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FOLK MEDICINE USED FOR THE TREATMENT OF GYNAECOLOGICAL DISORDERS IN RURAL AREAS OF BHADRAK DISTRICT, ODISHA, INDIA

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Abstract

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Folk knowledge of the people in a given community has developed over time and is based on experience often tested over centuries of use, adapted to the local culture and environment and held by individuals or communities. This knowledge on resource utilization by human beings for medicinal purposes might have been established by trial and error, accumulated over thousands of years and often becomes encoded in everyday cultural practices. This study addresses an ethno-medicinal investigation in the interior of Bhadrak district, Odisha, India to explore, document and preserve the traditional knowledge for therapeutic use against gynaecological disorders by local inhabitants. The study is primarily based on field surveys carried out in villages, where traditional healers provided information about plant species used as medicine. Data on the use of medicinal plants were collected using standard procedures. A total of 38 medicinal plant species belonging to 29 families were gathered and documented throughout the study period to cure gynaecological ailments of human being. The predominant families are Fabaceae, Apocynaceae and Amaranthaceae. The most widely accepted plant species for the management of gynaecological ailments are *Achyranthes aspera*, *Adhatoda vasica*, *Asparagus racemosus*, *Boerhavia diffusa*, *Moringa oleifera*, *Phyllanthus emblica*, *Piper nigrum*, *Saraca asoca*, *Trigonella foenum-graecum* and *Zingiber officinale*.

Keywords: ethno-gynaecology, indigenous herbalist, local communities, medicinal plant, traditional knowledge.

INTRODUCTION

Plant-based traditional medical system has been used in almost all cultures throughout the world and still is the mainstay of more than three-quarters of the world's population for their primary healthcare (Kamboj, 2000).This therapeutic knowledge might have been established by trial and error, and in every period, the healing properties of certain medicinal plants are identified, noted, and conveyed to the successive generations (Abebe & Ayehu, 2000). Traditional healers maintained the health of people by herbal products and surgical procedures in prehistoric culture occurred before the invention of writing (Temkin, 1991). With the advent of human civilization, written records of many traditional healthcare

systems (Ayurveda, Siddha, Unani, etc.) have been developed primarily based on plants (Satyavati et al., 1987). Even though modern health care methods have been revolutionized and synthetic drugs give quick action and relief from diseased condition, life threatening adverse effects on vital organs, predominantly hepatotoxicity, nephrotoxicity and severe mortality in some cases cannot be ignored (Variya et al., 2016). The plant kingdom represents a source of drugs and foods. In the developing world, livelihood is strongly linked to natural resource extraction and use (Ramakrishnan, 2007). Many plant-based drugs are still in demand for a variety of diseases such as congestive cardiac failure, bronchitis, skin allergies, inflammatory conditions and others (Panda et al., 2013). About 25% of the drugs prescribed worldwide come from plants, 121 such active compounds being in current use (Rates, 2001). Of the 252 drugs considered as basic and essential by the World Health Organisation (WHO, 1992), 11% are exclusively of plant origin and a significant number are synthetic drugs obtained from natural precursors.

Women seek medical care overall more frequently than men, and also follow more preventative health measures (Sloan, 2001). Therefore, it is not a surprise that one of the largest subgroups of traditional medicine users are women, specifically, the women of reproductive age between 30 and 59 years old (Chambliss, 2001; Romm, 2010). Ethno-gynaecology is an emerging branch that basically deals with women's health care problems, for example, menstrual pain, abortion, menopause, gonorrhoea, leucorrhoea, delivery complaints and infertility (Jain et al., 2016; Patel & Patel, 2012; Lawal et al., 2013). The treatment of female diseases with modern allopathic drugs particularly for an extended period of time has significant side effects such as nausea and vomiting, digestive problems; liver and kidney problem, and heart impairment related to drug intake (Lawal et al., 2013). Herbal medication hold highly reputational position in the developing countries like India, becoming popular among people of both urban and rural areas to their safety, efficacy and affordability (Balamurugan et al., 2017).

A perusal of literature reveals that many ethnobotanical studies have been carried out on the medicinal use of herbal plants throughout the globe including India (Islam et al., 2014; Sadeghi et al., 2014; Akour et al., 2016), but very few studies have been performed on the use of traditional remedies for gynaecological care (Das et al., 2015; Balamurugan et al., 2017). This study was performed in Bhadrak district of Odisha, India, where many women seek treatment from traditional healers for a variety of complications associated with the female reproductive organ. Such knowledge has not been documented previously from the study region. Documentation of indigenous medicinal practices is important not only from the point of view of human-plant relationships (Alcorn, 1981), but more so because many important modern drugs have come out following close observations of the traditional medicinal practices of indigenous communities (Gilani & Rahman, 2005). Hence, the present study is designed to collect, identify and document the ethno-gynaecological uses of medicinal plants and to highlight candidate plants for further pharmacological investigations.

MATERIALS AND METHODS

Bhadrak district (20°43′−21°13′ N and 86°6′−87° E) is located in northeast Odisha and covers an area of 2505 km^2, with a population of 1.507 million (2011 Census). It borders the Balasore district in the north, Jajpur in the south, Bay of Bengal and Kendrapara district in the east and Koenjhar in the west. The district accounts for 1.61% of the state's territory and shares 3.62% of the state's population. The climate of the district is warm and humid. The maximum and minimum temperatures range from 37.4 °C to 17.7 °C, respectively, and the annual average rainfall is approximately 1428 mm (Anonymous, 2009).

Our field study was carried out from September 2016 to November 2017. Data on the use of medicinal plants were obtained through questionnaires and informal conversations according to Martin (1995) and Huntington (2000). The interviews were carried out individually as well as in groups with members of the local population. We interviewed "native specialists", who were considered by their communities as having exceptional knowledge of the use of plants. Eighty three (58 men and 25 women) persons were interviewed. Among the interviewees, 10% were 21−40 years of age, 40% were 61 years

old or more and 50% were 41−60 years of age. Surveys were conducted in 49 villages covering all the blocks of the district. Interviewees were consulted to record local plant names, parts of plants used, methods of drug preparation and recommended doses. Personal interviews and group discussions with local inhabitants revealed some valuable and specific information about the plants that were authenticated by crosschecking (Cunningham, 2001). The voucher specimen of plant species were identified by using standard floras and available literature (Haines, 1925; Saxena & Brahmam, 1996). The list of medicinal plants was depicted along with their botanical names followed by family name and the parts used for medicinal purpose.

RESULTS AND DISCUSSION

A total of 38 medicinal plant species of ethnopharmacological importance were gathered and documented throughout the study period to cure gynaecological diseases of human being (Table 1; Fig. 1, 2).

These medicinal plants were distributed among 29 families. Among botanical families, Fabaceae was predominant over others exhibiting seven plant species. Predominance of species belonging to the family Fabaceae in this region is comparable with Prabhu et al. (2013) and Prabhu & Vijayakumar (2016). During the present study, the following most frequently used plant species for the treatment of

Table 1. Ethnobotanical inventory of medicinal plants used for gynaecological disorder in Bhadrak district, Odisha, India

Sl. No.	Botanical name & Family	Local name	Parts used	NI	NV	Mode of use
1	*Achyranthes aspera* L. (Amaranthaceae)	Apamaranga	Twig	47	34	Juice from tender twigs is used for the complicacy of labour.
2	*Acorus calamus* L. (Araceae)	Bacha	Tuber	12	9	Tubers with water are used for labour pain.
3	*Adhatoda vasica* Nees. (Acanthaceae)	Basanga	Root	54	41	Paste of roots is used for leucorrhoea.
4	*Aegle marmelos* (L.) Corr. (Rutaceae)	Bela	Bark	22	13	The bark powder with root juice of *Oroxylum indicum* and *Mangifera indica* (leaf) is used for labour pain.
5	*Aloe vera* (L.) Burn.f. (Xanthorrhoeaceae)	Ghekuanari	Leaf	23	12	Leaf is used for easy delivery.
6	*Amaranthus spinosus* L. (Amaranthaceae)	Kantasaga	Whole plant	26	14	Paste from whole plant is used for leucorrhoea. Juice from roots is used to reduce menstrual flow.
7	*Anthocephalus cadamba* (Roxb.) Miq. (Rubiaceae)	Kadamba	Stem	08	05	Stem bark is used for genital tract and bleeding disorders.
8	*Argemone mexicana* L. (Papaveraceae)	Kantakusum	Leaf	09	05	Leaves with *Piper nigrum* is used for leucorrhoea.
9	*Asparagus racemosus* Willd. (Asparagaceae)	Satabari	Root	57	41	Root paste is used for quick delivery.
10	*Boerhaavia diffusa* L. (Nyctaginaceae)	Puruni	Whole plant, root	43	32	Decoction of whole plants is used for leucorrhoea. Root paste with water is used to hasten delivery.
11	*Barassus flabellifer* L. (Arecaceae)	Tala	Inflore-scence	13	8	Paste of male inflorescence with black pepper powder *(Piper longum)* is used as contraceptive. Root paste is used for prolonged menstrual cycle.
12	*Bombax cieba* L. (Malvaceae)	Simli	Bark	19	07	Stem bark powder with water is used to increase labour and smooth delivery.
13	*Butea monosperma* (Lam.) Taub. (Fabaceae)	Palash	Bark	31	21	Decoction of bark is used to cure leucorrhoea, amenorhoea, dysmenorrhoea and menstrual disorders.
14	*Catharanthus roseus* (L.) G. Don (Apocynaceae)	Sadabihari	Leaf	32	20	Leaf juice with honey is used to treat leucorrhoea and menorrhagia.

Sl. No.	Botanical name & Family	Local name	Parts used	NI	NV	Mode of use
15	*Centella asiatica* (L.) Urban (Apiaceae)	Thalkudi	Leaf	29	18	Leaf juice with water is used for irregular menstruation.
16	*Clitoria ternatea* L. (Fabaceae)	Aparajita	Root	21	13	Root paste with black pepper is used for leucorrhoea.
17	*Cynodon dactylon* (L.) Pers. (Poaceae)	Duba	Whole plant	33	17	Paste from whole plant is used for leucorrhoea.
18	*Dioscorea alata* L. (Dioscoreaceae)	Khamba Alu	Tuber	27	24	Boiled tubers are used for general weakness after delivery.
19	*Mangifera indica* L. (Anacardiaceae)	Amba	Bark	25	15	Decoction of stem bark with black pepper is used to stop bleeding from uterus.
20	*Michelia champaca* L.(Magnoliaceae)	Champa	Bark	11	05	Dried stem bark with water is used for irregular menstruation cycle.
21	*Moringa oleifera* Lam. (Moringaceae)	Sajana	Root, bark	66	42	Root and bark with warm milk is used to induce abortion, menstrual disorders and several venereal diseases.
22	*Nelumbo nucifera* Gaertn. (Nelumbonaceae)	Padma	Rhizome	27	14	Decoction of rhizome is used for leucorrhoea and other menstrual problems.
23	*Nymphaea nouchali* Burm.f. (Nymphaeaceae)	Nila Kain	Rhizome	30	17	Rhizome paste with honey is used to regulate menstruation.
24	*Ocimum sanctu*m L. (Lamiaceae)	Tulsi	Leaf	34	19	Leaf juice with gur and cow milk is used to relieve pain after delivery.
25	*Phyllanthus emblica* L. (Phyllanthaceae)	Aonla	Seed	51	38	Seed paste with honey is used for leucorrhoea.
26	*Piper nigrum* L. (Piperaceae)	Golmaricha	Seed	59	39	Decoction of seed is used for weakness after delivery.
27	*Pterospermum marsupium* Roxb. (Fabaceae)	Piasal	Bark	07	04	Paste of bark with honey is used for leucorrhoea and menorhagia.
28	*Punica granatum* L. (Lythraceaae)	Dalimba	Flower	14	07	Paste of flower with honey is used for leucorrhoea and menorrhagia.
29	*Rauvolfia serpentina* (L.) Benth. ex. Kurz. (Apocynaceae)	Sarpagandha	Root	25	13	Root decoction with cow milk is used for uterine contraction and expansion of foetus.
30	*Saraca asoca* (Roxb.) Willd. (Fabaceae)	Ashok	Bark	73	44	Decoction of bark is used for menstrual and uterine disorders.
31	*Spondias pinnata* (L.f.) Kurz. (Anacardiaceae)	Salama	Root	13	04	Root paste is used for menstrual cycle.
32	*Strychns nux vomica* L. (Loganiaceae)	Kuchila	Seed	09	05	Seed powder with water is used to treat menstrual disorders.
33	*Tamarindus indica* L. (Fabaceae)	Tentuli	Fruit	15	09	Fruit paste with honey is used for menorrhagia.
34	*Terminalia arjuna* (Roxb.) Wight. & Arn. (Combretaceae)	Arjuna	Bark	39	22	Stem bark with honey and water is used for leucorrhoea and menorrhagia.
35	*Tephrosia purpurea* (L.) Pers. (Fabaceae)	Banakulathi	Leaf	16	07	Leaf decoction with honey is used for post-natal complications.
36	*Trigonella foenum-graecum* L. (Fabaceae)	Methi	Seed	26	16	Seed powder with water is used for abdominal pain during menstrual flow.
37	*Zingiber officinale* Roscoe (Zingiberaceae)	Ada	Rhizome	61	43	Dried rhizome powder + powder of *Piper longum* with cow ghee is used to relieve pain and weakness after delivery.
38	*Ziziphus mauritiana* Lam. (Rhamnaceae)	Barkoli	Bark	18	11	Paste of stem bark with water is used for abdominal pain during pregnancy.

NI: Number of informants, who reported the use of species for the treatment of gynaecological disorder, NV: Number of villages, where the reported plant species is used for gynaecological ailments.

gynaecological diseases were reported: *Achyranthes aspera* L., *Asparagus racemosus* Willd., *Adhatoda vasica* Nees., *Boerhavia diffusa* L., *Moringa oleifera* Lam., *Phyllanthus emblica* L., *Piper nigrum* L., *Saraca asoca* (Roxb.) Willd., *Terminalia arjuna* (Roxb.) Wight. & Arn., *Trigonella foenum-graecum* L. and *Zingiber officinale* Roscoe. It was found that the bark of *Saraca asoca* is used for menstrual and

Fig. 1. Some plant species observed during the study: (a) *Achyranthes aspera* L., (b) *Adhatoda vasica* Nees., (c) *Aegle marmelos* (L.) Corr., (d) *Aloe vera* (L.) Burn.f., (e) *Amaranthus spinosus* L., (f) *Boerhavia diffusa* L., (g) *Bombax cieba* L., (h) *Butea monosperma* (Lam.) Taub., (i) *Catharanthus roseus* (L.) G. Don., (j) *Centella asiatica* (L.) Urban, (k) *Moringa oleifera* Lam., (l) *Nelumbo nucifera* Gaertn. (Photo:Taranisen Panda)

uterine disorders. In India, barks of *Saraca asoca* are widely used for gynaecological disorders. This plant has remained one of the oldest known medicinal plants in Indian texts dating back to thousands of years. The treatise of *Susruta* (500 BC), *Chakradatta* (a text of the 11th century), the 12th century work *Gadanigraha* of Sodhala and Ayurvedic treatise *Bhaisajya Ratnavali* describe its uses in menorrhagia,

Fig. 2. Some plant species observed during the study: (a) *Nymphaea nouchali* Burm.f., (b) *Ocimum sanctu*m L., (c) *Phyllanthus emblica* L., (d) *Punica granatum* L., (e) *Rauvolfia serpentina* (L.) Benth. ex. Kurz., (f) *Saraca asoca* (Roxb.) Willd., (g) *Spondias pinnata* L.f.) Kurz., (h) *Strychns nux vomica* L., (i) *Tamarindus indica* L., (j) *Tephrosia purpurea* (L.) Pers., (k) *Terminalia arjuna* (Roxb.) Wight. & Arn., (l) *Ziziphus mauritiana* Lam. (Photo: Taranisen Panda)

uterus pain, disorders of the womb and severe bleeding (Begum et al., 2014). In India, Sri Lanka, Bangladesh and Pakistan, the bark is used by womenfolk in treating menorrhagia, leucorrhoea, menstrual and uterine disorders (Shukla et al., 2008; Pradhan et al., 2009; Mollik et al., 2010; Begum et al., 2014). In the study area, root and bark of *Moringa oleifera* was used to induce abortion of women, menstrual disorders and several venereal diseases. The aqueous extract of root and bark of *Moringa oleifera* showed post- coital anti-fertility in albino rat and also induced foetal resorption at late pregnancy (Prakash et al., 1987). It also shows abortifacient and teratogenic effect (Nath et al., 1992), induces biochemical alteration in female genital tract of ovariectomised rat (Shukla et al., 1989) and exhibits biphasic effect on periodicity of oestrous cycle in adult intact rat (Shukla et al., 1987). Root of *Adhatoda vasica* is utilized for the treatment of leucorrhoea. *Adhatoda vasica* leaves are used to stimulate and heal before and after delivery, as an abortifacient and for post-partum haemorrhage and urinary trouble (Hossain & Hoq, 2016). Root is used to treat leucorrhoea, help in parturition and facilitates the expulsion of foetus (Hossain & Hoq, 2016). The phyto-chemical studies of the various parts of *Adhatoda vasica* have revealed the presence of vasicine alkaloids. The investigations on the activity of vasicine in stimulating uterine contractions, human myometrial strips taken from the uteruses of both pregnant and non-pregnant women have shown to induce uterine contractions, with effectiveness similar to the drug oxytocin (Pahwa et al., 1987). Research on rats, rabbits, hamsters and guinea pigs have indicated that vasicine has uterotonic and abortifacient effects possibly by enhancing the synthesis and release of prostaglandins (Hossain & Hoq, 2016). In our study, the whole plant of *Boerhavia diffusa* was found to be used for the treatment of leucorrhoea, and root to hasten the delivery. *Boerhavia diffusa*is a well-known medicinal plant much used in Ayurveda and Unani medicines and other traditional medicines in many parts of the world (Chaudhary & Dantu, 2011). People in different indigenous groups of India use this plant to hasten childbirth (Shah et al., 1983). Whole plant and root is used to treat leucorrhoea by the people of South West Bengal and Vedaranyam taluk, South India (Das et al., 2015; Balamurugan et al., 2017). Studies of Seth et al. (1986) have reported that the ethanolic extract of root of *Boerhaavia diffusa* on monkeys stop the intrauterine contraceptive device (IUCD)-induced bleeding. Jain et al. (2016) have concluded that the methanolic extract of *Boerhaavia diffusa* root on female albino rats shows significant anti-fertility activity. The current investigation recorded the root of *Asparagus racemosus* for quick delivery. *Asparagus racemosus* is used in all female related problems such as sexual debility (Frawley, 1997), polycystic ovarian diseases, dysmenorrhoea, premenstrual syndrome, infertility and menopause (Sahrawat et al., 2014), and pelvic inflammatory disease like endometriosis (Prasad et al., 2002). It also supports deeper tissue and builds blood and so it helps to remove infertility, prepare the womb for conception, prevents miscarriage and acts as a post-partum tonic by increasing lactation and normalize the uterus, prolapse of uterus and the balancing reproductive hormones level (Mitra et al., 1999; Kalia et al., 2003*)*. In the study area, the juice of tender twig of *Achyranthes aspera* was used to reduce the complicacy of labour. *Achyranthes aspera* is used to stop bleeding after abortion and to facilitate delivery and stimulate labour pain (Jain, 1991; Qureshi & Bhatti, 2009). The aerial parts of the plant have been reported to prevent pregnancy in adult female rats (Wadhwa et al., 1986). Similarly, various authors have reported the ethno-medicinal use of several herbal remedies for gynaecological disorder and have confirmed potentials for leaf of *Aloe vera* (L.) Burm.f., leaf and root of *Argemone mexicana* L., flower bud and stem bark of *Butea monosperma* (Lam.)Taub*.,* whole plant and leaf of *Centella asiatica* (L.) Urban, whole plant of *Cynodon dactylon* (L.) Pers., flower of *Punica granatum* L., seed of *Phyllanthus emblica* and *Piper nigrum*, fruit of *Tamarindus indica* L., stem bark of *Terminalia arjuna*, seed of *Trigonella foenum-graecum* and rhizome of *Zingiber officinale* (Panghal et al., 2010; Sarma & Kumar, 2011; Gogoi & Zaman, 2013; Kalita et al., 2013; Rekka et al., 2013; Das et al., 2015; Shali Saheb et al., 2017; Sushen et al., 2017), however, in some cases, parts and methods of uses are different (Jain, 1991). Analysis of the growth forms of these medicinal plants revealed that herbs constituted the largest number or proportion with 16 species (44.4%), followed by trees (41.7%), climbers (8.3%) and shrubs (5.6%). The common use

of herbaceous medicinal plants has also been reported in other parts of the world and attributed to their wide range of bioactive ingredients (Uprety et al., 2010). Plant species have primarily been harvested from the wild (55.5%), which indicates that villagers depend on natural environment to obtain medicinal plants. Barks were the plant parts most frequently used, constituting 23.1%, followed by root (20.5%), leaf and rhizome (12.8% each), seed (10.3%), whole plant (7.7%), fruit (5.1%), and the remainders (7.7%) were flower, inflorescence and twig, respectively. Most preparations of remedies in our study area involved the use of single plant; however, some of the remedies are prepared by combining different plants, for example, the bark powder of *Aegle marmelos* (L.) Corr. mixed with root juice of *Oroxylum indicum* (L.) Benth. ex Kurz and leaf juice of *Mangifera indica* L. is used for labour pain patient. According to traditional healers, complex medicines of two or more plant species are more potent than those prepared with a single species. The use of multiple therapies in traditional medicine based on combining plants has shown to increase the efficacy of some herbal medicines (Zonyane et al., 2012). According to Bussmann & Sharon (2006), the use of more than one plant species to prepare a remedy for ailments is attributed to the additive or synergistic effects that they could have during ailment treatment.

The methods for preparation of the therapeutic materials sometimes varied from individual to individual (e.g., the same plant material for the same ailment could be prepared in different ways, depending upon the preferences of different healers). The plants were used in various forms for different ailments. The most frequently used form was paste. The paste was prepared by grinding the fresh or dried plant parts with oil or water. In some cases, the processing involved drying of the plant material followed by grinding into fine powder. The juice was taken orally along with water or milk or honey. Plant species were also used in a raw form (taken orally). Decoction was obtained by boiling the plant parts in water until the volume of water reduce to required amount. Higher use of paste preparation for the treatment of gynaecological disorder is in accordance with Rajkumar & Shivanna (2009) and Giday et al. (2010). Water is commonly used as a solvent for the preparation of herbal remedies and sometimes milk or honey is added to increase a viscosity of the preparation (Mahmood et al., 2013; Islam et al., 2014). During the period of investigation, it was found that besides traditional herbal healers, some elderly person (age group 50–70 years) both man and woman in the villages possess sound knowledge and understanding about medicinal use of some plants, especially those species that are often used for curing common diseases such as fever, cough and cold, wounds, cuts, etc. Most of the people reported that traditional knowledge was passed through verbal communication and repeated practice. The healers reported that knowledge of the use of plants was passed to one of their family members without revealing this knowledge to the others.

The present study indicates that folk medicine still exists among people and plays a significant role in the treatment of human gynaecological disorders and also testifies ancient traditions in rural areas of Bhadrak district, Odisha, India. Moreover, providing modern medical healthcare, especially in developing countries, is still a far reaching goal due to economic constraints. The current study provides a baseline for future pharmacological research in the field of gynaecology. Therefore, it is necessary to focus on the reported plants to produce new pharmaceuticals against gynaecological diseases for the enhanced posterity of mankind.

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GINEKOLOGINIŲ LIGŲ GYDYMAS LIAUDIES MEDICINOJE BHADRAK RAJONO ODISHA KAIMO VIETOVĖSE INDIJOJE

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Santrauka

Liaudies medicinos žinios remiasi tam tikroje bendruomenėje susiformavusia ir žmonių saugoma patirtimi, kuri patikrinta per šimtmečių naudojimą ir yra artima vietos kultūrai bei aplinkai. Šios žinios apie augalų naudojimą gydymui buvo įgytos ir sukauptos per ilgamečius bandymus ir klaidas kasdieninės praktikos metu. Straipsnyje apžvelgiamos originalios liaudies medicinos žinios apie ginekologinių sutrikimų gydymą Bhadrak rajono Odisha kaimo vietovėse Indijoje. Informacija apie gydymui naudojamas augalų rūšis surinkta vykdant minėtų vietovių liaudies gydytojų apklausą. Tyrimo metu buvo surinkta informacija apie 38 vaistinių augalų rūšis, atstovaujančias 29 šeimas, kurių svarbiausios Fabaceae, Apocynaceae ir Amaranthaceae. Nustatyta, kad ginekologinių sutrikimų gydymui dažniausiai yra naudojamos šios augalų rūšys: *Achyranthes aspera*, *Adhatoda vasica*, *Asparagus racemosus*, *Boerhavia diffusa*, *Moringa oleifera*, *Phyllanthus emblica*, *Piper nigrum*, *Saraca asoca*, *Trigonella foenum-graecum* ir *Zingiber officinale*.