, women prefer traditional medicines due to limited access to analgesics and sanitary facilities (van Andel et al. 2014). Rural women in Pakistan, grappling with gynecological issues due to poor living conditions and strenuous physical work, find solace in the diverse array of six thousand flowering plants, with six hundred serving medicinal purposes (Nasir and Ali, 1971–1991). Local practitioners, known as "Daiya," possess extensive traditional knowledge in treating women's problems, relying primarily on medicinal plants and plant-derived products (Tareen et al. 2010). The traditional lifestyle and inadequate access to modern health facilities prompt rural women to seek guidance from nearby midwives and traditional healers (Qureshi et al. 2009). There is a scarcity of literature on the

ethnomedicinal practices employed by rural women to address gynecological disorders. Additionally, the advent of allopathy and recent modernization has led to a rapid decline in knowledge, as the younger generation shows little interest in preserving these valuable healing practices. Consequently, there is a risk of the extinction of ethnogynecological knowledge if not adequately documented. This study was conducted in Mohmand Agency, Federally Administrated Tribal Areas (FATA), Pakistan, where the Pashtun tribe predominates, facing challenges such as low economic status, poor infrastructure, and a lack of modern facilities (Murad et al. 2013; Adnan et al. 2014a). Many women in this region rely on traditional healers for addressing various complications related to the female reproductive organs, and such knowledge has not been previously documented in the study area. Therefore, the present study aims to document the ethnogynecological uses of medicinal plants and identify specific plants for further pharmacological investigations. The research serves as a foundational resource for future studies in phytochemistry, pharmacology, and the conservation of plants used by indigenous communities.

MATERIALS AND METHODS

The current research work was conducted in District Karak located in the south of Kohat and on the West Side District Bannu and LakiMarwat. Karak is the only District in Pakistan which is inhibited by only one tribe of Pashtuns known as Khattak. The study was carried out frequently during 2020-2021. Ten regions were selectedto study the ethno-gynecological aspects of plants.Regular trips were organized to these regions. During the trips I have held interviews and discussion with local women to know about the ethno-gynecological uses of the local plants.

Data collection

Between June and October 2020, an ethno-gynecological survey was conducted. Field visits were regular in June to engage with informants, while the collection of ethnobotanical data occurred in the subsequent four months. The fieldwork was performed as Participatory Rural Approach (PRA), recognized as an effective and popular method in botanical studies. In the approach outlined by Chambers (1992), the indigenous population actively participated, detailing their methodologies and interaction patterns with environmental and natural resources. The gathering of indigenous knowledge and the survey relied on direct interactions with local respondents in the study area (Mahmood *et al.* 2013). Within the PRA framework, information was obtained through semi-structured interviews, meetings, and group discussions. Using a snowball technique, forty key informants (midwives) were selected, representing different age groups (Table 1), chosen for their reputable standing in the field of traditional medicine. Interviews, conducted in the local language "Pashto". Prior to interviews, the main theme of the study was presented to each informant. Ethnogynecological data, encompassing plant botanical names, local names, family names, parts used, modes of preparation, and methods of drug administration (e.g., juice, paste, decoction, powder), were documented. Semi-structured interviews also recorded information about gender, age, professional background, and knowledge of herbal recipes for gynecological problems. Initial documented results were recorded for each respondent for potential feedback. Group discussions were organized to clarify and validate field data. Semi-structured questionnaires underwent harmonization through free interviews and informal conversation (Huntington, 2000). Considering gender and age differences, interviews were conducted individually and collectively. While certain cultural barriers initially hindered female participation in interviews, the investigated female informants later gave their consent. All respondents and focal individuals in the study area granted permission to publish and protect the data on traditional medicines they provided.

Plant Collection & Preservation:

Thirty-three different plant species were collected from different areas of Karak. For the collection of these plants knife, newspaper, herbarium sheet, woody plant presser, and notebook were used. The collected plants were pressed, dried, and mounted on the herbarium sheets. Plant'sidentification was done by taxonomists at the Department of Botany, Government Post Graduate college Karak. The correctly identified specimens were placed in the herbarium, Department of Botany, Government Post Graduate College Karak.

Taxonomic verification

Muhammad Adil from the Department of Botany at Qurtaba University of Science and Technology, Peshawar, was identified the documented medicinal plants. These plants were mounted, preserved on herbarium sheets, assigned vernacular names, and labeled with a voucher number specific to each species.

The specimens were then deposited at the Department of Botany, Government Post Graduate College Karak. To address taxonomic issues related to the accurate nomenclature and updated systematic position, verification was conducted using "The Plant List" (www.theplantlist.org).

Table1: Demographic characteristics of the informants.

Category	Total
Gender	
Female	40
Age groups	
28-40	10
> 40	30
Educationalattainment	
Illiterate	7
Primary	11
Middle	15
Secondary	7
Occupation	
House wives	40

Data Organization and analysis

The data were structured and systematized utilizing Microsoft Excel (2007). Use Reports (UR) were tallied for each species, where UR denotes the specific plant part employed for a particular ailment as mentioned by an informant. The Use Value (UV) index was employed to illustrate the relative significance of each taxon within the local communities. The calculation for the use value (UV) was as follows:

$UV = \sum Ui / N$

where Ui represents the number of uses reported by each survey participant for a specific species, while N denotes the overall number of respondents involved in the survey, as per the study by Phillips and Gentry in 1993.

RESULTS AND DISCUSSION

Ethnogynecological knowledge and indigenous communities

The survey revealed that ethno gynecological knowledge is limited to older female community members, midwives, and local herbal practitioners referred to as Hakims. Female respondents sharing this knowledge were exclusively housewives, possibly due to the prevalent cultural and religious norms in remote areas of Pakistan, where women are predominantly confined to their homes. The age range of female informants, including midwives, varied from 30 to 70 years (Table 1). The selection process for informants highlighted the younger generation's lack of familiarity with traditional therapies and their disinterest in acquiring such knowledge. Notably, the female informants chosen for the study had no formal education, as societal expectations in rural areas prioritize their roles as wives, mothers, and homemakers, with limited emphasis on formal education, especially at higher levels. Access to education at primary and secondary levels is constrained, retention rates are low, and facilities are inadequate.Conversely, traditional healers, known as "hakims," exhibited higher levels of education, including secondary and university levels (Table 1). Women in the study area prefer traditional therapies, considering them safer and more effective than modern drugs. Consequently, they generally seek the counsel of traditional healers for gynecological issues rather than consulting modern healthcare practitioners. Pregnant women, in particular, place more trust in medicinal plants and express concerns for their unborn child's well-being (Nordeng and Havnen, 2005). In emergencies, women may be taken to local dispensaries or relocated to more settled areas.Notably, knowledge related to traditional remedies for gynecological problems is diminishing, and with the passing of older female community members, this knowledge is at risk of being lost. Therefore, there is an urgent need to prioritize the conservation of this traditional knowledge to prevent its extinction in the foreseeable future (Mahmood et al. 2013).

Important medicinal plants

In the present study, 23 medicinal plants were documented for their use in treating gynecological ailments within indigenous communities in the study area (Table 2). These medicinal plants were employed against 32 health and pathological conditions. The most widely recognized medicinal plant species, denoted by the highest Use Value (UV), were *Withania somnifera* (.94 Use Value), *Paeonia emodi* (.93 Use Value), *Lotus corniculatus* (.91 Use Value), *Curcuma longa* (.90 Use Value), *Trachyspermumammi* (.85 Use Value), and *Nigella sativa* (.80 Use Value). The Use Value (UV), as proposed by Phillips and Gentry (1993), serves to assess the local importance of a given species. A higher UV indicates greater significance, but it does not specify whether a plant species is used for a single or multiple purposes (Musa et al. 2011).In the study area, *Withania somnifera* is utilized for treating leucorrhea, fertility, and as a sexual tonic. *Paeonia emodi* is commonly used for the regulation of menses and abdominal pain, while *Lotus corniculatus* addresses issues like gonorrhea and backache. Similarly, Curcuma longa is employed for leucorrhea and menstrual pain in women, and *Trachyspermumammi* is used to treat gonorrhea, uterine discharge, and regulate menses. N. sativa is traditionally used for backache.

Table 2: Medicinal plant used for the treatment of various gynecological disorders

Botanical names	Plant Families	Local name	Part used	Method of administration	Use for diseases	UV
*Fagoniacretica*L	Zygophyllaceae	Spelaghzaye	Leaves and stem	Decoction	Mensesinfection	.55
*Curcuma longa*L	Zingiberaceae	Korkaman, Haldi	Rhizome	Powder + milk	Leucorrhea, menstrual pain	.90
Tamarixaphylla (L.) H.Karst.	Tamaricaceae	Ghaz	leaves and bark	Decoction	Uterine infection	.68
*Daucus carota*L	Apiaceae	Gajara	Seed	Orally	menstrual pain	.71
*Trachyspermumammi*Sprague	Apiaceae	Sperkye	Seeds	Powder + water or milk	weight loss, Gonorrhea, uterine discharge, Regulation of menses.	.85
*Pegnum harmala*L	Zygophyllaceae	Spelanaye	Seeds, stem and leaves	Powder + ghee + sugar	Menses pain, Vaginal infection	.81
*Raphanus sativus*L	Brassicaceae	Moli	Seeds	Powder + water + Hony	weight loss, Regulation of menses.	.66
Citrullus colocynthis (L.) Schrad**.**	Cucurbitaceae	Trkha	Seed	Powder + water + sugar	Stomach Pain,	.39
Aloe vera(L.) Burm.f.	Asclepiadaceae	Alovera	Latex, leaves juice	Powder + milk	Gonorrhea, uterine discharge, Regulation of menses.	.71
*Trigonella foenum-graecum*L	Fabaceae	Shmleta/methe	Seeds	Powder + milk or water	for menses, relief in stomach problem, leucorrhea	.65
*Brassica campestris*L	Brassicaceae	Serson/oraye	Leaves, seed oil	Message	Mastitis, oil message for the abdomen pain	.59
Ricinus communis var. giganteus André	Euphorbiaceae	Arnd	Seeds, leaves, oil	Powder or oil+ water	Abortion, Leucorrhea, oil use orally used for labor pain	.84
*Nigella sativa*L	Ranunculaceae	Klonji	Seeds	Powder+ milk	back ache	.80
*Psidium guajava*L	Myrtaceae	Amrood	Fruit,leaves	Orally or powder	Leucorrhea, menstrual disorders	.49
Punica granatum	Punicaceae	Anar	Seeds, leaves	Decoction and leaves powder + milk	leucorrhea, Amenorrhea, pile, gonorrhea	.78
*Ocimumbasilicum*L	Lamiaceae	Bobraye/niazbo	Flower	Decoction +milk	Menses pain	.67
*Cuminum cyminum*L	Apiaceae	Zera	Fruit	Powder + water	To increase lactation, eucorrhea	.77
*Anacardium occidentale*L	Anacardiaceae	Kajo	Seeds	Orally	Abortion	.19
Withania somnifera (L.) Dunal	Rutaceae Solanaceae	Kotilal	Leaves and roots	Powder+ water or milk	Leucorrhea, infertility, sexual tonic	.94
Acacia modesta (Wall.) P.J.H.Hurter	Fabaceae	Palusa	Gum	Powder + milk+ wheat flour	Anemia, backache, aphrodisiac	.89
Lotus tenuis Waldst. & Kit. ex Willd.	Fabaceae	Fathi Khani	Whole plant	Powder +water	Gonorrhea, Backache	.91
Juglans regia L	Juglandaceae	Ghoz	Fruit	Orally	Sexual tonic	.89
Paeonia emodi Royle	Paeoniaceae	Mamekh	Leaves	Powder + water	Regulation of menses, abdominal pain	.93

Previously, W. somnifera was employed for leucorrhea, abdominal pain, as a tonic, for urinary disorders, sexual weakness, sterility in women, aphrodisiac, and menstrual pain (Adnan et al. 2014b; Ahmad et al. 2014; Khan et al. 2015a; Sher et al. 2016). In other cultures, F. vulgare is reported for use as a carminative and in urinary tract infections, as a laxative, for abdominal pain, and menstrual pain (Akhtar et al. 2013; Khan et al. 2015a; Sher et al. 2016). C. sativa is reportedly used as a sedative, analgesic, diuretic (Aziz et al. 2017), and for treating male impotency (Khan et al. 2015a). N. sativa has reported uses as a sexual tonic, lactation aid, aphrodisiac, gestational diabetes remedy, menstruation additive, abortion aid, and for parturition uterus pain (Sadeghi and Mahmood, 2014; Aziz *et al*. 2017).The study also assessed the biological efficacy of medicinal plants through the Fic value, which determines the consensus among informants for traditional medications. In our study, Fic values ranged between 0.39 and 0.94 (Table 2). A high Fic value was recorded for leucorrhea, infertility, and sexual tonic (0.94), as well as for the regulation of menses and abdominal pain (each 0.93), followed by gonorrhea (0.91), and leucorrhea and menstrual pain (each 0.90). High Fic values suggest consistent information sharing among various informants and community members, indicating consensus. Fic demonstrates the homogeneity of collected information and the agreement among informants regarding specific plant or part utilization for treatment. A higher Fic indicates increased knowledge or information sharing, and vice versa.Regarding plant parts used for treating various ailments, seeds (28%), leaves (20%),

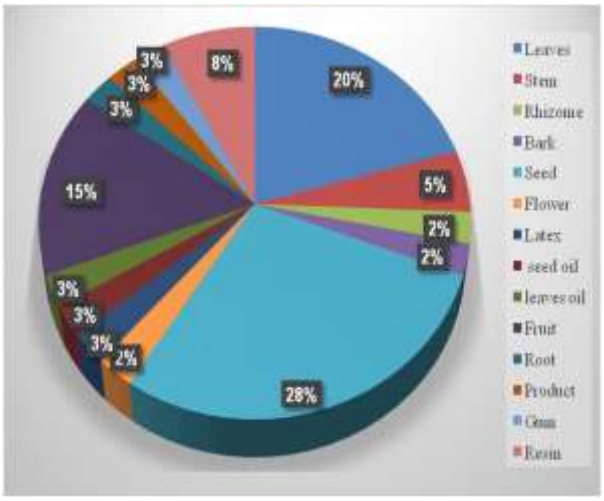

Figure: 2 Different parts used in the study area

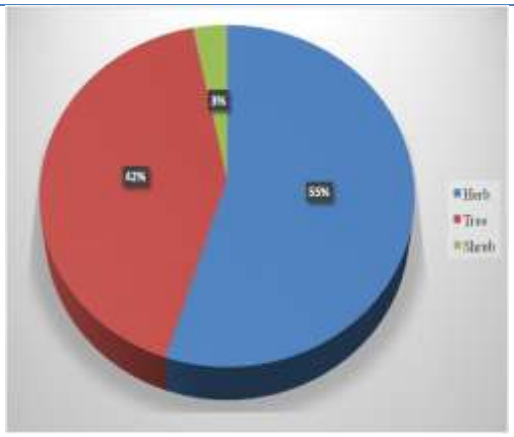

Figure: 3Attributes of medicinal plants used in the study area

Fruit (15%), and resin (8%) were the most commonly utilized (Fig 2), followed by herbs (55%), trees (42%), and shrubs (3%) (Fig 3).

In Traditional Chinese Medicine (TCM), roots are frequently used in herbal preparations (Ghorbani et al. 2011). The root is often the most harvested plant part in various studies (Hussain et al. 2006; Tolossaet al. 2013), possibly because roots remain in the soil and are accessible throughout the year. However, the easy harvest of herb roots, both for commercial and medicinal purposes, has negative implications for the sustainability and conservation of medicinal plants. Previous reports highlight that root (30%) rank second among frequently harvested plant parts (Lepcha and Das, 2011), contributing to the threat faced by these medicinal plants. Unsustainable herbaceous root harvesting is recognized as a significant conservation concern (Verma et al. 2007).

Herbal therapies used in the study area

The current study documented various formulations and administration methods for herbal therapies. Different recipes, primarily in powder form, were consumed with ingredients like milk, whey, water, honey, ghee, and sugar. The survey highlighted that woman predominantly utilized herbs for ethnomedicinal preparations, while trees were seldom employed, especially in remote areas where medicinal herbs served as primary components in local medicines, being considered the main and preferred choice for remedies (Khan et al. 2011). The extensive use of herbs signifies their abundance in villages and the longstanding traditional knowledge of healers, a pattern reported in various regions globally (Kala, 2005; Muthu et al. 2006). Herbs, with their ability to grow in roadsides, home gardens, farmland, and wild habitats, are more prevalent than other growth forms. However, some studies have reported a higher use of trees (Maroyi, 2013; Murad et al. 2013) and shrubs in traditional medications (Moshi et al. 2012; Pada let al. 2013). The variation in the growth form of medicinal plants may be linked to different socio-

cultural beliefs, ecological status, and practices of traditional healers across regions or countries. Most remedies primarily relied on the application of a single plant due to factors like palatability, non-toxicity, and the high efficacy of certain plants (Tugume et al. 2016). However, some plants were combined to achieve maximum therapeutic effects, indicating the phenomenon of synergism and the superior results obtained from such combinations. Women in the studied regions reported medicinal plants for treating 32 types of gynecological ailments, with menses being the most treated category. Eight plants were used for menses-related problems, followed by seven for leucorrhea, amenorrhea, three for weight loss, and two each for stomach problems and abortion. The increased use of plants for menstrual issues could be attributed to the natural phenomena associated with various complications, such as pelvic or abdominal cramps, bloating, sore breasts, lower back pain, mood swings, food cravings, irritability, fatigue, and headaches (Sharma et al. 2008; Yamamoto et al. 2009). Traditional medicines for women's diseases were administered in various forms, including decoctions, infusions, juices, extracts, suppositories, powders, and pills. These traditional medicines were often mixed with honey or milk to enhance taste, depending on the ailment. Detailed methods for the preparation of herbal medicines have been described elsewhere (Mahmood et al. 2013). In the same vein, the current study recorded different preparation and administration methods for herbal therapies from local herbalists (hakims) at various sites, emphasizing their simplicity. Orally, herbal recipes were ingested as plant powder (mixed with water), decoction, or occasionally as juice extracts. Researchers from various parts of the world have indicated similar practices (Abbasi et al. 2013; Ridvan et al. 2015).On the contrary, paste and crushed herbs were widely employed to address skin-related issues. The effectiveness of grinding and boiling for the extraction of biologically active compounds has been emphasized in literature (Deeba, 2009). The majority of herbal preparations typically centered around a single plant, although some remedies involved a combination of various plants. For instance, gum powder from Acacia modesta is combined with wheat flour to alleviate back pain after delivery. Additionally, decoctions made from the leaves of *Tamarixaphylla*, mixed with milk and flour, are used for treating uterine infections. Traditional healers in the study area asserted that herbal remedies formed by combining two or more plants are more potent than those based on a single plant. Previous studies have highlighted the efficacy of using multiple traditional herbal formulations in the present era due to synergism (Zonyane et al. 2012; Sher et al. 2015). The preparation of plant-based remedies for similar or different ailments varies among individuals and communities. For example, in a study by Sher *et al*. (2015), traditional practitioners recommended the decoction of leaves and roots of *W. somnifera* as an aphrodisiac, while in our study, these medicinal plants were used for treating leucorrhea, enhancing fertility, and acting as a sexual tonic.

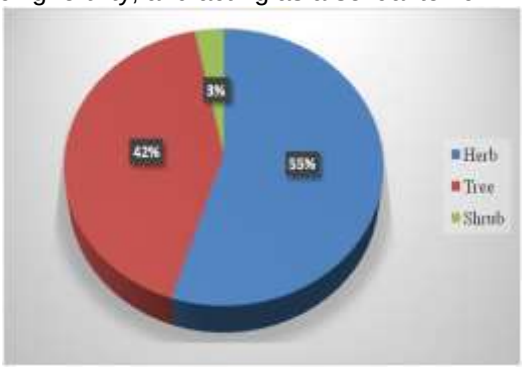

Figure: 3 Attributes of medicinal plants used in the study area

CONCLUSIONS

In the study area, the residents display a favorable inclination toward the application of medicinal plants. Midwives harbor indigenous knowledge concerning gynecological issues. Within the study area, 23 medicinal plants are utilized for addressing 32 distinct types of gynecological issues. The most widely acknowledged medicinal plants encompass *Withania somnifera, Paeonia emodi, Lotus corniculatus, Curcuma longa*, and*Trachyspermumammi*. Seeds constitute the primary plant part utilized in crafting ethnomedicinal remedies for gynecological problems. Among the prevalent disease categories, menstrual problems are the most prominent, treated with the assistance of 8 medicinal plants. This study establishes a foundational framework for prospective pharmacological investigations in the realm of gynecology. Therefore, it is imperative to concentrate on the identified plants to discover novel pharmaceutical interventions for gynecological diseases.

Ethical disclosures

Protection of human and animal subjects. The authors declare that no experiments were performed on humans or animals for this study.

Supplementary materials

The supplementary material / supporting for this article can be found online and downloaded at: https://www.isisn.org/article/

Ethical disclosures Protection of human and animal subjects.

The authors declare that no experiments were performed on humans or animals for this study.

Confidentiality of data.

The authors declare that no patient data appear in

this article.

Right to privacy and informed consent.

The authors declare that no patient data appear in this article.

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Author contribution

GR, AR, and AHK collected the data. AMHK wrote the draft manuscript. HU helped in the compilation of data. During revision stages, FS, RU, SU, MJ, SI, NI, SI, SAI and SI contributed significantly and MA, MK, ZU, IA and KZ supervised all stages of this research study. MA gave technical comments on the draft manuscript and indicated grammatical and language mistakes. All authors read and approved the final manuscript.

Conflicts of interest

The authors declare no conflicts of interest.

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REFERENCES

Abbasi, A.M., Khan, M.A., Shah, M.H., Shah, M.M., Pervez, A., Ahmad, M., 2013.Ethnobotanical appraisal and cultural values of medicinally important wild edible vegetables of Lesser Himalayas-Pakistan. J. Ethnobiol. Ethnomed. 9, http://dx.doi.org/10.1186/1746-4269-9-66.

Adnan, M., Bibi, R., Mussarat, S., Tariq, A., Shinwari, Z.K., 2014a. Ethnomedicinal and phytochemical review of Pakistani medicinal plants used as antibacterial agents against Escherichia coli. Ann. Clin. Microbiol. Antimicrob. 13, http://dx.doi.org/10.1186/s12941-014-0040-6.

Adnan, M., Ullah, I., Tariq, A., Murad, W., Azizullah, A., Khan, A.L., Ali, N., 2014b. Ethnomedicine use in the war affected region of northwest Pakistan. J. Ethnobiol. Ethnomed. 10, http://dx.doi.org/10.1186/1746-4269-10-16.

Ahmad, M., Sultana, S., Fazl-i-Hadi, S., Ben Hadda, T., Rashid, S., Zafar, M., Khan, M.A., Khan, M.P.Z., Yaseen, G., 2014. An ethnobotanical study of medicinal plants in high mountainous region of Chail valley (District Swat-Pakistan). J. Ethnobiol. Ethnomed. 10, http://dx.doi.org/10.1186/1746-4269-10-36.

Akhtar, N., Rashid, A., Murad, W., Bergmeier, E., 2013. Diversity and use of ethnomedicinal plants in the region of Swat, North Pakistan. J. Ethnobiol. Ethnomed. 9, http://dx.doi.org/10.1186/1746-4269-9-25.

Appendino, G., Gibbons, S., Giana, A., Pagani, A., Grassi, G., Stavri, M., Smith, E., Rahman, M.M., 2008. Antibacterial cannabinoids from Cannabis sativa: a structure–activity study. J. Nat. Prod. 71, 1427–1430.

Aziz, M.A., Khan, A.H., Adnan, M., Izatullah, I., 2017. Traditional uses of medicinal plants reported by the indigenous communities and local herbal practitioners of Bajaur Agency, Federally Administrated Tribal Areas Pakistan. J. Ethnopharmacol. 198, 268–281.

Chambers, R., 1992. Rural Appraisal: Rapid, Relaxed and Participatory (IDS Discussion Papers 311). Institute of Development Studies, London.

Deeba, F., 2009. Documentation of Ethnoveterinary Practices in Urban and Periurban Areas of Faisalabad Pakistan. University of Agriculture, Faisalabad, Pakistan.

Ghorbani, A., Langenberger, G., Feng, L., Sauerborn, J., 2011. Ethnobotanical study of medicinal plants utilized by Hani ethnicity in Naban river watershed national nature reserve, Yunnan China. J. Ethnopharmacol. 134, 651–667.

Gosh, C., Das, A.P. (Eds.), Recent Studies in Biodiversity and Traditional Knowledge in India. , pp. 257–270.

Huntington, H.P., 2000. Using traditional ecological knowledge in science: methods and applications.

Ecol. Appl. 10, 1270–1274.
Hussain, M., Shah, G.M., Khan, M.A., 2006. Traditional medicinal and economic uses of Gymnosperms of Kaghan valley, Pakistan. Ethnobot. Leaflets 10, 72–81.
Kaingu, C.K., Oduma, J.A., Kanui, T.I., 2011. Practices of traditional birth attendants in Machakos District Kenya. J. Ethnopharmacol. 137, 495–502.
Kala, C.P., 2005. Ethnomedicinal botany of the Apatani in the Eastern Himalayan region of India. J. Ethnobiol. Ethnomed. 1, http://dx.doi.org/10.1186/1746-4269-1-11.
Khan, N., Ahmed, M., Ahmed, A., Shaukat, S.S., Wahab, M., Ajaib, M., Siddiqui, M.F., Nasir, M., 2011. Important medicinal plants of Chitral Gol National Park (CGNP) Pakistan. Pak. J. Bot. 43, 797–809.
Khan, R.U., Mehmood, S., Muhammad, A., Mussarat, S., Khan, S.U., 2015a. Medicinal plants from Flora of Bannu used traditionally by North West Pakistan's women to cure gynecological disorders. Am. Eur. J. Agric. Environ. Sci. 15, 553–559.
Lawal, I., Amao, A., Lawal, K., Alamu, T., Sowunmi, I.L., 2013. Phytotherapy approach for the treatment of gynaecological disorder among women in Ido Local Government Area of Ibadan, Oyo State, Nigeria. J. Adv. Sci. Res. 4, 41–44.
Lepcha, S.R., Das, A.P., 2011. Ethno-medico-botanical exploration along the international borders to Tibet Autonomous Region of China and the kingdom of Bhutan with special reference to the Pangolakha Wildlife Sanctuary, East Sikkim. In:
Mahmood, A., Rashid, S., Malik, R.N., 2013. Determination of toxic heavy metals in indigenous medicinal plants used in Rawalpindi and Islamabad cities, Pakistan. J. Ethnopharmacol. 148, 158–164.
Maroyi, A., 2013. Traditional use of medicinal plants in south-central Zimbabwe: review and perspectives. J. Ethnobiol. Ethnomed. 9, http://dx.doi.org/10.1186/1746-4269-9-31.
Moshi, M.J., Otieno, D.F., Weisheit, A., 2012. Ethnomedicine of the Kagera Region, North Western Tanzania. Part 3: Plants used in traditional medicine in Kikuku village Muleba District. J. Ethnobiol. Ethnomed. 8, http://dx.doi.org/10.1186/1746-4269-8-14.
Murad,W.,Azizullah,A.,Adnan, M., Tariq,A.,Khan,K.U.,Waheed, S.,Ahmad,A., 2013. Ethnobotanical assessment of plant resources ofBanda Daud Shah, DistrictKarak
Musa, M.S., Abdelrasool, F.E., Elsheikh, E.A., Ahmed, L.A., Mahmoud, A.L.E., Yagi, S.M., 2011. Ethnobotanical study of medicinal plants in the Blue Nile State Southeastern Sudan. J. Med. Plants Res. 5, 4287–4297.
Muthu, C., Ayyanar, M., Raja, N., Ignacimuthu, S., 2006. Medicinal plants used by traditional healers in Kancheepuram District of Tamil Nadu India. J. Ethnobiol. Ethnomed. 2, http://dx.doi.org/10.1186/1746-4269-2-43.
Nasir, E., Ali, S.I., 1971–1991. Flora of west Pakistan, Tech. Rep. 1-190. Pakistan Agriculture Research Council, Islamabad, Pakistan.
Nordeng, H., Havnen, G.C., 2005. Impact of socio demographic factors, knowledge andattitudeontheuseofherbaldrugsinpregnancy.Acta Obstet. Gynecol. Scand. 84, 26–33.
Padal, S.B., Vijayakumar, Y., Butchi, R.J., Chandrasekhar, P., 2013. Ethnomedicinal uses of Shrub species by Tribals of Borra Panchayat, AnanthagiriMandalam, Visa khapatnam district, And hraPradesh, India. Int.J. Pharm. Sci.Invent. 2, 10–12.
Pakistan. J. Ethnobiol. Ethnomed. 9, http://dx.doi.org/10.1186/1746-4269-9-77.
Phillips, O., Gentry, A.H., 1993. The useful plants of Tambopata Peru: I. Statistical hypotheses tests with a new quantitative technique. Econ. Bot. 47, 15–32.
premenstrual symptoms, menstrual pain, irregular menstrual cycles, and psychosocial stress among Japanese college students. J. Physiol. Anthropol. 28, 129–136.
Qureshi, R.A., Ghufran, M.A., Gilani, S.A., Yousaf, Z., Abbas, G., Batool, A., 2009. Indigenous medicinal plants used by local women in southern Himalayan regions of Pakistan. Pak. J. Bot. 41, 19–25.
Rekka, R., Murugesh, S., Prabakaran, R., Tiruchengode, N.D., 2013. Plants used by Malayalitribes in ethnogynaecological disorders inYercaud Hills, Southern Eastern Ghats Salem District, Tamil Nadu. Sci. Res. Rep. 3, 190–192.
Ridvan, P., Ugur, C., Kaan, K., Denizhan, U.M., Zafer, T., 2015. An ethnobotanical study on medicinal plants in Espiye and its surrounding (Giresun-Turkey). J. Ethnopharmacol. 163, 1–11.
Sadeghi, Z., Mahmood, A., 2014. Ethno-gynecological knowledge of medicinal plants used by Baluch tribes, southeast of Baluchistan, Iran. J. Rev. Bras. Farmacogn. 24, 706–715.
Sharma, P., Malhotra, C., Taneja, D.K., Saha, R., 2008. Problems related to menstruation amongst adolescent girls. Indian J. Pediatr. 75, 125–129.
Sher, H., Aldosari, A., Ali, A., de Boer, H.J., 2015. Indigenous knowledge of folk medicines among tribal minorities in Khyber Pakhtunkhwa, northwestern Pakistan. J. Ethnopharmacol. 166, 157–167.
Sher, H., Bussmann, R.W., Hart, R., de Boer, H.J., 2016. Traditional use of medicinal plants among Kalasha, Ismaeli and Sunni groups in Chitral District, Khyber Pakhtunkhwa province Pakistan. J. Ethnopharmacol. 188, 57–69.
Tareen, R.B., Bibi, T., Khan, M.A., Ahmad, M., Zafar, M., 2010. Indigenous knowledge of folk medicine by the women of Kalat and Khuzdar regions of Balochistan,

Pakistan. Pakistan J. Bot. 42, 1465–1485.
Tolossa, K., Debela, E., Athanasiadou, S., Tolera, A., Ganga, G., Houdijk, J.G., 2013. Ethno-medicinal study of plants used for treatment of human and livestock ailments by traditional healers in South Omo Southern Ethiopia. J. Ethnobiol. Ethnomed. 9, http://dx.doi.org/10.1186/1746-4269-9-32.
Trotter, R., Logan, M., 1986. Informant consensus: new approach for identifying potentially effective medicinal plants. In: Etkin, N.L. (Ed.), Indigenous Medicine and Diet: Behavioral Approaches. Redgrave Publishers, New York, pp. 91–112.
Tugume, P., Kakudidi, E.K., Buyinza, M., Namaalwa, J., Kamatenesi, M., Mucunguzi, P., Kalema, J., 2016. Ethnobotanical survey of medicinal plant species used by communities around Mabira Central Forest Reserve Uganda. J. Ethnobiol. Ethnomed. 12, http://dx.doi.org/10.1186/s13002-015-0077-4.
van Andel, T., de Boer, H.J., Barnes, J., Vandebroek, I., 2014. Medicinal plants used for menstrual disorders in Latin America, the Caribbean, sub-Saharan Africa, South and Southeast Asia and their uterine properties, a review. J. Ethnopharmacol. 155, 992–1000.
Verma,A.K.,Kumar, M., Bussmann, R.W., 2007. Medicinal plants in an urban environment: the medicinal flora of Banares Hindu University, Varanasi, Uttar Pradesh. J. Ethnobiol. Ethnomed. 3, http://dx.doi.org/10.1186/1746-4269-3-35.
Yamamoto,K., Okazaki,A., Sakamoto,Y., Funatsu,M., 2009. The relationshipbetween
Zonyane, S.,VanVuuren, S.F., Makunga, N.P., 2012. Pharmacological and phytochemical analysis of a medicinal plant mixture that is used as a traditional medicine in Western Cape. In: Proceedings of the 38th Annual Conference of the South African Association of Botanist, University of Pretoria, Pretoria, South Africa, January, p. 12