

# The Journal of Phytopharmacology

(Pharmacognosy and phytomedicine Research)

## Review Article

ISSN 2320-480X

JPHYTO 2021; 10(6): 490-495

November- December

Received: 03-10-2021

Accepted: 15-11-2021

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doi: 10.31254/phyto.2021.10610

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## Traditional pteridophytic herbal medicines and reproductive health disorders in women- A Review

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### ABSTRACT

In search for treatment of their disease, people looked for drugs in nature since ancient times. To support this, there is ample evidence from various sources like written documents, preserved monuments and even original plant medicines. Quite a large number of ferns and fern allies are being utilized in different ways as traditional herbal medicine by different tribal communities, ethnic groups and folklore throughout the world for the treatment of different illnesses. This article reviewed the ethnomedicinal use of pteridophytes especially for the treatment of reproductive health related disorders in women.

**Keywords:** Pteridophytes, Herbal medicine, Secondary metabolites, Reproductive health.

### INTRODUCTION

Plants are a natural source of food, fuel, shelters, medicines, which are used by all human civilizations since ancient times. Until the advent of iatrochemistry in 16<sup>th</sup> century, plants had been the source of treatment and prophylaxis <sup>[1]</sup>. Information about the benefits of herbal drugs is known in our ancient literature of Ayurvedic, Siddha, Unani and Chinese medicine <sup>[2]</sup>. Humans have relied on medicinal plants for healing ailments as they are the major source of new therapeutic agents (bioactive substances) that helps to alleviate human ailments and promote health. These therapeutic abilities of medicinal plants are conferred by the presence of secondary metabolites <sup>[3]</sup>. The most commonly reported are flavonoid glycosides, mainly kaempferol, quercetin, luteolin and apigenin derivatives. In the modern technocratic world, the traditional system of medicine plays an important role in health care of urban, rural and tribal people for all types of ailments.

Pteridophytes (aka, ferns and fern allies) have been known for its medicinal and therapeutic values, gaining importance in plant-based novel drug therapy. Many species of this plant division are highly ignored and are determined to have an array of potential secondary metabolites that act against various diseases <sup>[4]</sup>. They can be used directly or in extracted forms for the management of various ailments due to the presence of various secondary metabolites <sup>[3]</sup>. The limited knowledge of these medicinal plants for disease control and their weed habitat make these ferns to be destroyed by human. The ferns had an important role in folklore medicine and are being used as valuable sources of food and medicine for the prevention of illness and maintenance of human and animal health. These days, plant-derived extracts are extensively considered due to their lack of side effects, and many are currently being used traditionally as ethnomedicine for the prevention and treatment of different types of infections <sup>[5]</sup>. According to the WHO, 2003 about 85% of the population of developing countries being unable to afford modern pharmaceutical drugs relies on traditional medicines, mainly plant based, to sustain their primary health care needs. Therefore, this article reviewed some of the pteridophytic taxa used as traditional herbal medicine for the treatment of reproductive health related diseases of women. A detail literature survey revealed that there are about 47 pteridophytic taxa belonging to 24 different families are being used as traditional herbal medicine to cure various reproductive health related diseases of women. A Summary of ethnomedicinal uses of pteridophytes in reproductive health disorders in women is also given in table 1.

### USES OF PTERIDOPHYTES IN REPRODUCTIVE HEALTH RELATED DISORDERS IN WOMEN

The families and genera of different pteridophytes have been arranged according to R.E.G. Pichi Sermolli's <sup>[6]</sup> system of classification.

***Adiantum capillus-veneris* Linn.** (Family- Adiantaceae, popularly known as **Maidenhair Fern**, locally as **Hansraj**): Aqueous extract of fresh leaves (2-5 tsp) along with tea is used in the treatment of irregular stoppage of menses, cold imposthumes of uterus and to facilitate childbirth and extracting placenta <sup>[7, 8, 9]</sup>. Frond decoction is given orally to remove infertility in women <sup>[11]</sup>. The whole fern is used as

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aphrodisiac that arouses sexual instinct, brings on desire, or increases sexual pleasure or performance [12].

*Adiantum lunulatum* Burm. f. (Family- Adiantaceae, locally known as): Decoction of fresh leaves is given to cure irregular menstrual cycle. Plant paste is given to women to help them to conceive [13].

*Adiantum philippense* Linn. (Family- Adiantaceae, popularly known as *walking maidenhair fern*, *Goyali Lota*, *Kalijhant in Bengali*, *Hamsapadi in Hindi*): Powder of dried rhizome (2-3 tsp) mixed with water and is used orally once for 3-5 days during menstrual period for contraception /for sterility by tribal women [9, 14]. Decoction of fresh fronds (2-3 tsp) is used in abnormal or irregular stoppage of menses /emmenagogue [15].

*Adiantum pedatum* Linn (Family- Adiantaceae): Aqueous extract of young fronds is given orally for the treatment of irregular menstruation in females [16].

*Actinopteris radiata* (Sw.) Link (Family- Actinopteridaceae, popularly known as *Mayurshikh*, *Morpankhi*): For the treatment of leucorrhea and to increase fertility fresh paste or dried powder of leaves with honey is used orally twice a day [17]. Inception of pregnancy is promoted if juice of fresh leaves mixed with fresh cow milk is taken once a day for a week or the leaves ash (2-3gm) mixed with fresh cow milk is given to lady for a night after menses [15]. Oral consumption of fresh leaves with sugar twice a day is used as aphrodisiac substance and as strength tonic to increase the potency in women [14].

*Acrostichum aureum* L. (Family: Pteridaceae, common name- **leather fern**, popularly known as **swamp fern** or **mangrove fern**): Aqueous extract made from fronds is administered orally for the promotion of healthy pregnancy [18].

*Alsophila gigantea* Wall. Ex Hook. (Family - Cyatheaceae): The fresh rhizome (10 gm) crushed and mixed with 1g of black pepper powder and taken orally with cow milk twice a day for seven days in empty stomach against white discharge in women [19].

*Asplenium indicum* Sledge (Family- Aspleniaceae): Fresh rhizome paste (5 gm) is mixed with 10 ml milk and taken thrice a day for a week for the treatment of gonorrhoea [20].

*Asplenium laciniatum* D. Don, Prod (Family- Aspleniaceae): Paste of root along with cow's urine is give orally for the treatment of leucorrhea [13, 21].

*Asplenium singaporianum* (Family- Aspleniaceae): Decoction of fronds is used to stop bleeding after child birth [16].

*Asplenium trichomanes* L. (Family- Aspleniaceae, locally known as *Do patiya chhoti*): Decoction of fresh/dried plant (2-3 tsp.) used in abscess of uterus while to promote menstruation 1 teaspoon of dried fronds is used orally for a week [22].

*Asplenium yoshinagae* Makino var. *planicaule* (Wall. ex Mett.) Morton (Family- Aspleniaceae, locally known as *Do patiya badi*): For the treatment of gonorrhoea fresh rhizome paste is mixed with milk and administrated orally to affected female thrice a day for 7 days [19].

*Blechnum orientale* L. (Family- Blechnaceae, locally known as *Hastajori*, *Shield Fern*): Complete sterility is claimed by tribal

women who eat the top new leaves of this fern each day for 3 days, then wait 2 weeks before repeating the treatment [23].

*Cheilanthes farinosa* (Forsk.) Kaulf (Family- Sinopteridaceae, popularly known as *Chandi booti*, *Nanha*, *Silver fern*): Decoction of fronds is used orally for a week to treat irregular menstruation [24].

*Cheilanthes albomarginata* Clarke (Family- Sinopteridaceae, commonly known as *Nanha*): Powdered dried leaves are mixed with crushed ginger rhizomes (*Zingiber officinale* L.) and used for the treatment of infertility in women [25].

*Davallia solida* (G. Frost.) Sw. (Family- Davalliaceae): Whole fern is used in the treatment of dysmenorrhea and leucorrhoea [21].

*Dicranopteris linearis* (Burm.) Underwood (Family- Gleicheniaceae, locally known as *Rajhans*, *Thicket fern*): Frond decoction along with warm milk is used in the removal of sterility of women [7, 8, 26, 27].

*Diplazium esculentum* (Retz.) Sw. (Family- Athyriaceae, popularly known as *Lingra*): Young fronds of this fern are used by pregnant women as protection against difficult child birth [16].

*Dryopteris cochleata* (D. Don) C. Chr. (Family- Aspidiaceae, popularly known as *Kakolisag*, *Jatashankari*): Extract of the whole fern is used as cooling medicine for gonorrhoea [7].

*Equisetum ramosissimum* Desf. (Family- Equisetaceae): Dried powder of this fern-ally is orally administered for the improvement of the fertility of women [16].

*Equisetum ramosissimum* Desf. ssp. *debile* (Roxb. ex Vauch) Hauch (Family- Equisetaceae, known as *Had-jod*): Decoction of rhizome of this fern-ally is given orally twice a day for a month to facilitate fertilization in women and to cure gonorrhoea [7, 8].

*Glaphyopteridopsis erubescens* (Wall ex Hook.) Ching (Family- Thelypteridaceae): Decoction of the young fronds has promising effect in the treatment of gonorrhoea especially for leucorrhoea [28].

*Helminthostachys zeylanica* (Lin) Hook (Family- Helminthostachyaceae, commonly known as 'Dhimraj'): Whole plant is used as aphrodisiac [11].

*Hypodematium crenatum* (Forssk.) Kuhn (Family- Athyriaceae, popularly known as *Bhoot Kesari*, *Jaributti*): Paste/dry powder of leaves along with fresh cow milk is taken after five days of menstrual period for about a week to facilitate conception in women [7, 8, 29].

*Lygodium flexuosum* (Linn.) Sw. (Family- Lygodiaceae, locally known as *Kalijar*, *Climbing fern*): Juice of the fern is used in the treatment of gonorrhoea and dysmenorrhea [28] and to cure menorrhagia and female infertility [13, 25].

*Lygodium reticulatum* Schkuhr (Family- Lygodiaceae): Decoction of both frond and rhizome is used for the effective treatment of dysmenorrhea and for contraception in women [8, 9, 21, 30].

*Marsilea quadrifolia* L. (Family- Marsileaceae, commonly known as '*water clover*' or '*pepperwort*'): The whole fern is used to increase sexual desire in females [25].

**Microsorium membranifolium** (R.Br.) Ching. (Family- Polypodiaceae): Juice of the fern is used in dysmenorrhea, gonorrhoea, leucorrhoea [21].

**Nephrolepis acuta** Wall. (Nephrolepidaceae): The whole fern is used to treat dysmenorrhea [20].

**Nephrolepis cordifolia** (L.) C. Presl (Family- Nephrolepidaceae, also known as ‘Nechii’, ‘Ladder fern’): Extract of rhizome of this fern is used once during menstrual period to cause permanent sterility in women [8, 30, 31, 32].

**Nephrolepis exaltata** (L.) Schott (Family- Nephrolepidaceae, known as ‘Fish bone fern’): Rhizome extract is used against women’s sterility, in menstrual disorders and as birth-aid in parturition [19, 33].

**Oleandra colubrina** (Blanco) Copel. and **Oleandra neriiformis** Cav. (Family- Oleandraceae): Stipe of these ferns is used as emmenagogue [16].

**Ophioglossum reticulatum** L. (Family- Ophioglossaceae, commonly known as ‘Van palak’, ‘Brahmi fern’): Fresh fronds along with rice are boiled and taken orally in empty stomach for 15-20 days against menstrual disorders [13]. The juice of whole plant is used in the treatment of uterine hemorrhage and leucorrhoea [20] and also given to the women after delivery as strength tonic [34].

**Osmunda regalis** L. (Family- Osmundaceae, popularly known as ‘Royal Fern’): Decoction of rhizome is used as abortifacient while paste of leaves mixed with curd is given for birth control [24].

**Parahemionitis cordata** (Hook. & Grev.) Fraser-Jenk (Family- Hemionitidaceae, also known as ‘Chakuliya’, ‘Rabbit ear fern’): Juice of whole plant is given orally for effective treatment of dysmenorrhea [29].

**Pleopeltis macrocarpa** (Bory ex Willd.) Kaulf. (Family- Polypodiaceae): Decoction of the fern is given orally at night for abortion [35].

**Pityrogramma calomelanos** (L.) Link (Family- Pteridaceae): The fern is used in amenorrhoea [36].

**Pityrogramma triangularis** (Family- Pteridaceae): Fronds are chewed

for relieving pain of childbirth [16].

**Pteris ensiformis** Burm. (Family- Pteridaceae): The fern is used in the treatment of dysmenorrhea [36].

**Pteris quadriaurita** Retz. (Family- Pteridaceae): Fresh leaf juice mixed with toddy (sap of *Phoenix sylvestris*) and drink in the early morning in empty stomach for 2-3 days is effective against irregular menstrual cycle [13].

**Pteridium aquilinum** (L.) Kuhn (Family- Hypolepidaceae, commonly known as ‘bracken fern’): Juice of rhizome is mixed with juice of ginger and is taken orally as aphrodisiac [37].

**Selaginella bryopteris** (L.) Bak (Family- Selaginellaceae, popularly known as ‘Sanjeevani’): Paste of the plant is used in gonorrhoea, leucorrhoea and in post-partum care [8, 9, 20].

**Selaginella ciliaris** (Retz.) Spring (Family- Selaginellaceae, popularly known as ‘Choti sanjeevani’): Paste of the whole plant is given orally for treating amenorrhoea [8].

**Selaginella involvens** (Sw.) Spring (Family- Selaginellaceae): Paste of fresh leaves is given orally against amenorrhoea [8, 15].

**Selaginella tamariscina** (Beauv.) Spring (Family- Selaginellaceae): The whole plant is effective in the treatment of amenorrhoea [16].

**Woodwardia unigemmata** (Makino) Nakai (Family- Blechnaceae, commonly known as ‘jeweled chain fern’): Decoction of leaves is used as a tea for curing infertility in women [25].

#### Future goals and directions

Medicinal effects of pteridophytes are attributed to an array of secondary metabolites in them. So for the detection, isolation, purification and structural characterization of these biologically active natural constituents novel and sensitive biotechnological techniques are to be employed. Moreover, for the cultivation, processing of medicinal ferns and fern-allies and the manufacture of herbal medicines agro-industrial technologies need to be applied. Lastly, for botanical medicines, the recommended strategies, guidelines and standards of World Health Organization (WHO) should be followed.

**Table 1:** Summary of Ethnomedicinal uses of Pteridophytes in reproductive health disorders in women

Sl. No.	Reproductive health disorder	Botanical Name	Local Name	Useful Parts
1	Irregular menstruation	1. <i>Adiantum capillus-veneris</i>	Hansraj	Leaves
		2. <i>Adiantum lunulatum</i>	-----	Leaves
		3. <i>Adiantum philippense</i>	Kalijhant/ Hamsapadi	Leaves
		4. <i>Adiantum pedatum</i>	-----	Leaves
		5. <i>Asplenium trichomanes</i>	Do patiya Chhoti	Fronds
		6. <i>Cheilanthes farinosa</i>	Chandi booti, Nanha	Fronds
		7. <i>Nephrolepis exaltata</i>	Fish bone fern	Rhizome
		8. <i>Ophioglossum reticulatum</i>	Van palak, Brahmi fern	Fronds
		9. <i>Pteris quadriaurita</i>	-----	Fronds

Sl. No.	Reproductive health disorder	Botanical Name	Local Name	Useful Parts
2	Amenorrhoea / Emmenagogue (absence or suppression of normal menstrual flow)	1. <i>Adiantum philippense</i> .	Kalijhant/ Hamsapadi	Fronds
		2. <i>Oleandra colubrina</i>	-----	Stipe
		3. <i>Oleandra neriiformis</i>	-----	Stipe
		4. <i>Pityrogramma calomelanos</i>	-----	Whole plant
		5. <i>Selaginella ciliaris</i>	Choti sanjeevani	Whole plant
		6. <i>Selaginella involvens</i>	-----	Leaves
		7. <i>Selaginella tamariscina</i>	-----	Whole plant
		8. <i>Pityrogramma calomelanos</i>	-----	Whole fern
3	Dysmennorrhoea (painful menstruation)	1. <i>Davallia solida</i>	-----	Whole plant
		2. <i>Lygodium flexuosum</i>	Kalijar	Whole plant
		3. <i>Lygodium reticulatum</i>	-----	Rhizome
		4. <i>Microsorium membranifolium</i>	-----	Whole plant
		5. <i>Nephrolepis acuta</i>	-----	Whole plant
		6. <i>Parahemionitis cordata</i>	Chakuliya/rabbit earfern	Whole fern
		7. <i>Pteris ensiformis</i>	-----	Whole fern
4	Menorrhagia (Heavy menstrual bleeding )	1. <i>Lygodium flexuosum</i>	Kalijar	Whole plant
5	Female contraception / Abortifacient	1. <i>Adiantum philippense</i>	Kalijhant/ Hamsapadi	Rhizome
		2. <i>Lygodium reticulatum</i>	-----	Fronds & Rhizome
		3. <i>Osmunda regalis</i>	Royal Fern	Rhizome
		4. <i>Pleopeltis macrocarpa</i>	-----	Whole plant
6	For conception / to remove infertility	1. <i>Adiantum capillus-veneris</i>	Hansraj	Fronds
		2. <i>Adiantum lunulatum</i>	-----	Whole fern
		3. <i>Actiniopteris radiata</i>	Mayurshikh/morpankhi	Leaves
		4. <i>Acrostichum aureum</i>	Mangrove fern	Leaves
		5. <i>Cheilanthes albomarginata</i>	Nanha	Leaves
		6. <i>Dicranopteris linearis</i>	Rajhans	Fronds
		7. <i>Equisetum ramosissimum</i>	-----	Whole plant
		8. <i>Equisetum ramosissimum</i> Desf. ssp. <i>debile</i>	Had-jod	Rhizome
		9. <i>Hypodematium crenatum</i>	Bhoot Kesari / Jaributti	Leaves
		10. <i>Lygodium flexuosum</i>	Kalijar	Whole fern
		11. <i>Nephrolepis exaltata</i>	Fish bone fern	Rhizome
		12. <i>Woodwardia unigemmata</i>	Jeweled chain fern	Leaves
7	For total sterility	1. <i>Adiantum philippense</i>	Kalijhant/ Hamsapadi	Rhizome
		2. <i>Blechnum orientale</i>	Hastajori, Shield Fern	Fronds
		3. <i>Nephrolepis cordifolia</i>	Nechii, Ladder fern	Rhizome
8	Gonorrhoea	1. <i>Asplenium indicum</i>	-----	Rhizome
		2. <i>Asplenium yoshinagae</i> Makino var. <i>planicaule</i>	Do patiya badi	Rhizome
		3. <i>Dryopteris cochleata</i>	Kakolisag/Jatashankari	Whole fern
		4. <i>Equisetum ramosissimum</i> Desf. ssp. <i>debile</i>	Had-jod	Rhizome
		5. <i>Glaphyopteridopsis erubescens</i>	-----	Fronds
		6. <i>Lygodium flexuosum</i>	Kalijar	Whole fern
		7. <i>Microsorium membranifolium</i>	-----	Whole fern
		8. <i>Selaginella bryopteris</i>	Sanjeevani	Whole plant
9	Leucorrhoea	1. <i>Actiniopteris radiata</i>	Mayurshikh, Morpankhi	Leaves
		2. <i>Asplenium laciniatum</i>	-----	Roots

Sl. No.	Reproductive health disorder	Botanical Name	Local Name	Useful Parts
		3. <i>Davallia solida</i>	-----	Whole fern
		4. <i>Glaphyopteridopsis erubescens</i>	-----	Leaves
		5. <i>Microsorium membranifolium</i>	-----	Whole fern
		6. <i>Ophioglossum reticulatum</i>	Van palak/ Brahmi fern	Whole fern
		7. <i>Selaginella bryopteris</i>	Sanjeevani	Whole plant
10	Aphrodisiac	1. <i>Adiantum capillus-veneris</i>	Hansraj	Whole fern
		2. <i>Actiniopteris radiate</i>	Mayurshikh/ Morpankhi	Leaves
		3. <i>Helminthostachys zeylanica</i>	Dhimraj	Whole fern
		4. <i>Pteridium aquilinum</i>	Bracken fern	Rhizome
11	Post-Partum care/strengthening	1. <i>Actiniopteris radiate</i>	Mayurshikh/ Morpankhi	Leaves
		2. <i>Asplenium singaporianum</i>	-----	Leaves
		3. <i>Ophioglossum reticulatum</i>	Van palak/Brahmi fern	Whole fern
		4. <i>Selaginella bryopteris</i>	Sanjeevani	Leaves
12	Birth-aid in parturition/ Facilitate easy child birth	1. <i>Adiantum capillus-veneris</i>	Hansraj	Leaves
		2. <i>Diplazium esculentum</i>	Lingra	Leaves
		3. <i>Nephrolepis exaltata</i>	-----	Fish bone fern
		4. <i>Pityrogramma triangularis</i>	.....	Leaves
13	Uterine hemorrhage	1. <i>Ophioglossum reticulatum</i>	Van palak/Brahmi fern	Whole fern
14	Cold imposthume of uterus	1. <i>Adiantum capillus-veneris</i>	Hansraj	Leaves
15	Sexual desire/performance in females	1. <i>Adiantum capillus-veneris</i>	Hansraj	Whole fern
		2. <i>Marsilea quadrifolia</i>	water clover/pepperwort	Whole fern
16	White discharge	1. <i>Alsophila gigantea</i>	-----	Rhizome
17	Abscess of uterus	1. <i>Asplenium trichomanes</i>	Do patiya Chhoti	Whole fern

## CONCLUSION

Being weedy in nature and wild in habitat pteridophytes are not extensively explored scientifically and their economic importance especially medicinal values are largely been ignored. However, indigenous peoples across the globe have been exploiting pteridophytes for medicinal and traditional uses since dawn of human civilization. Such indigenous knowledge of ethnomedicinal values of pteridophytes should be focused, documented in order to open the eyes of the scientific world. Such exploration of their hidden potential of medicinal properties could have paved the way for the source of novel, safe and bioactive natural compounds that could lead the synthesis of new modern drugs for the treatment of complicated human ailments. In view of this, it is suggested that rare species of fern and fern allies should be protected from merciless collection and destruction. Special attention should be taken for the cultivation, propagation and conservation of endangered medicinal pteridophytes, so that the present and future generation will enjoy the economic value of this unique group of plants [16].

Moreover, the present review has provided latest information regarding new pteridophytic species which are not covered till now and many of them still lack suitable scientific evidence despite of their promising effect on female reproductive health disorder. Further, ethnobotanical knowledge if recognized, valued and implemented properly can conserve the biodiversity and help the environment and society in a holistic way.

## Acknowledgement

The authors are thankful to Dhiman Mondal, librarian of Ananda Mohan College for providing help during literature survey at time of review.

## Conflict of Interest

None declared.

## Financial Support

None declared.

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#### HOW TO CITE THIS ARTICLE

Das D, Patra B. Traditional pteridophytic herbal medicines and reproductive health disorders in women- A Review. *J Phytopharmacol* 2021; 10(6):490-495. doi: 10.31254/phyto.2021.10610

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