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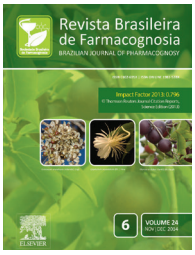

Original article

Ethno-gynecological knowledge of medicinal plants used by Baluch tribes, southeast of Baluchistan, Iran

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ABSTRACT

The objective of this study was to establish a regional profile of the indigenous knowledge on the treatment of various gynaecological disorders by Baluch Tribes of Iran. The ethical guidelines adopted by the International Society of Ethnobiology were strictly followed during the field survey. Data were collected during 2013-2014 based on interviews, group conversations and close consultation with local informants. Participants were selected using the snowball sampling technique. Secondary methods of data collection were also used for triangulation. A quantitative analysis including the informant consensus factor and use value was performed to evaluate the medicinal plants. A total of 33.3% Baluch women reported high affiliation with herbal remedies for gynaecological problems, while others attribute was also positive for medicinal plants. A total of eighty plant species belonging to 43 botanical families were documented. Levels of Relative frequency of citation decreased as follows: *Nigella sativa* (0.92), *Pistacia atlantica* (0.91), *Anethum graveolens* (0.88), *Carum carvi* (0.87) and *Trigonella foenum-graecum* (0.85). Results of the informant consensus factor showed that menstrual problems (0.87) and vaginal infection (0.74) were the most common problems of women in the studied area. The use value and informant consensus factor validated that the relative importance of plant species and shared knowledge of herbal therapies between Baluch womenfolk of this area is still rich.

Introduction

Ethno-medicinal studies are significant for the discovery of new crude drugs from reported indigenous medicinal plants. Right from the commencement of ethno-botany with special emphasis on the documentation of traditional medicinal knowledge of plants, has discovered/provided a number of key modern drugs (Flaster, 1996; Cox, 2000). At present, about 25% of the drugs included in the modern pharmacopeia are plant-derived, and many others are synthetic analogues built on prototype compounds isolated from plants. In developing countries, traditional medicines are still the main source of the healthcare system and it has been estimated that about 80% of

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the population in such countries are dependent on traditional medicines (Danøe and Bøgh, 1999; WHO, 2002; Mahmood et al., 2013). According to estimations, more than 50,000 flowering plants have been used for medicinal purposes throughout the world (Schippmann et al., 2002).

Ethno-gynecology is a traditional approach of indigenous tribes to deal with female health issues. Medicinal approaches or knowledge incorporating plants or any other natural/spiritual therapies used to treat gynecological problems such as abortion, menstrual pain, menopause, morning sickness, leucorrhoea, infertility, delivery problems, among others, are taken into consideration (Patel, 2012; Lawal et al., 2013). Nowadays, gynecological disorders are often treated with allopathic medicine, surgery and non-steroidal anti-inflammatory drugs. Though the efficacy of these treatments is great, numerous potential side effects are common like nausea and vomiting related to surgery/anesthetics; sexual problems after hysterectomy; skin rashes or digestive problems related to drugs; or more serious liver, kidney, and heart impairment related to drug intake especially when used for an extended period of time (Lawal et al., 2013). Moreover, the embryo is at risk of harm by some drugs during pregnancy.

Specifically, on ethno-gynecology, limited literature is available (Sahu, 2011) though, on ethno-medicinal and ethno-botanical knowledge many reports have been published throughout the globe (Qureshi et al., 2009; Mahmood et al, 2013a, b; Sadeghi et al., 2014). Keeping in consideration of these things the current study was designed to record the ethno-gynecological indigenous medicinal knowledge from Baluch tribes residing in the southeast of Baluchistan, Iran. This study was also aimed to assess the ethno-gynecological data using modern multivariate techniques to provide a baseline data for pharmaceutical industries to research the most valued medicinal plants by their pharmacological activities.

Material and methods

Study area

The study area is located southeast of the Sistan and Baluchistan Province, Iran lying between 61.86° to 62.46° longitude and 26.55° to 28.17° latitude and 1000-1500 m above sea level. These region includes Saravan, Sib and Soran, Mehrastan (Zaboli) and Sarbaz counties. Pakistan is located east to the study area (Fig. 1). The Siahan Range is the longest mountain chain that lies east of the study area, starting from Taftan Mountains continuing to Nahook passing from Pakistan territory, while Beark mountain chain resides in the west of this region. Mashki River in Saravan originates from the southern hillside near to Khash. The weather is hot with an average annual rainfall of 100 mm (http://www.sbportal.ir/fa/sistan/cityinformation/saravan).

Figure 1 – Location map of Iran showing the study area (Sistan and Baluchistan province south-east of Baluchistan).

Data collection and plant identification

Ethno-gynecological knowledge was collected from interviews with 420 women and midwives of the Baluch tribe (Table 1) along with eight herbal store workers from the study area during 2013-2014. A total of 428 informants were interviewed over the visited area from women informants; gender, age, profession and background information were recorded on questionnaires. The local language of the study area was Balochi and an interpreter knowledgeable of the local languages of the study area helped during data collection, which allowed the accuracy of data recordings. The ethno-botanical data was recorded along with the botanical name of plant, family name, vernacular name, plant part(s) used in herbal preparation, mode of application in women ailments and mode of preparation(s) (*i.e.* decoction, paste, power or juice) through questionnaires, interviews and group meetings. Specimens of plants described were collected for scientific identification and preparation of herbarium specimens and finally voucher specimens were identified with the help of the Ghahreman guide of flora of Iran. Plant specimens were deposited in the Herbarium of the High Education Complex of Saravan for future correspondence.

Data analysis

The indigenous medicinal information of plant species was analyzed using different techniques. Various approaches were used for quantitative as well as qualitative analysis of ethno-botanical data. These approaches depend on the objectives of the researcher, nature of the study and aim of the objective evaluations of the reliability of conclusions based on the data (Hoft et al., 1999). The quantification of ethno-botanical data is a major step towards a much more rigorous methodology.

Relative frequency of citation (RFC)

Relative frequency of citation (RFC) was obtained by dividing the frequency of citation (FC) (the number of informants reporting the use of species) by the total number of informants participating in the survey (N). RFC index varies from zero (nobody refers to the plants as useful) to one (every informant would mention it as useful).

$$RFC=FC/N$$

Informants consensus factor (ICF)

Informant consensus factor (ICF) was employed to identify the ethno-pharmacological importance of the collected plant species and the homogeneity of information. This index shows the agreement degree of the informants' knowledge about each category of ailments (Song et al., 2013). All the citations were placed into ailment categories for which the plant was referred to be used.

The ICF was calculated as;

$$ICF=Nur-Nt/Nur-1$$

The highest value should be near to one, which indicates the largest association of informants to the use of a specific species in a specific category of use (Trotter and Logan, 1986).

Table 1
Demographic characteristic of women in the study area.

Informants	Age group (Years)	Qualifications
Female	Lowest than	Illiterate (31.0%)
	25 (26.2%)	Knowing reading and writing (7.1%)
	25-35 (23.8%)	Primary (11.9%)
	35-45 (16.7%)	Secondary School level (16.7%)
	45-55 (16.7%)	Technical Diploma (19.0%)
	55 through highest (16.7%)	Intermediate (9.5%) +
		Bachelor and masters degree(4.8%)

Results and discussion

Ethno-gynecological trends of local women

A total of 420 informants were interviewed during the course of this study (Table 2). Ethnographic investigations revealed that about 36% of the Baluch women use herbal drugs to treat gynaecological problems. However, those who do not use the herbal therapies have a positive attitude toward the ethno-gynecological knowledge. Moreover, about 7% of the total female populations of the studied area relay completely on herbal therapy recommended by old indigenous or experienced women. Their faith that medicinal plants and herbal drugs are effective and safe for the treatment of certain gynaecological problems is the reason for ethno-medicinal practice. This faith especially, attracts pregnant women often concerned about their unborn child's well-being (Nordeng et al., 2005). Results of our study/survey reflected that most of the young women are not familiar with traditional medicine and prefer to consult with a doctor for any minor problem. On the other hand, it is much striking to note that the indigenous knowledge of plants is much higher among old aged people. Efforts should be done on priority basis to conserve this traditional treasure from being extinct in the near future (Mahmood et al., 2013a).

Diversity of medicinal plants and relative frequency of citation

In the current study 80 medicinal plant species belonging to 43 families were reported that were commonly used by the Baluch tribe women for the treatment of different gynecologic diseases (Table 3). Medicinal plants including *Pistacia atlantica, Carum carvi, Foeniculum vulgare, Anethum graveolens, Trigonella foenum-graecum, Crocus sativus* and *Nigella sativa* were found to be the most effective indigenous remedies against gynaecological problems and thus reflect a high frequency of citation (more

Table 2
Ethno-gynecological knowledge of plants from the study area.

S. N°	Family	Plant species	Vernacula Name	Part(s) used	Medicinal Preparation(s)	Therapeutic action	RFC
1	Amaryllidaceae	*Allium cepa* L.	Pimaz	Seed	Decoction	Aphrodisiac	0.24
2		*Allium schoenoprasum* L.	Pemlok	Leaf, seed	Orally, ecoction	Aphrodisiac, infection	
3	Anacardiaceae	*Mangifera indica* L.	Anbe	Fruit	Orally	Aphrodisiac	0.25
		Pistacia atlantica Desf.	Gonget	Gum, oil	Decoction, smoke to infections, orally, scrub	Aphrodisiac, vaginal infections, anemia, back pain	0.91
4	Apiaceae	*Carum carvi* L.	Zire	Fruit	Decoction	Aphrodisiac, lactiferous diuretic, irregular menstrual	0.87
		Dorema ammoniacum D. Don *Dorema aureum* Stocks	Hoshtarak, Oshtork	Gum	Decoction, cataplasm,	Abortion, aphrodisiac	0.18
		Carum copticum (L.) Benth. & Hook. f.	Ezbootk, Ajghowan	Fruit	Decoction, pill, thresh	Menstruation additive, carminative, lactiferous, diuretic, gestational, hypertension	0.62
		Coriandrum sativum L.	Geshnizh	Fruit	Decoction	Diuretic, gestational edema	0.42
		Ferula assa-foetida L.	Peterk	Leaf, gum, resin	Vaginal suppository, pill	Abortion, infection	0.19
		Foeniculum vulgare Mill.	Raz	Leaf, fruit	Infusion, distillate	Menstruation additive, menopause hot flashes, lactiferous	0.85
		Anethum graveolens L.	Shot'k	Leaf fruit,	Decoction	Lactiferous, carminative menstruation additive, menopause hot flashes	0.88
		Pimpinella anisum L.	Raz	Fruit	Decoction, distillate	Lactiferous, carminative menstruation additive, menopause hot flashes	0.73
		Ducrosia anethifolia (DC.) Boiss.	Goatk	Aerial parts, seed	Orally, decoction,	Carminative, menstruation additive, lactiferous	0.72
5	Apocynaceae	*Nerium indicum* Mill.	Khar-zahreh	Leaf, flower	Decoction	Abortion	0.21
6	Asteraceae	*Artemisia sieberi* Besser	Deranna	Aerial parts	Decoction, moisturized in water, pill, bath of body	Abdominal pain	0.66
		Cousinia stocksii C. Winkl.	Polosh	Gum, roots	Powder and pill	Diuretic, antiseptic	0.13
		Achillea millefolium L.	Boodko	Aerial parts	Moisturized in water, pill, infusion	Gestational diabetes, anemia, menopausal hot flashes	0.22
		Artemisia vulgaris L.	Berenjasf	Flower, leaf	Infusion, pill, decoction	Amplification of uterine spasm, carminative, sedative	0.59
		Pulicaria andulata L.	Bomadarane balochi	Flower, leaf	Decoction	Nausea, menstruation additive	0.56
		Matricaria chamomilla L.	Baboneh	Flower	Infusion	Menstruation additive,	0.48
		Casthamus tinctorius L.	Golrang	Flower	Infusion	Menstruation additive	0.20
		Calendula officinalis L.	Hamishe bahar	Flower	Infusion	Irregular menstrual	0.27
7	Brassicaceae	*Capsella bursa-pastoris* (L.) Medik.	Kiseh keshish	Arial part	Decoction	Irregular menstrual, sedative	0.60
8	Combretaceae	*Terminalia gangetica* Roxb.	Halile	Fruit	Infusion	Aphrodisiac, lactiferous, carminative	0.21
9	Cruciferae	*Lepidium sativum* L.	Tartizak	Seed	Decoction with milk	Aphrodisiac lactiferous, carminative, abortion, menstruation additive	0.41
		Lepidium draba L.	Shitraj, Ozmak	Seed	Infusion	Aphrodisiac, carminative, diuretic	0.24
10	Cucurbitaceae	*Citrullus colocynthis* (L.) Schrad.	Gegelanjook	Fruit	Decoction	Gestational diabetes	0.46
11	Euphorbiaceae	*Ricinus communis* L.	Karchak	Oil	Orally	Constipation	0.17

Table 2 Cont.

S. N°	Family	Plant species	Vernacula Name	Part(s) used	Medicinal Preparation(s)	Therapeutic action	RFC
12	Fabaceae	*Cassia acutifolia* Delile	Senna	Leaf	Decoction	Diuretic, constipation	0.66
		Trigonella foenum-graecum L.	Ambage	Fruit or seed, leaf	Decoction, Insert in Kachi	Aphrodisiac, anemia, lactiferous, gestational hypertension and hyperlipidemia, carminative, sedative	0.83
		Alhagi maurorum Medik	Harheshak	Arial part	Infusion, distillate	Diuretic, gestational edema	0.15
		Astragalus tribuloides Delile	Sareng, sateng	Arial part	Infusion	Urinary infection	0.13
		Glycyrrhiza glabra L.	Shirinbayan	Root	Pill	Constipation, digestive problem	0.43
		Medicago sativa L.	Yonjeh	Seed	Decoction	Lactiferous menstruation additive	0.19
		Quercus infectoria Olivier	Mazog	Fruit	Cataplasm	Back pain	0.22
13	Lamiaceae	*Melissa officinalis* L.	Semsook	Leaf	Decoction	Diuretic, sedative	0.19
		Mentha sylvestris L. *Mentha pulegium* L.	Podena, porcheng	Leaf, Roots	Infusion, chew, bath	Body heat, kidney stones	0.31
		Otostegia persica (Burm. f.) Boiss.	Golder	Leaf flower	Decoction, cataplasm	Gestational diabetes, hypertension and hyperlipidemia, carminative, sedative for back pain	0.60
		Salvia reuteriana Boiss.	Moor, morpojo	Leaf, flowering branches	Decoction, pill	Gestational diabetes, hypertension and hyperlipidemia	0.42
		Teucrium polium L.	Kalpurak	Flowering branches	Decoction, pill	Sedative, vomit, gestational diabetes, hypertension and hyperlipidemia, menstruation disorders, carminative	0.69
		Salvia officinalis L.	Mangoli	Arial part	Infusion	Menopause hot flashes	0.11
		Melissa officinalis L.	Badranj	Fruit, leaf, flower	Infusion	Menstruation additive	0.14
		Saturea hortensis L.	Marze	Leaf, seed	Decoction	Aphrodisiac, menstrual disorder, carminative	0.16
14	Lauraceae	*Cinnamomum verum* J.Presl	Darchin	Stem bark	Decoction, mixed with honey, condiment	Lactiferous, aphrodisiac, infection, carminative	0.47
15	Xanthorrhoeaceae	*Eremurus spectabilis* M. Bieb.	Serish	Seed	Cataplasm	Back pain	0.13
		Aloe vera (L.) Burm. f.	Orvekharze	Leaf	Pill	Gestational diabetes, abortion	0.27
16	Linaceae	*Linum usitatissimum* L.	Barz	Seed	Cataplasm, moisturized in water	Menstrual pain, restore fertility, menopause, hot flashes	0.24
17	lridaceae	*Crocus sativus* L.	Zafaroon	Stamen	Infusion	Aphrodisiac, abortion	0.80
18	Lythraceae	*Lawsonia inermis* L.	Hanna	Leaf	Cataplasm, moisturized in water	Body heat	0.53
19	Malvaceae	*Althaea officinalis* L.	Hatmi	Flower, root	Moisturized in water, decoction	Body heat, regulation of menstruate	0.31
20	Menispermaceae	*Cocculus pendulus* (J.R. Forst. & G. Forst.) Diels	Zammor	Leaf, root, stem bark	Cataplasm decoction	Heat of body, sedative	0.25
21	Moraceae	*Ficus carica* L.	Anjir	Fruit	Orally	Aphrodisiac, diuretic, constipation	0.36
		Morus alba L.	Toot	Fruit	Orally	Diuretic, constipation	0.21
22	Myrtaceae	*Syzygium aromaticum* (L.) Merr. & L.M. Perry	Mikhak	Cloves (flower buds)	Condiment	Aphrodisiac, vaginal infections nausea	0.24
23	Nyctaginaceae	*Boerhavia elegans* Choisy	Sourhmard	Flower, thin branch, leaf	Orally, infusion	Urinary tract and intestinal infections, inflammation, blood purifier, anemia	0.14
24	Oleaceae	*Olea ferruginea* Royle	Hat	Leaf	Infusion	Gestational diabetes, sedative	0.18
25	Palmaceae	*Phoenix dactylifera* L.	Horma	Fruit, seed	Orally, decoction	Aphrodisiac anemia	0.51
26	Papaveraceae	*Papaver somniferum* L.	Kognal	Latex, seed, fruit bark	Cataplasm, decoction	Sedative, narcotic	0.23

Table 2 Cont.

S. N°	Family	Plant species	Vernacula Name	Part(s) used	Medicinal Preparation(s)	Therapeutic action	RFC
27	Pinaceae	*Pinus sylvestris* L.	Kaj	Cones	Decoction	Kidney and urinary infection	
28	Piperaceae	*Piper nigrum* L.	Phelphelsiah	Fruit	Condiment	Aphrodisiac, carminative	0.55
29	Plantaginaceae	*Plantago major* L.	Barhang	Fruit	Decoction, tincture	Constipation, infection, gestational edema, antifertility	0.18
30	Poaceae	*Zea mays* L.	Zorrat	Tassel, fruit	Orally, infusion	Urinary Infection, diuretic, gestational edema	0.31
31	Portulacaceae	*Portulaca oleracea* L.	Khorfeh	Seed, leaf	Infusion	Infection, menstruation reducer	0.16
32	Pteridaceae	*Adiantum capillus-veneris* L.	Siah lengak	Leaf	Decoction	Menstruation additive, diuretic	0.09
33	Lythraceae	*Punica granatum* L.	Anar	Bark of fruit, fruit	Decoction	Antiseptic, vomit	0.42
34	Ranunculaceae	*Nigella sativa* L.	Siadon	Seed	Mixed with honey, infusion	Aphrodisiac gestational diabetes and hypertension, menstruation additive, abortion, parturition uterus pain	0.92
35	Rhamnaceae	*Ziziphus spina-christi* (L.) Desf.	Sedr, konar	Fruit, leaf	Orally, cataplasm	Hair tonic, gestational edema	0.13
36	Rosaceae	*Rosa gallica* L.	Golsorh	Flower	Decoction	Aphrodisiac, menopause hot flashes	0.50
		Prunus persica (L.) Batsch	Haltak	Leaf	Cataplasm	Heat of body	0.24
		Cotoneaster numularius Fisch. & C.A. Mey.	Shirhesht	Seed	Infusion	Constipation, heat of body, diuretic	0.15
37	Rubiaceae	*Gaillonia aucheri* (Guill.) Jaub. & Spach	Kartoos	Flower	Decoction	Carminative	0.18
38	Rutaceae	*Ruta graveolens* L.	Sadab	Leaf	Decoction	Contraceptive, abortion, menstruation additive, diuretic, carminative	0.26
		Citrus bigaradia Loisel.	Baharnarenj	Flower	Distillate	Menstruation additive	
39	Solanaceae	*Withania coagulans* (Stocks) Dunal	Boozidan	Leaf, root, seed	Pill, decoction/ cataplasm	Gestational diabetes, stomachache, abortion	0.08
40	Urticaceae	*Urtica dioica* L.	Gazane	Fruit, seed, leaf	Decoction	Fertility, anemia	0.13
41	Lamiaceae	*Vitex pseudo-negundo* Hand.-Mazz.	Hale jor	Stem, leaf	Decoction	Gestational hypertension, abortion, menstrual disorders, sedative, lactiferous menopause, hot flashes	0.25
42	Zingiberaceae	*Curcuma longa* L.	Zarchobe	Root	Mix with milk, condiment	Menstruation subtractive, irregular menstrual	0.52
		Zingiber officinale Roscoe	Zangebil	Rhizome	Condiment Decoction	Nausea, carminative	0.28
43	Zygophyllaceae	*Peganum harmala* L.	Espantan	Seed leaf	Smoke, decoction	Gestational diabetes, antiseptic	0.21
		Tribulus terrestris L.	Kharkhasak	Fruit, root, leaf	Decoction	Urinary infection, constipation, carminative	0.29

Table 3
Disease-based categories and ICF (informant consensus factor).

S. N°	Category	Nur (Use citation)	Nt (N° of plants used)	Category Uses Taxon ICF
1	Abortion	93	10	0.20
2	Aphrodisiac	243	14	0.55
	Anemia	287	5	0.67
3	Contraception management	134	2	0.31
4	Digestive problem	282	28	0.61
5	Gestational diabetes,	223	9	0.51
6	Gestational hypertension and hyperlipidemia	230	6	0.53
7	Infections	324	13	0.74
8	Female Infertility	125	2	0.29
9	Menopause	236	8	0.53
10	Menstruation problems	389	23	0.87
11	Sedative	315	10	0.72

than 0.70). Among botanical families, Apiaceae and Lamiaceae were predominant over others exhibiting eight plant species. It is noteworthy that few of plant species like *Quercus infectoria, Crocus sativus, Piper nigrum* and *Zingiber officinale* were not native species of the studied area, but are extensively used by local women. Tribal people import these plants from Baluchistan Province of the neighboring country Pakistan. The current results were in accordance with previously published reports from Pakistan (Mahmood et al., 2013) and Brazil (Mendonca Filho and Menezes, 2003). To evaluate the relative importance of plants in indigenous healthcare systems, use value is used as a micro-statistical tool, which reflects people interaction with specific plants as the best treatments against ailments. Plants with high use value should focus on further phytochemical screenings, to develop/discover new active biological compounds (Mahmood et al., 2012).

Herbal therapies

Tribal communities have diverse knowledge of traditional medicines related to indigenous plants for basic healthcare needs (Rekka et al., 2013). Herbal preparations include different plant mixtures (Fig. 2) and edible forms especially for periodic and obstetric cramps. Kachi is a special dessert for obstetric woman, prepared with rice/wheat flour, butter, sugar and condiments of *Ducrosia anethifolia, Foeniculum vulgare, Anethum graveolens, Trigonella foenum-graecum, Crocus*

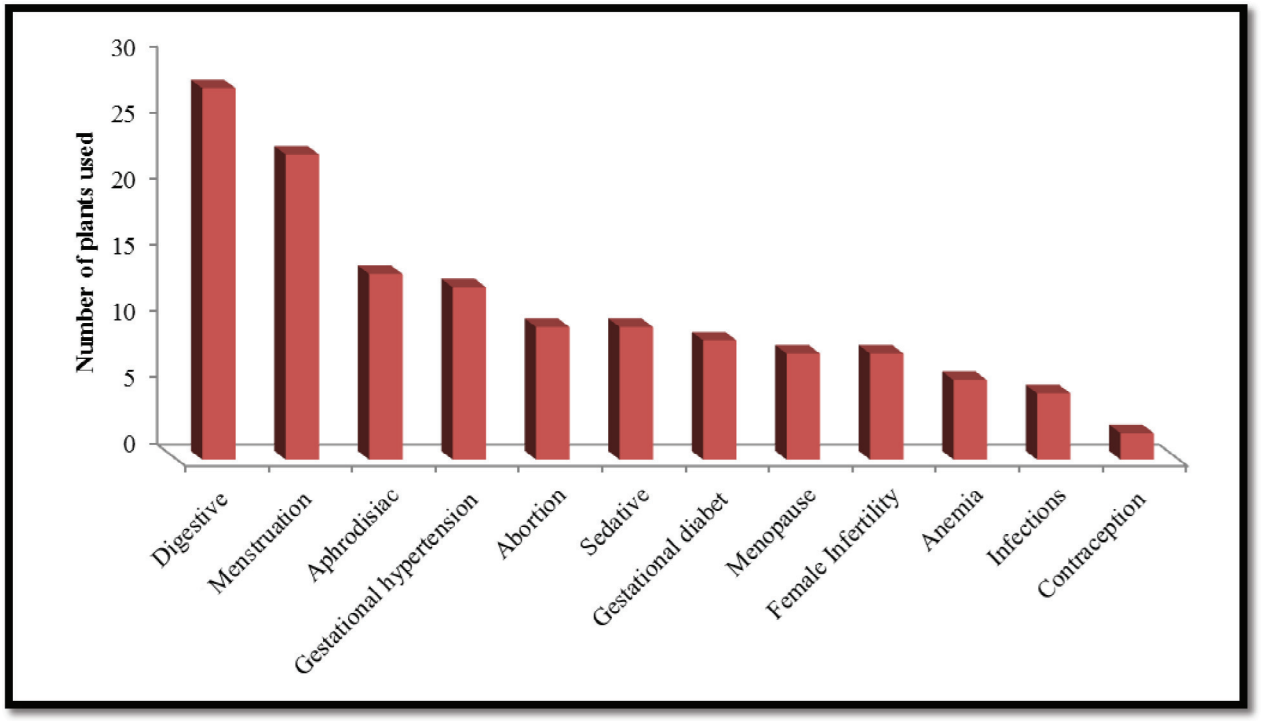

Figure 2 – Plants diversity used for a specific gynecological disorder.

sativus, *Piper nigrum* and *Carum carvi*. These condiments are carminative, lactiferous and phyto-estrogenic. Smoke of *P. atlantica* gum has been reported to exhibit antibacterial activity against vaginal infection and this remedy is very common among the women of the Baluch tribe. This plant has been investigated for its phenolic compounds and triterpenoids (Nunes et al., 2003; Tohidi et al., 2011), which looks a proper justification of antibacterial activity. Parvin et al (2010) reported smoke containing polar phenolic compounds displayed the best antimicrobial activities. The advantages of smoke-based remedies are rapid delivery to the brain, a more efficient absorption by the body and lower costs of production (Mohagheghzadeh et al., 2006). Furthermore, no reported study is available on the antimicrobial properties *P. atlantica*.

Informant consensus factor (ICF)

Medicinal plants used to treat different ailments were categorized into eleven groups of illnesses. These categories were based on the International Classification of Diseases (WHO, 1992) and common disorders faced by the tribal women. The present findings indicated that Baluch women have deep faith on indigenous medicine. They seem to depend upon the plants for curing various diseases including menstrual problems, vaginal infection, conception, digestive tract problems etc. Results of the ICF showed that menstrual problems (0.87), vaginal infections (0.74) and sedative agents (0.72) were the most common problems experienced by the women in the studied area. A wide spectra of indigenous herbal remedies were available to regulate the menstrual cycle. Dosage of remedy is very important, because a high consumption of pyrogenic plants such as *Carum carvi, Crocus sativus* and *Anethum graveolens* may lead to abortion. In all disease categories contraception and abortion have low ICF, which perhaps is due to the opposition towardsabortion from the Muslim community of Baluch tribe. However this view is only common to Muslim religion, not widely accepted (http://www.iranicaonline.org /articles/baluchistan-ia).

Plant part(s) used as therapeutic agents

Plant parts used for the treatment of various ailments were leaves, fruits, seeds, flowers, roots, bark, milky latex, and oil seeds. The leaves were the main part used (27.9%) among others, followed by seeds (19.2%), fruits (15.4%), flowers (13.5%), roots (7.70%), aerial parts (4.80%), and bark and gum (both 3.80%) (Fig. 3). According to the principles of traditional Iranian medicine (TIM), active ingredients of plants work at specific temperaments. Their temperaments have been understood in TIM by different methods such as their pharmacological effects, flavor, odor, and color. There are many herbal pharmacopeias in TIM that describe plants' temperaments such as the volume 20 and twenty one of Al-Havi, Al-Abnya, the second book of Canon, Tohfe- al-omenin, and Makhzan-al-Advia (Shams-Ardekani et al., 2011). Shams-Ardekani et al (2011) investigated Relationship between Temperaments of Medicinal Plants and Their Major Chemical Compounds. The average temperament of the herbs used for gynecological problems is "hot" and "dry". Among the different parts of plants, seeds and dried fruits usually have dry and hot temperament.

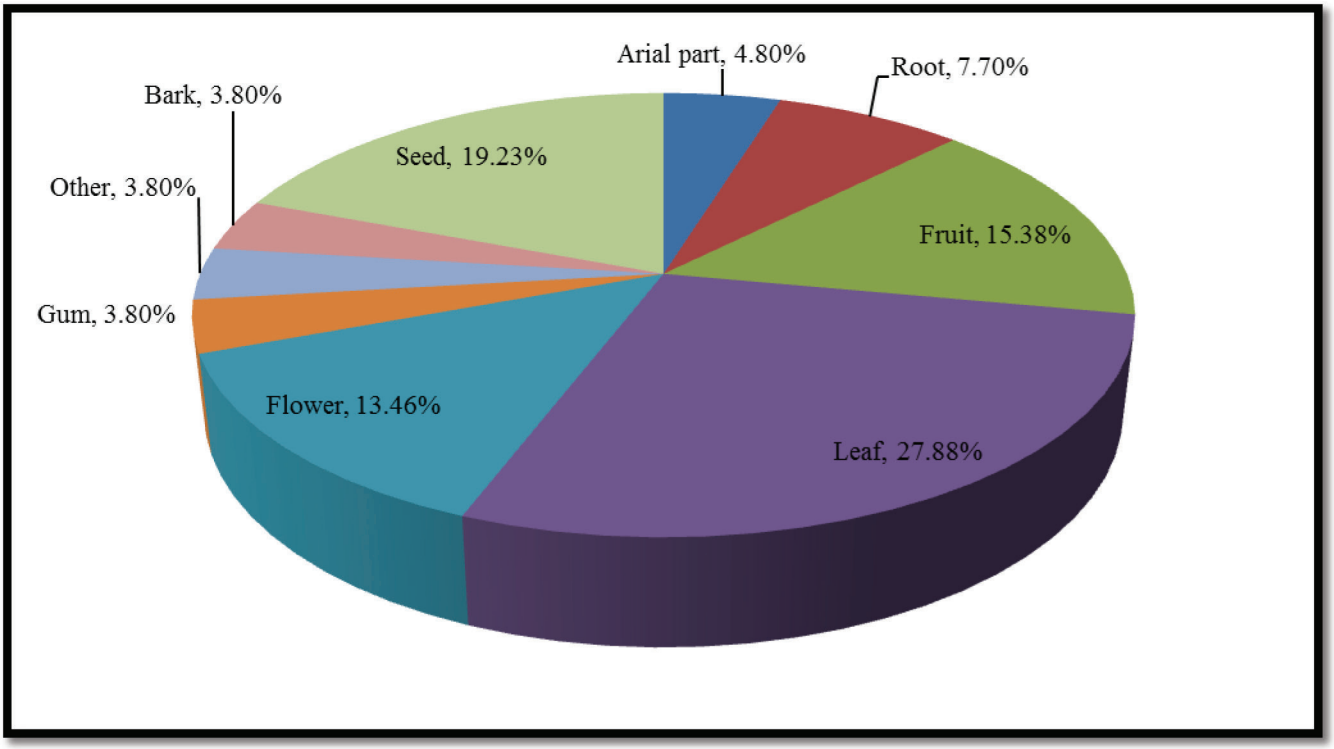

Figure 3 – Proportional presentation of plant parts used for gynecological problems.

Preparation and mode of application

Traditional medicine for the treatment of women diseases include decoctions, infusions, juices, extracts, suppositories, cataplasms, powders, pills, or are sometimes mixed with honey or milk, condiments, smoke and vaginal suppository depending on the type of ailments. Detailed methods for preparation of herbal medicines have been described elsewhere (Mahmood et al., 2013a). The majority of herbal medicines modes of preparation were decoctions and infusions (Fig. 4) while the oral mode of application was predominant over topical administration.

Conclusion

Diversity and efficacy of medicinal plants, along with the positive attitude of local people towards herbal medicines for the treatment of gynecological problems in the study area favored the aims of this study to document this treasure. Old women had a greater relation to indigenous plants and they have potential information on the medicinal values of the indigenous plants. Younger generations have more relation with allopathic medicines that lead to the decrease of indigenous medicinal knowledge. Furthermore, this study will also be useful for conservation of the medicinal flora in future. Widely used medicinal plants should be further investigated to discover better alternatives to the allopathic drugs.

Authors' contributions

ZS contributed in conducting the survey, collecting plant sample and identification, confection of herbarium, running the laboratory work, analysis of the data and drafted the paper. AM supervised this draft contributed to critical reading and final preparation of the manuscript. All the authors have read the final manuscript and approved the submission.

Conflicts of interest

The authors declare no conflicts of interest.

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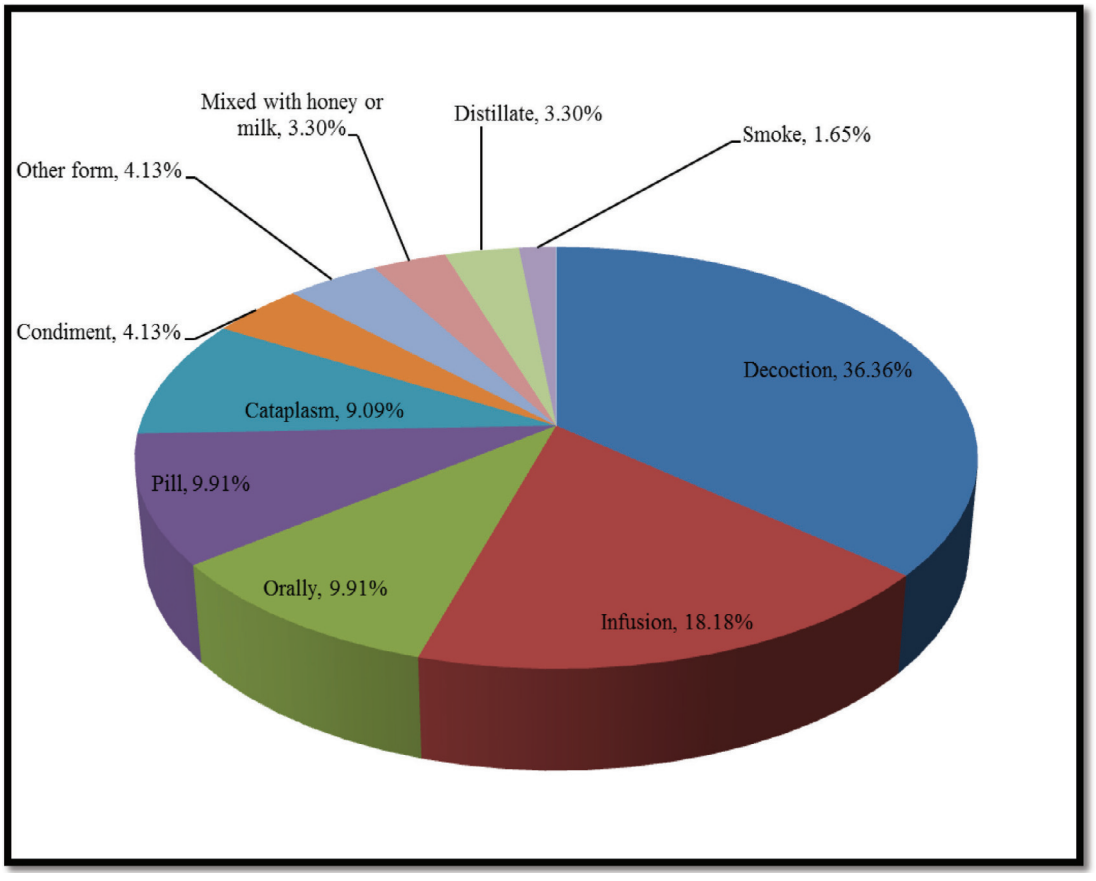

Figure 4 – Proportion of remedial preparations from reported plants of the study area.

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