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Systematic Review

Medicinal plants used for treating infertility and related disorders of women in India: a systematic review

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ABSTRACT

Assessment of plant medicine for treating infertility and related disorders is making headway universally recent couple of decades to bring out new effective and safe substances as an alternative medicine. Present paper reviews the published literature on plant medicine used for female infertility and related disorders. The 53 research papers or reports shortlisted are based studies under taken in India. Total 459 uses of 202 medicinal plants classified under 84 families. Total 62 trees, 55 shrubs, 79 herbs and 3 climbers are reported. Most used plant parts for making medicine are roots in 111 formulations and leaf in 101 formulations. Medicinal plants used for infertility are 84, while for related disorder like leucorrhoea 79 plants, menorrhagia 53, dysmenorrhea 29, amenorrhea 23 and 22 plants used to regulate menstruation. Additional investigations could be helpful to verify the claims reported using a specific formulations or recipes and which will subsequently result in providing possible the alternative medicine for the treatment of female infertility.

Keywords: Medicinal plants, Female infertility, Related disorders, India

INTRODUCTION

Since time immemorial, the use of plants for the purpose of treating different ailments or diseases has been a traditional practice and is still in existence in many parts of India.[1] The indigenous traditional knowledge systems of India have contributed significantly to different health issues. People in India have conventionally practised their knowledge about the use of various plant parts and formulations for treating various diseases or ailments.

According to world health organisation (WHO), 2007, traditional plant medicine is prevalent in developing countries and up to 80% of the world inhabitants are depending on traditional indigenous medicines or folk medications and therapies for their primary health care needs,[2] consequently making plant medicine an extremely imperative healthcare asset to the humanity.

According to WHO, infertility is an inability to achieve a pregnancy after 12 months or more of regular unprotected sexual intercourse.[3,4] There are several couples throughout the world who desire a pregnancy, but are unable to achieve so. Such couples need medical advice and assistance to solve the problem of infertility. Based on world-wide figures and assessments on the current world population, about 72.4 million women are currently facing infertility problems, of these, 40.5 million are pursuing infertility treatment.[5]

Infertility is issue that affects over 80 million people globally; nevertheless, infertility rates differ from one country to another, with the minimum about 5% to maximum about 30%.[6] In India, about 8% of currently married women are suffering from primary and secondary infertility, of which about 5.8% are the cases of secondary infertility.[7,8] Also, with increasing stress and changing

lifestyles, women are facing more and more problems regarding the menstruation due to hormonal imbalances.[9]

Medicinal plants have tremendous potential treating infertility and associated reproductive health issues. Medicinal plants as reported in literature can be used as such/formulations such as extract, decoction, paste, along with food supplements, etc./along with conventional therapies for managing reproductive health of women.[10]

Present study aims to review existing literature on the use of medicinal plants for management of reproductive disorders of women in India.

METHODS

The study was commenced with an objective to bring together the medicinal plant resources used for women's reproductive health at one place.

The details of plant species, such as, valid botanical name, family, local name (Hindi/Sanskrit name wherever available), parts used, ailments / diseases, method of preparation of medicine, and mode of administration is considered, as given in published literature. Total 459 uses of 202 medicinal plants which belong to 84 families have been discussed in this systematic review.

Inclusion criteria

Present work included the published papers with title indicating the words, such as, 'female fertility', 'infertility', 'promote conception', 'management of reproductive health of women', 'female health care' and gynaecological disorders published on Indian medicinal plants, 53 research publications which comprise original research work done in different parts of India and some review articles are shortlisted for present study.

For management of reproductive disorders of women following diseases or indications are considered, amenorrhea, dysmenorrhea, infertility, leucorrhoea, menorrhagia and to regulate menstrual cycle.

In published resources if symptoms, indications or common words are used for disease of disorder are converted in proper medical terms.

Exclusion criteria

The study excluded all published literature sources based on studies conducted outside India, papers addressed on these issues but without mention of plants in detail.

Research papers/plant uses within them based on infections and sexually transmitted diseases are not considered.

Study selection

Following are diseases considered which includes symptoms or indications under them: Amenorrhea: absence of periods. Dysmenorrhea: menstrual pain, pain during bleeding, painful menstruation. Infertility: fertility, promote conception, to conceive, promote fertility. Leucorrhoea: white/pale discharge. Menorrhagia: excessive bleeding during menstruation. To regulate menstrual cycle: Estrogenic, irregular menstrual periods, irregular periods, regulates hormone flow.

RESULTS

Enumeration

Medicinal plants are enumerated under six diseases/disorders with valid botanical name, family name in parenthesis (in parenthesis), local name Hindi or Sanskrit, habit of the plant, part/s used as medicine, method of preparation of medicine, mode of administration, etc. Following are the six diseases or disorder considered for present review- 1. Amenorrhea; 2. Dysmenorrhea; 3. Infertility; 4. Leucorrhoea; 5. Menorrhagia and 6. To regulate menstrual cycle. The information provided in present systematic review is based on the published resources, based on studies from different region of India.

Table 1: Medicinal plants used to treat amenorrhoea.

Botanical name and (Family)	Local Name (Hindi/Sanskrit)	Habit	Part used	Mode of preparation, administration	Reference
***Abutilon indicum* (L.) Sweet (Malvaceae)**	Kanghi	Shrub	Seed	Powder with water, oral	Balamurugan et al, (2018)[11]
***Acacia leucophloea* (L.) Willd. (Mimosaceae)**	Safed kikar	Tree	Leaves, bark	Extract, oral	Das et al, (2015)[12]
***Achyranthes aspera* L. (Amaranthaceae)**	Latjira	Herb	Root	Decoction, oral	Balamurugan et al, (2018)[11]; Khan et al, (2006)[13]
***Allium cepa* L. (Liliaceae)**	Pyaz	Herb	Bulb	Eaten, oral	Sharma et al, (2018)[14]
***Aloe vera* (L.) Burm. f. (Liliaceae)**	Gheekunvar	Herb	Leaves	Paste, oral	Das, et al, (2015)[12]; Sikarwar (2002)[15]; Rajeswari et al (2019)[16]; Rekka et al, (2013)[17]

Continued.

Botanical name and (Family)	Local Name (Hindi/Sanskrit)	Habit	Part used	Mode of preparation, administration	Reference
Butea monosperma (Lam.) Taub (Fabaceae)	Palash	Tree	Leaves	Decoction, oral	Sarkhel, (2014)[18]
Carica papaya L. (Caricaceae)	Papita	Tree	Fruit	Unripe fruit with rice, oral	Das et al, (2015)[12]; Rajeswari et al, (2019)[16]
Chenopodium album L. (Amaranthaceae)	Bethusag	Herb	Seed	-	Pakkala (2021)[19]
Cynodon dactylon Pers. (Poaceae)	Hariali	Herb	Whole plant	Paste with rice water, oral	Das et al, (2015)[12]
Datura metal L (Solanaceae)	Sadahdhatura	Shrub	Leaves	Decoction, Oral	Sarkhel, (2014)[18]
Hibiscus rosasinensis L. (Malvaceae)	Jasum	Shrub	Flower, root	Paste with honey, oral	Balamurugan et al, (2018)[11]; Chouhan et al, (2020)[20]
Indigofera tinctoria L. (Fabaceae)	Neel	Shrub	Whole plant	Powder with buttermilk, oral	Das et al, (2015)[12]; Rajeswari et al (2019)[16]; Chouhan et al, (2020)[20]
Jatropha curcus L. (Euphorbiaceae)	Janglai erandi	Shrub	Leaves, seed	-	Deka et al, (2013)[21]
Leucus aspera Link. (Lamiaceae)	Chota halkusa	Herb	Leaves	Juice with honey, oral	Tripathi et al, (2010)[22]
Pedalium murex L. (Pedaliaceae)	Karvagokhru	Herb	Seed	Powder with honey, oral	Balamurugan et al, (2018)[11]; Rajeswari et al, (2019)[16]
Pergularia daemia (Forsk.) Chiov. (Asclepiadaceae)	Akasan	Shrub	Latex	Topically	Sarangi et al, (2004)[23]
Polyalthia cerasoides (Roxb.) Bedd. (Annonaceae)	Kudumi	Tree	Bark	Paste, oral	Devi Prasad et al, (2014)[24]
Saraca asoca (Roxb.) Willd (Fabaceae)	Asoka	Tree	-	-	Adhikari, PP, (2018)[25]
Selaginella ciliaris (Retz.) Spring (Selaginellaceae)	Choti sanjeewan	Herb	Frond	Decoction, oral	Singh et al, (2012)[26]
Sesamum indicum L. (Pedaliaceae)	Til	Herb	Seed	With ghee, oral	Sarkhel (2014)[18]
Tamarindus indica L. (Caesalpiniaeae)	Emali	Tree	Root-bark	Paste in cow milk, oral	Das et al, (2015)[12]; Rajeswari et al, (2019)[16]; Chouhan et al, (2020)[20]
Vitex negundo L. (Verbaneceae)	Nirgudi	Tree	Root	Crushed roots cooked in rice, oral	Das et al, (2015)[12]; Rajeswari et al, (2019)[16]
Withania somnifera (L.) Dunal. (Solanaceae)	Ashwagandha	Shrub	Root	-	Baranwal A, (2016)[27]

Table 2: Medicinal plants used to treat dysmenorrhoea.

Botanical name and (Family)	Local Name (Hindi/Sanskrit)	Habit	Part used	Mode of preparation, administration	Reference
Abrus precatorius L. (Fabaceae)	Gunja	Shrub	Seed	Boiled and taken, oral	Balamurugan et al, (2018)[11]
Achyranthes aspera L. (Amaranthaceae)	Latjira	Herb	Leaves, root	Extract, oral	Balamurugan et al, (2018)[11]; Das et al, (2015)[12]; Khan et al, (2006)[13]; Sikarwar (2002)[15]; Chouhan et al, (2020)[20]

Continued.

Botanical name and (Family)	Local Name (Hindi/ Sanskrit)	Habit	Part used	Mode of preparation, administration	Reference
Aloe vera (L.) Burm. f. (Liliaceae)	Gheekunvar	Herb	Leaves	Paste, oral	Rekka et al, (2013)[17]
Amaranthus viridis L. (Amaranthaceae)	Tanduliya	Herb	Leaves	-	Pakkala et al, (2021)[19]
Ambroma augusta (L.) L. f. (Malvaceae)	Bonkopahi	Shrub	Root	Paste, oral	Pattanayak (2016)[28]
Aristolochia bracteolata Lam. (Aristolochiaceae)	Kiramar	Herb	Root	Extract, oral	Sarangi et al, (2004)[23]
Asperagus racemosus Willd. (Liliaceae)	Shatawar	Herb	Root	Paste with water	Pattanayak, (2016)[28]; Parmar et al, (2017)[29]
Chenopodium ambrosioides L. (Chenopodiaceae)	Bethusag	Herb	Leaves	Decoction, oral	Das et al, (2015)[12]
Cinnamomum tamala (Buch. - Ham.) T. Nees and C. H. Eberm. (Lauraceae)	Tejpatta	Tree	Leaves	Decoction, oral	Das et al, (2015)[12]
Cissampelos pareira L. (Menispermaceae)	Akandi	Herb	Root	Paste, oral	Das et al, (2015)[12]
Cynodon dactylon Pers. (Poaceae)	Hariali	Herb	Whole plant	Extract, oral	Bora et al, (2016)[30]
Datura metal L. (Solanaceae)	Sadahdhatura	Shrub	Leaves	-	Deka et al, (2013)[21]
Dolichos biflorum L. (Leguminosae)	Kulhata	Herb	Seed	-	Deka et al, (2013)[21]
Drimia indica (Roxb.) Jessop (Liliaceae)	Kattuli	Herb	Bulb	Paste, oral	Das et al, (2015)[12]
Eclipta prostrata L. (Asteraceae)	Bhangra	Herb	Whole plant	Extract, oral	Das et al, (2015)[12]
Enicostemma littorale, Blume. (Gentianaceae)	Chota chirayata	Herb	Whole plant	Powder, oral	Rajeswari et al, (2019)[16]; Rekka et al, (2013)[17]; Pakkala et al, (2021)[19]
Gossypium arboretum L. (Malvaceae)	Kapas	Shrub	Rootbark	Oral	Singh (2017)[31]
Hydrocotyle sibthorpioides Lam. (Apiaceae)	-	Herb	Tuber	Paste, oral	Bora et al, (2016)[30]
Leucus aspera Link. (Lamiaceae)	Chota halkusa	Herb	Leaves, flower	Extract of decoction, oral	Balamurugan et al, (2018)[11]; Tripathi et al, (2010)[22]
Moringa oleifera Lam. (Moringaceae)	Shajna	Tree	Bark	Extract, oral	Pattanayak (2016)[28]
Nelumbo nucifera Gaertn (Nelubonaceae)	Kamal	Herb	Rhizome	Tablets prepared by paste, oral	Bora et al, (2016)[30]
Pedalium murex L. (Pedaliaceae)	Karvagokhru	Herb	Leaves	Extract, oral	Balamurugan et al, (2018)[11]
Ricinus communis L. (Euphorbiaceae)	Arandi	Shrub	Leaves, seed	-	Chouhan et al, (2020)[20]; Gupta et al, (2013)[32]
Saraca asoca (Roxb.) Willd (Fabaceae)	Asoka	Tree	Bark	Decoction, oral	Baranwal, A, (2016)[27]; Bora et al, (2016)[30]
Schleichera oleosad (Lour.) Oken. (Sapindaceae)	Kusum	Tree	Bark	-	Jomy (2010)[33]
Sesbania grandiflora Pers. (Fabaceae)	Agasti	Tree	Flower	Juice, oral	Das et al, (2015)[12]; Rajeswari et al, (2019)[16]
Tephrosia purpurea (L.) Pers. (Fabaceae)	Dhamasia	Shrub	Root	Powder with honey, oral	Balamurugan et al, (2018)[11]
Trigonella foenum-graecum L. (Fabaceae)	Methi	Herb	Seed	Power with coconut water, oral	Abdulla et al (2012)[34]
Vitex negundo L. (Verbaneceae)	Nirgudi	Tree	Root	-	Chouhan et al, (2020)[20]

Table 3: Medicinal plants used to treat Infertility.

Botanical name and (Family)	Local name (Hindi/Sanskrit)	Habit	Part used	Mode of preparation, administration	Reference
Abroma augusta (L.) L. f. (Malvaceae)	Ulatkambal	Shrub	Root, Stem	Paste, oral	Singh et al, (2019)[39]; Laskar et al, (2020)[42]
Acacia leucophloea (L.) Willd. (Mimosaceae)	Safed kikar	Tree	Leaves	Paste, oral	Das et al, (2015)[12]
Achyranthes aspera L. (Amaranthaceae)	Latjira	Herb	Root, Stem	Decoction, oral	Khan et al, (2006)[13]
Acrostichum aureum L. (Pteridaceae)		Shrub	Frond	Extract, oral	Das et al, (2021)[35]
Actaea racemose L. (Ranunculaceae)	Jiunti	Herb	-	-	Kumar (2021)[36]
Actiniopteris radiata (Koenig ex Sw.) Link (Pteridaceae)	Morpankhi	Herb	Frond	Powder with honey, oral	Singh et al, (2012)[26]; Das et al, (2021)[35]
Adiantum capillus-veneris L. (Adiantaceae)	Hansraj	Herb	Frond	Extract with tea, oral	Das et al, (2021)[35]
Adiantum philippense L. (Adiantaceae)	Kalijhant	Herb	Frond	Decoction, oral	Das et al, (2021)[35]
Aegle marmelos (L.) Corr. (Rutaceae)	Bel	Tree	Fruit	Eaten, oral	Laddimath et al, (2016)[37]
Albizia lebbeck (L.) Bth. (Fabaceae)	Siris	Tree	Bark, Leaves	Decoction, oral	Laddimath et al, (2016)[37]
Alstonia scholaris(L) R.Br. (Apocynaceae)	Saptparna	Tree	Latex	With water, oral	Pakkala et al, (2021)[19]; Taid et al, (2014)[38]
Amaranthus gangeticus L. (Amaranthaceae)	Lal sag	Herb	Root	With rice water, oral	Laddimath et al, (2016)[37]
Amaranthus tricolor L. (Amaranthaceae)	-	Herb	Whole plant	-	Das et al, (2013)[21]
Andrographis paniculate (Burm f) nees (Acanthaceae)	Kirayat	Herb	Leaves	Tablets prepared by paste, oral	Singh et al, (2019)[39]
Argemone maxicana L. (Papaveraceae)	Bharband	Herb	Root, Leaves	Powder as a tea, oral	Tripathi et al, (2010)[22]; Singh (2017)[31]; Laddimath et al (2016)[37]
Artanema longifolium (L.) Vatke. (Linderniaceae)	-	Herb	Seed	-	Tarafdar (1983)[40]
Artocarpus heterophyllus Lam. (Moraceae)	Kathal	Tree	Flower	Paste with cooked rice, oral	Singh et al, (2019)[39]
Asperagus racemosus Willd. (Liliaceae)	Shatawar	Herb	Root	Juice with milk, oral	Das et al, (2015)[12]; Chouhan et al, (2020)[20]; Gupta et al (2013)[32]; Lal et al, (1980)[41]; Laskar et al, (2020)[42]; Panduranga et al, (2011)[43]; Gaware et al, (2009)[44]
Azadirachta indica A. Juss (Meliaceae)	Neem	Tree	Bark	Powder with jaggery, oral	Das et al, (2015)[12]; Rajeswari et al (2019)[16]; Rekka et al, (2013)[17]
Barleria prionitis L. (Acanthaceae)	Jhinti	Shrub	Root	Paste with cow ghee, oral	Sarangi et al, (2004)[23]; Laddimath et al (2016)[37]
Benincasa hispida (Thunb.) Cogn. (Cucurbitaceae)	Petha	Climber	Seed, fruit	-	Deka et al, (2013)[21]
Benkara malabarica (Lam.) Tirveng. (Rubiaceae)	Pidava	Tree	Stem, Bark	-	Pakkala et al, (2021)[19]
Bombax ceiba L.	Simal	Tree	Bark,	Paste, oral	Chouhan et al, (2020)[20];

Continued.

Botanical name and (Family)	Local name (Hindi/Sanskrit)	Habit	Part used	Mode of preparation, administration	Reference
(Bombacaeae)			Flower		Gupta et al (2013)[32]; Singh et al, (2019)[39]
Bryonia laciniosa (L.) Naud. (Cucurbitaceae)	Shivlingi	Climber	Seed	With milk, oral	Devi Prasad et al, (2014)[24]; Kadam (2013)[45]; Sharma et al, (2019)[46]; Bhabhor et al, (2021)[47]; Chaudhari et al, (2013)[48]
Butea monosperma (Lam.) Taub (Fabaceae)	Palash	Tree	Flower, Bark	-	Chouhan et al, (2020)[20]; Gupta et al, (2013)[32]
Caesalpinia bonduc (L) Roxb. (Caesalpiniaceae)	Katkaranj	Climber	Leaves	Paste with sesamum oil, oral	Laddimath et al, (2016)[37]
Calotropis procera (Ait.) R. Br. (Asclepiadaceae)	Arka	Shrub	Root	Powder with milk, oral	Pakkala et al, (2021)[19]; Panduranga et al, (2011)[43]
Centella asiatica (L.) Urban (Apiaceae)	Brahma-manduki	Herb	Leaves	Juice, oral	Bora et al, (2016)[30]; Laskar et al, (2020)[42]
Cheilanthes albomarginata Clerke (Sinopteridaceae)	Nanha	Herb	Frond	Decoction, oral	Das et al, (2021)[35]
Cinnamomum zeylanicum Breyan (Lauraceae)	Dalchini	Tree	Bark	Oral	Saziini et al, (2023)[49]
Cipadessa baccifera (Roth.) Miq (Meliaceae)	Nalbila	Shrub	Leaves	Tablets prepared by taken, oral	Devi Prasad et al, (2014)[24]
Cleome gynandra L. (Capparidaceae)	Arakakanta	Herb	Leaves	-	Das et al, (2013)[21]; Laskar et al, (2020)[42]
Clitoria ternatia L. (Fabaceae)	Aparajit	Shrub	Leaves, Seed	-	Laskar et al, (2020)[42]
Colocasia esculenta (L.) Schott. (Araceae)	Ghuiya	Herb	Whole plant	-	Deka et al, (2013)[21]
Costus speciosus (Koenig) Sm. (Costaceae)	Keu	Herb	Rhizome	-	Pakkala et al, (2021)[19]
Crotalaria juncea L. (Fabaceae)	Sana	Shrub	Leaves	-	Deka et al, (2013)[21]
Cynodon dactylon Pers. (Poaceae)	Hariali	Herb	Whole plant	Extract, oral	Das et al, (2013)[21]; Singh et al, (2019)[39]; Laskar et al, (2020)[42]
Cynoglossum zeylanicum (Sw. ex Lehm.) Thunb. Ex Brand (Boraginaceae)	Andahuli	Herb	Leaves	-	Pakkala et al, (2021)[19]; Jansirani et al, (2018)[50]
Dendrophthoe falcata (L.f.) Etting. (Loranthaceae)	Bandaka	Tree	Whole plant	Paste with cow milk, oral	Hemadri et al, (1983)[51]
Desmodium gangaticum DC (Fabaceae)	Salwan	Shrub	Whole plant	-	Deka et al, (2013)[21]; Laskar et al, (2020)[42]
Dicranopteris linearis (Burm.) Underwood (Gleicheniaceae)	Rajlhans	Herb	Frond	Decoction with milk, oral	Singh et al, (2012)[26]; Das et al, (2021)[35]
Enydra fluctuans Lour. (Asteraceae)	Helchi	Herb	Whole plant	-	Deka et al, (2013)[21]
Equisetum ramosissimum Desf. (Equisetaceae)	-	Herb	Frond	Decoction, oral	Das et al, (2021)[35]
Erythrina variegata L. (Fabaceae)	Mandara	Tree	Root	-	Pakkala et al, (2021)[19]
Hibiscus rosasinensis L. (Malvaceae)	Jasum	Shrub	Root	Paste with milk, oral	Laddimath et al, (2016)[37]
Hybanthus enneaspermus	Ratnpurus	Herb	Leaves	Paste with milk,	Panduranga et al,

Continued.

Botanical name and (Family)	Local name (Hindi/Sanskrit)	Habit	Part used	Mode of preparation, administration	Reference
(L.) F. Muell. (Violaceae)				oral	(2011)[43]
Hypodematium crenatum (Forssk.) Kuhn (Athyriaceae)	Bhoot Kesari	Herb	Frond	Paste, oral	Das et al, (2021)[35]
Ipomoea paniculata (L.) R.Br. (Convolvulaceae)	Bhilaikand	Shrub	Root	Paste, oral	Das et al, (2015)[12]
Lawsonia inermis L. (Lythraceae)	Mehandi	Shrub	Leaves, rootbark	-	Das et al, (2013)[21]; Laskar et al, (2020)[42]
Leea macrophyla Roxb. (Vitaceae)	Dholsamudra	Shrub	Leaves, root	-	Das et al, (2013)[21]; Laskar et al, (2020)[42]
Lygodium flexuosum (L.) Sw. (Lygodiaceae)	Kalijir	Herb	Frond	Decoction, oral	Das et al, (2021)[35]
Melia azedarach L. (Meliaceae)	Bakein	Tree	Bark	Powder with jaggery, oral	Rajeswari and Murugesh, (2019)[16]; Pakkala et al, (2021)[19]
Mucuna pruriens (L) DC. (Fabaceae)	Kiwach	Shrub	Root, seed	Pils prepared with cow milk, oral	Das et al, (2015)[12]; Laskar et al, (2020)[42]; Hemadri and Rao, (1983)[51]
Musa paradisiaca L. (Musaceae)	Kela	Herb	Root	-	Laskar et al, (2020)[42]
Musa velutina Wendle and Drude (Musaceae)	Jangalikela	Herb	Fruit	Eaten, oral	Bora et al, (2016)[30]; Laskar et al, (2020)[42]
Nelumbo nucifera Gaertn (Nelubonaceae)	Kamal	Herb	Rhizome	Decoction, oral	Pakkala et al, (2021)[19]; Tripathi et al, (2010)[22]
Nephrolepis exaltata (L.) Schott (Nephrolepidaceae)	-	Herb	Frond	-	Das et al, (2021)[35]
Nigella sativa L. (Ranunculaceae)	Kanonji	Herb	Seed	Tablets prepared by paste, oral	Singh et al, (2019)[39]
Oroxylum indicum (L.) Benth.ex Kurz. (Bignoniaceae)	Sauna	Tree	Rootbark	-	Tarafdar (1983)[40]
Paederia foetida L. (Rubiaceae)	Gandhali	Shrub	Leaves	Decoction, oral	Bora et al, (2016)[30]; Laskar et al, (2020)[42]
Pedalium murex L. (Pedaliaceae)	Karvagokhru	Herb	Fruit	Powder, oral	Pakkala et al, (2021)[19]; Panduranga et al, (2011)[43]
Phyla nodiflora (L.) Greene. (Verbanaceae)	Jalpapli	Herb	Root	Decoction, oral	Das et al, (2015)[12]
Pongamia pinnata (L.) Pierre (Fabaceae)	Karanj	Tree	Seed, Root	-	Deka et al, (2013)[21]; Laskar et al, (2020)[42]
Portulaca oleracea L. (Portulacaceae)	Khursa	Herb	Root	-	Das et al, (2013)[21]
Punica granatum L. (Lythraceae)	Anar	Shrub	Fruit	Oral	Laskar et al, (2020)[42]; Saziini et al, (2023)[49]
Putranjiva roxhburgii Wall. (Euphorbiaceae)	Putranjiva	Tree	Seed, Leaves	-	Deka et al, (2013)[21]; Laskar et al, (2020)[42]
Pycnocyclea glauca Lindl. (Apiaceae)	-	Herb	Root	-	Tarafdar (1983)[40]
Ricinus communis L. (Euphorbiaceae)	Arandi	Shrub	Leaves, Seed	-	Chouhan and Garg, (2020)[20]; Gupta and Solanki, (2013)[32]
Rubus moluccanus L. (Rosaceae)	Anchu	Shrub	Leaves, Stem	Oral	Taid et al, (2014)[38]
Saraca asoca (Roxb.) Willd (Fabaceae)	Asoka	Tree	Flower, Bark	-	Das et al, (2013)[21]; Laskar et al, (2020)[42];

Continued.

Botanical name and (Family)	Local name (Hindi/Sanskrit)	Habit	Part used	Mode of preparation, administration	Reference
					Gaware et al, (2009)[44]
Schleichera oleosad (Lour.) Oken. (Sapindaceae)	Kusum	Tree	Stembark	Extract, oral	Hemadri and Rao, (1983)[51]
Semecarpus anacardium L.f. (Anacardiaceae)	Bhilawa	Tree	Fruit	-	Das et al, (2013)[21]
Sida acuta Burm. f. (Malvaceae)	Bariara	Shrub	Leaves, Root	Decoction, oral	Das et al, (2015)[12]; Rajeswari et al, (2019)[16]
Smilax zeylanica L. (Smilacaceae)	Kumarika	Shrub	Root	Powder, oral	Hemadri and Rao, (1983)[51]
Solanum indicum L. (Solanaceae)	Jangli bhata	Shrub	Fruit, Root	-	Laskar et al, (2020)[42]
Solanum torvum Sw. (Solanaceae)	Bhankatiya	Shrub	Root	Juice, oral	Singh et al, (2019)[39]
Soymida febrifuga A. Juss. (Meliaceae)	Rohan	Tree	Stembark	Extract, oral	Hemadri and Rao, (1983)[51]
Terminalia arjuna (Roxb. ex DC) Wight and Arn. (Combretaceae)	Arjun	Tree	Bark	Paste, oral	Singh et al, (2019)[39]
Tinospora cordifolia (Willd.) Miers. (Memispermaceae)	Giloy	Shrub	Stem, leaves	Tablets prepared by paste, oral	Pakkala et al Patel, (2021)[19]; Singh et al, (2019)[39]; Laskar et al, (2020)[42]
Tribulus terrestris L. (Zygophyllaceae)	Gokhru	Herb	Leaves	Extract, oral	Laddimath and Rao, (2016)[37]
Vites agjus-castus (Lamiaceae)	-	Tree	Fruit	-	Kumar, (2021)[36]
Vitex negundo L. (Verbaneceae)	Nirgudi	Tree	Root	Powder with milk, oral	Singh (2017)[31]; Sahu, (2011)[52]
Withania somnifera (L.) Dunal. (Solanaceae)	Ashwagandha	Shrub	Root	Paste, oral	Das et al, (2015)[12]; Baranwal (2016)[27]; Pattanayak (2016)[28]; Laddimath et al (2016)[37]; Saziini et al, (2023)[49]
Woodwardia unigemmata (Makino) Nakai (Blechnaceae)	-	Shrub	Frond	Decoction, oral	Das et al, (2021)[35]

Table 4: Medicinal plants used to treat leucorrhoea.

Botanical name and (Family)	Local Name (Hindi/Sanskrit)	Habit	Part used	Mode of preparation, administration	Reference
Abutilon indicum (L.) Sweet (Malvaceae)	Kanghi	Shrub	Root	Powder, oral	Yadav, et al, (2006)[53]
Acacia farnesiana Willd. (Mimosaceae)	Vilayati kikar	Tree	Bark	Powder with lukewarm water, oral	Balamurugan et al, (2018)[11]; Sarkhel (2014)[18]; Tripathi et al, (2010)[22]; Patel et al (2018)[54]
Achyranthes aspera L. (Amaranthaceae)	Latjira	Herb	Leaves	Extract, oral	Khan et al, (2006)[13]
Adenanthera pavonina L. (Mimosaceae)	Kunchnandana	Tree	Bark	Decoction, oral	Bora et al, (2016)[30]
Aerva lanata (L.) Juss. ex Schult (Amaranthaceae)	Astamabayota	Herb	Stembark	Decoction, oral	Panduranga et al, (2011)[43]
Alsophila gigantea Wall. ex-	-	Tree	Rhizome	Powder with	Singh et al, (2012)[26]

Continued.

Botanical name and (Family)	Local Name (Hindi/Sanskrit)	Habit	Part used	Mode of preparation, administration	Reference
Hook. (Cyatheaceae)				cow milk, oral	
Amaranthus spinosus L. (Amaranthaceae)	Katailichaulai	Herb	Root, leaves	Paste, oral	Pattanayak, S, (2016)[28]; Saheb et al, (2017)[55]; Sapam et al, (2017)[56]
Ambroma augusta (L.) L. f. (Malvaceae)	Bonkopahi	Shrub	Root	Paste, oral	Pattanayak (2016)[28]
Andrographis paniculata (Burm. f.) Nees (Acanthaceae)	Kirayat	Herb	Root	-	Saheb et al, (2017)[55]
Argemone maxicana L. (Papaveraceae)	Bharband	Herb	Leaves	Juice, oral	Dash and Satapathy, (2016)[57]
Aristolochia bracteolata Lam. (Aristolochiaceae)	Kiramar	Herb	Stem	Juice, oral	Pakkala et al, (2021)[19]; Panduranga et al, (2011)[43]
Asperagus racemosus Willd. (Liliaceae)	Shatawar	Herb	Root	Paste with water	Pakkala et al, (2021)[19]; Tripathi et al, (2010)[22]; Devi Prasad et al (2014)[24]; Pattanayak (2016)[28]; Gupta and Solanki, (2013)[32]; Patel et al (2018)[54]; Saheb et al (2017)[55]; Rasool et al (2017)[63]
Azadirachta indica A.lJuss. (Meliaceae)	Neem	Tree	Bark	Decoction, oral	Balamurugan et al, (2018)[11]; Azad (2013)[62]
Bauhinia malabarica Roxb. (Fabaceae)	Amli	Tree	Stembark	-	Pakkala et al (2021)[19]
Boerhavia diffusa L. (Nyctaginaceae)	Punarnava	Herb	Root	Decoction, oral	Balamurugan et al, (2018)[11]; Jansirani et al, (2018)[50]; Dash et al (2016)[57]; Behara (2006)[61]
Bombax ceiba L. (Bombacaceae)	Simal	Tree	Root, Flower	Extract, oral	Chouhan et al (2020)[20]; Sarangi et al (2004)[23]; Gupta et al (2013)[32]
Borassus flabellifer L. (Areaceae)	Tad	Tree	Fruit	-	Gupta et al (2013)[32]
Butea monosperma (Lam.) Taub (Fabaceae)	Palash	Tree	Root, bark	Powder, oral	Sarangi et al (2004)[23]; Shrivastava (2018)[58]; Shukla et al, (2008)[59]; Wadankar et al (2011)[60]
Calotropis gigantea (L.) Dryand (Asclepiadaceae)	Arka	Shrub	Root	Decoction, oral	Dash et al (2016)[57]; Behara (2006)[61]
Canthium parviflorum Lam. (Rubiaceae)	Kirama	Shrub	Leaves	-	Saheb et al, (2017)[55]
Carica papaya L. (Caricaceae)	Papita	Tree	Latex	-	Chouhan et al (2020)[20]; Gupta et al (2013)[32]
Catharanthus roseus (L.) G. Don (Apocynaceae)	Sadabahar	Shrub	Leaves	Juice with honey, oral	Balamurugan et al, (2018)[11]; Tripathi et al, (2010)[22]
Cinnamomum zeylanicum Breyan (Lauraceae)	Dalchini	Tree	Bark	Decoction, oral	Bora et al, (2016)[30]
Clerodendron viscosum Vent. (Verbenaceae)	Ghentu	Shrub	Leaves	Paste with water, oral	Tripathi et al, (2010)[22]
Clitoria ternatia L. (Fabaceae)	Aparajit	Shrub	Leaves	Juice, oral	Balamurugan et al, (2018)[11]
Cocculus hirsutus (L.) Diels (Menispermaceae)	Jamatikibel	Shrub	Leaves	-	Chouhan et al (2020)[20]; Gupta et al (2013)[32]
Commiphora wightii (Arnott.) Bhandari (Burseraceae)	Gugal	Shrub	Latex	-	Chouhan et al (2020)[20]; Gupta et al (2013)[32]
Costus speciosus (Koenig)	Keu	Herb	Tuber	-	Deka et al (2013)[21]

Continued.

Botanical name and (Family)	Local Name (Hindi/Sanskrit)	Habit	Part used	Mode of preparation, administration	Reference
Sm. (Costaceae)					
Curculigo orchioides Gaertn. (Hypoxidaceae)	Kali musali	Herb	Tuber	-	Saheb et al, (2017)[55]
Cyclea peltata (Lam.) Hook. f. Thoms. (Menispermaceae)	Patha	Shrub	Tuber	Paste with honey, oral	Devi Prasad et al, (2014)[24]
Dalbergia sissoo Roxb. (Fabaceae)	Sissoo	Tree	Leaves	Extract, oral	Singh (2017)[31]
Dolichos biflorum L. (Leguminosae)	Kulhata	Herb	Seed	Decoction, oral	Singh (2017)[31]; Sahu (2011)[52]
Emblica offcinalis Gaertan. (Euphorbiaceae)	Amla	Tree	Fruit	Pulp with honey, oral	Sarkhel (2014)[18]
Ensete superbum (Roxb.) Cheesman. (Musaceae)	Jangli kela	Herb	Seed	Paste with milk, oral	Devi Prasad et al, (2014)[24]
Erythrina stricta Roxb. (Fabaceae)	Mura	Tree	Bark	Juice with honey, oral	Ajesh et al (2012)[9]
Euphorbia hirta (Euphorbiaceae)	Dudhi	Herb	Leaves	Extract, oral	Singh (2017)[31]; Sahu (2011)[52]
Feronia elephantum Corr. (Rutaceae)	Kathbel	Tree	Leaves	Juice with honey, oral	Balamurugan et al, (2018)[11]; Tripathi et al, (2010)[22]
Ficus bengalensis L. (Moraceae)	Bargad	Tree	Bark, Leaves	Powder with honey, oral	Balamurugan et al, (2018)[11]; Chouhan et al (2020)[20]; Sarangi et al (2004)[23]; Gupta et al (2013)[32]; Azad (2013)[62]
Helicteres isora L. (Malvaceae)	Marophalli	Shrub	Fruit	-	Jansirani et al, (2018)[50]
Hemidesmus indicus R.Br. (Asclepiadaceae)	Anantmul	Herb	Root	Powder with water, oral	Balamurugan et al, (2018)[11]; Deka et al (2013)[21]; Tripathi et al, (2010)[22]; Abdulla et al (2012)[34]; Dash et al, (2016)[57]
Hibiscus rosasinensis L. (Malvaceae)	Jasum	Shrub	Flower	White flower taken with water, oral	Jansirani et al, (2018)[50]; Azad (2013)[62]
Ixora coccinea L. (Rubiaceae)	Rangan	Shrub	Flower	Decoction, oral	Balamurugan et al, (2018)[11]
Jatropha gossypifolia L. (Euphorbiaceae)	Bherenda	Shrub	Root	Paste with milk, oral	Sarangi et al (2004)[23]
Justicia adhatoda L. (Acanthaceae)	Arusha	Herb	Root	Juice, oral	Yadav et al, (2006)[53]
Litsea glutinosa (Lour.) C.B. Rob. (Lauraceae)	Garbijaur	Tree	Bark	Extract, oral	Shrivastava (2018)[58]
Litsea sebifera (Willd.) Persoon (Lauraceae)	Kathalua	Tree	Bark	Extract, oral	Shukla et al, (2008)[59]
Mangifera indica L. (Anacardiaceae)	Aam	Tree	Bark	Decoction, oral	Balamurugan et al, (2018)[11]; Chouhan et al (2020)[20]
Maranta arundinacea L. (Marantaceae)	Tikhor	Herb	Leaves	Paste, oral	Devi Prasad et al, (2014)[24]
Memecylon umbellatum Brum.f. (Melastomataceae)	Anjan	Tree	Rootbark	-	Saheb et al, (2017)[55]
Mimosa hamata Wild. (Mimosaceae)	Mundi	Shrub	Root, flower	-	Chouhan et al (2020)[20]; Gupta et al (2013)[32]
Morinda tomentosa Heyne ex Roth (Rubiaceae)	Surangi	Tree	Root	Decoction, Oral	Sarangi et al, (2004)[23]
Moringa oleifera Lam. (Moringaceae)	Shajna	Tree	Bark	Extract, Oral	Pattanayak (2016)[28]
Mucuna pruriens (L) DC. (Fabaceae)	Kiwach	Shrub	Seed	-	Patel et al (2018)[54]

Continued.

Botanical name and (Family)	Local Name (Hindi/Sanskrit)	Habit	Part used	Mode of preparation, administration	Reference
Myristica dactyloides Gaertn. (Myristicaceae)	Jatiphal	Tree	Leaves	-	Jansirani et al, (2018)[50]
Nelumbo nucifera Gaertn (Nelubonaceae)	Kamal	Herb	Rhizome	Decoction, Oral	Sarkhel (2014)[18]; Dash et al (2016)[57]; Behara (2006)[61]
Pedalium murex L. (Pedaliaceae)	Karvagokhru	Herb	Fruit, leaves	Powder, oral	Jansirani et al, (2018)[50]; Yadav et al, (2006)[53]
Phyla nodiflora (L.) Green (Verbanaceae)	Jalbuti	Herb	Whole plant	-	Gupta et al (2013)[32]
Phyllanthus fraternus Webster. (Euphorbiaceae)	Jaramla	Herb	Seed	With rice, oral	Sarangi et al (2004)[23]
Pterospermum xylocarpum (Gaertn) Sant. (Sterculiaeae)	Pulavu	Tree	Leaves	Paste, oral	Panduranga et al, (2011)[43]
Saraca asoca (Roxb.) Willd (Fabaceae)	Asoka	Tree	Bark	Powder, oral	Balamurugan et al (2018)[11]; Baranwal (2016)[27]; Shukla et al, (2008)[59]
Scoparia dulcis L. (Scrophulariaceae)	Mithi patti	Herb	Leaves	Juice with milk, oral	Devi Prasad et al, (2014)[24]
Senegalia catechu (L.f.) P. J. H. Hurter and Mabb (Mimosaceae)	Khair	Tree	Bark	-	Chouhan et al (2020)[20]
Senna auriculata (L.) Roxb. (Caesalpiniaceae)	Tarwar	Shrub	Root, stembark	Paste with milk, oral	Panduranga et al, (2011)[43]
Senna montana (Roth.) Singh. (Caesalpiniaceae)	Ponavarai	Shrub	Leaves	-	Saheb et al, (2017)[55]
Sida acuta burm. f. (Malvaceae)	Bariara	Shrub	Root, leaves	Powder with water, oral	Balamurugan et al, (2018)[11]; Patel et al (2018)[54]
Sida cordifolia L. (Malvaceae)	Balu	Shrub	Leaves	Powder with milk, oral	Panduranga et al, (2011)[43]; Saheb et al, (2017)[55]
Sida rhombifolia L. (Malvaceae)	Bhiunli	Shrub	Root	Paste, oral	Tripathi et al, (2010)[22]
Smilax zeylanica L. (Smilacaceae)	Kumarika	Shrub	Root	Decoction, oral	Balamurugan et al, (2018)[11]; Sarangi et al (2004)[23]; Shrivastava (2018)[58]; Shukla et al, (2008)[59]
Sterculia villosa Roxb. (Sterculiaceae)	Odal	Tree	Seed	-	Saheb et al, (2017)[55]
Strychnos potatorum L. f. (Longaniaceae)	Nelmal	Tree	Seed	-	Saheb et al, (2017)[55]
Strychnosnux-vomica L. (Loganiaceae)	Kuchila	Tree	Stem	Paste, oral	Dash et al (2016)[57]
Syzygium cumini (L.) Skeels (Myrtaceae)	Jaman	Tree	Stembark	-	Saheb et al, (2017)[55]
Terminalia arjuna (Roxb. ex DC) Wight and Arn. (Combretaceae)	Arjun	Tree	Bark	Powder with honey, oral	Balamurugan et al, (2018)[11]; Sarkhel (2014)[18]; Deka et al (2013)[21]; Saheb et al, (2017)[55]
Terminalia bellirica Roxb. (Combretaceae)	Behada	Tree	Gum	-	Saheb et al, (2017)[55]
Tribulus terrestris L. (Zygophyllaceae)	Gokhru	Herb	Whole plant	With water, oral	Sarangi et al (2004)[23]
Triumfetta rhomboidei (Tiliaceae)	Chiki	Shrub	Root	Powder, oral	Yadav et al, (2006)[53]
Withania somnifera (L.) Dunal. (Solanaceae)	Ashwagandha	Shrub	Root	-	Patel et al (2018) Patel et al (2018)[54]
Woodfordia fruticosa (L.) Kurz (Lythraceae)	Dhawai	Shrub	Flower	Dried flower powder with	Devi Prasad et al, (2014)[24]; Dash et al (2016)[57]; Behara

Continued.

Botanical name and (Family)	Local Name (Hindi/Sanskrit)	Habit	Part used	Mode of preparation, administration	Reference
				water, oral	(2006)[61]
Xanthium strumarium L. (Asteraceae)	Banokra	Shrub	Leaves	-	Saheb et al, (2017)[55]

Table 5: Medicinal plants used to treat menorrhagia.

Botanical name and (Family)	Local Name (Hindi/Sanskrit)	Habit	Part used	Mode of preparation, administration	Reference
Acacia farnesiana Willd. (Mimosaceae)	Vilayati kikar	Tree	Bark	Powder with lukewarm water, oral	Balamurugan et al, (2018)[11]; Patel et al (2018)[54]
Achyranthes aspera L. (Amaranthaceae)	Latjira	Herb	Leaves	Extract, oral	Khan et al, (2006)[13]; Bora et al, (2016)[30]
Aegle marmelos (L.) Corr. (Rutaceae)	Bel	Tree	Leaves	-	Chouhan et al, (2020)[20]
Argemone maxicana L. (Papaveraceae)	Bharband	Herb	Root	With jaggery, oral	Panduranga et al, (2011)[43]
Aristolochia indica L. (Aristolochiaceae)	Ishwarimul	Herb	Root	Decoction, oral	Balamurugan et al, (2018)[11]; Sarkhel (2014)[18]; Devi Prasad, et al, (2014)[24]
Asperagus racemosus Willd. (Liliaceae)	Shatawar	Herb	Tuber	Extract, oral	Balamurugan et al, (2018)[11]; Rajeswari et al Murugesh, (2019)[16]; Shrivastava (2018)[58]; Shukla et al, (2008)[59]
Ayapana triplinervis (Vahl) King and H. Roxb. (Euphorbiaceae)	-	Herb	Leaves	Extract, oral	Pattanayak et al (2016)[28]
Azadirachta indica A. Juss. (Meliaceae)	Neem	Tree	Bark	Extract with water and buttermilk, oral	Ajesh et al (2012)[9]
Bauhinia malabarica Roxb. (Fabaceae)	Amli	Tree	Bark	-	Chouhan et al, (2020)[20]; Gupta et al (2013)[32]
Bauhinia variegata L. (Caesalpiniaceae)	Kachnar	Tree	Stembark	-	Pakkala et al, (2021)[19]; Saheb et al, (2017)[55]
Bombax ceiba L. (Bombacaeae)	Simal	Tree	Root	-	Gupta et al (2013)[32]
Borassus flabellifer L. (Areaceae)	Tad	Tree	Fruit	-	Gupta et al, (2013)[32]
Borreria articularis (L. f.) Williams (Rubiaceae)	Guthari	Herb	Whole plant, root	Decoction, oral	Pakkala et al, (2021)[19]; Dash et al, (2016)[57]; Behara (2006)[61]
Butea monosperma (Lam.) Taub (Fabaceae)	Palash	Tree	Stembark	With cheese, oral	Panduranga et al, (2011)[43]
Caesalpinia bonduc (L) Roxb. (Caesalpiniaceae)	Katkaranj	Climber	Rootbark	-	Saheb et al, (2017)[55]
Calotropis gigantea (L.) Dryand (Asclepiadaceae)	Arka	Shrub	Leaves	Decoction, oral	Sarkhel (2014)[18]
Catharanthus roseus (L.) G. Don (Apocynaceae)	Sadabahar	Shrub	Leaves	Juice with honey, oral	Balamurugan et al, (2018)[11]; Tripathi et al, (2010)[22]
Ceiba pentandra L. (Bombacaceae)	Swet Simul	Tree	Root	Paste, oral	Tripathi et al, (2010)[22]
Centella asiatica (L.)	Brahma-manduki	Herb	Whole	Paste, oral	Sarkhel (2014)[18]

Continued.

Botanical name and (Family)	Local Name (Hindi/Sanskrit)	Habit	Part used	Mode of preparation, administration	Reference
Urban (Apiaceae)			plant		
Chloroxylon swietenia DC. (Rutaceae)	Bhirra	Tree	Leaves	-	Jansirani et al, (2018)[50]
Cleome viscosa L. (Capparidaceae)	Arakakanta	Herb	Leaves	Paste, oral	Balamurugan et al, (2018)[11]
Cynodon dactylon Pers. (Poaceae)	Hariali	Herb	Whole plant	Paste, oral	Sarkhel (2014)[18]; Chouhan et al (2020)[20]; Azad (2013)[62]
Dalbergia sissoo Roxb. (Fabaceae)	Sissoo	Tree	Stembark	Paste with honey, oral	Tripathi et al, (2010)[22]
Dallbergia latifolia Roxb. (Fabaceae)	Sisham	Tree	Root	Paste with water, oral	Panduranga et al, (2011)[43]
Desmodium triflorum DC. (Fabaceae)	Kudaliya	Herb	Leaves	Juice with honey, oral	Ajesh et al (2012)[9]
Eragrostis cuvula Nees (Poaceae)	Kusha	Herb	Root	Paste with milk, oral	Tripathi et al, (2010)[22]
Erythrina variegata L. (Fabaceae)	Mandara	Tree	Leaves	-	Saheb et al, (2017)[55]
Feronia elephantum Corr. (Rutaceae)	Kathbel	Tree	Latex	Latex with honey, oral	Balamurugan et al, (2018)[11]
Ficus bengalensis L. (Moraceae)	Bargad	Tree	Bark	Powder, oral	Balamurugan et al, (2018)[11]; Rekka et al, (2013)[17]
Ficus racemosa L. (Moraceae)	Gullar	Tree	Fruit, leaves	Powder with milk, oral	Rajeswari et al (2019)[16]
Gmelina arborea Roxb. (Verbanaceae)	Gumhar	Tree	Stembark	Paste, oral	Panduranga et al, (2011)[43]
Hygrophila auriculata Schumach. Heine (Acanthaceae)	Gokanta	Herb	Leaves	Extract, oral	Pattanaya (2016)[28]
Ipomoea paniculata (L.) R.Br. (Convolvulaceae)	Bhilaikand	Shrub	Root	-	Patel et al (2018)[54]
Justicia adhatoda L. (Acanthaceae)	Arusha	Herb	Leaves	-	Chouhan et al (2020)[20]
Kalanchoe pinnata (Lam.) Pers. (Crassulaceae)	Amarpir	Shrub	Leaves	With cheese, oral	Panduranga et al, (2011)[43]
Lannea coromandelica (Houtt.) Merr. (Anacardiaceae)	Mohi	Tree	Leaves	Paste with milk, oral	Balamurugan et al, (2018)[11]
Lawsonia inermis L. (Lythraceae)	Mehandi	Shrub	Root, leaves	-	Gupta et al (2013)[32]
Malvaviscus penduliflorus DC. (Malvaceae)	Michi jaswand	Shrub	Flower	Eaten raw, oral	Ajesh et al (2012)[9]
Mimosa pudica L (Mimosaceae)	Lajwanti	Herb	Leaves, root	Powder with water, oral	Sarkhel (2014)[18]; Panduranga et al, (2011)[43] Azad (2013)[62]
Mucuna pruriens (L) DC. (Fabaceae)	Kiwach	Shrub	Seed	-	Patel et al (2018)[54]
Musa paradisiaca L. (Musaceae)	Kela	Herb	Stem	Juice, oral	Azad (2013)[62]
Nyctanthus arbortristis L. (Nyctaginaceae)	Harshingar	Tree	Bark	Paste, oral	Tripathi et al, (2010)[22]
Oroxylum indicum (L.) Benth. Ex Kurz (Bignoniaceae)	Sauna	Tree	Bark	Decoction, oral	Ajesh et al (2012)[9]; Behara, (2006)[61]
Pergularia daemia	Akasan	Shrub	Seed	-	Saheb et al, (2017)[55]

Continued.

Botanical name and (Family)	Local Name (Hindi/Sanskrit)	Habit	Part used	Mode of preparation, administration	Reference
(Forssk.) Chiov (Asclepiadaceae)					
Phyllanthus amarus Schumach. and Thonn. (Euphorbiaceae)	Jaramla	Herb	Whole plant	-	Patel et al (2018)[54]
Piper nigrum L. (Piperaceae)	Kalimirch	Shrub	Fruit	Tablets prepared by paste, oral	Bora et al, (2016)[30]
Pterocarpus marsupium Roxb. (Fabaceae)	Bijasal	Tree	Bark	Paste, oral	Tripathi et al, (2010)[22]
Saraca asoca (Roxb.) Willd (Fabaceae)	Asoka	Tree	Bark	Extract, oral	Baranwal (2016)[27]; Parmar et al, (2017)[29]
Senna occidentalis (L.) link. (Caesalpiniaceae)	Kasondi	Shrub	Whole plant	Powder with milk, oral	Rajeswari et al (2019)[16]; Chouhan et al (2020)[20]
Sphagneticola calendulacea (L.) Prusk (Asteraceae)	-	Herb	Whole plant	Decoction, oral	Sarkhel et al (2014)[18]; Deka et al, (2013)[21]
Tinospora cordifolia (Willd.) Miers. (Memispermaceae)	Giloy	Shrub	-	-	Parmar et al, (2017)[29]
Ventilago denticulata Willd. (Rhamnaceae)	Pitti	Shrubs	Stembark	-	Saheb et al, (2017)[55]
Woodfordia fruticosa (L.) Kurz (Lythraceae)	Dhawai	Shrub	Flower	Powder with honey, oral	Tripathi et al, (2010)[22]

Table 6: Medicinal plants used to regulate menstrual cycle.

Botanical name and (Family)	Local Name (Hindi/Sanskrit)	Habit	Part used	Mode of preparation, administration	Reference
Aloe vera (L.) Burm. f. (Liliaceae)	Gheekunvar	Herb	Leaves	Juice with turmeric powder and black salt, oral	Sharma et al, (2018)[14]; Deka et al (2013)[21]; Baranwal (2016)[27]; Azad, (2013)[62]
Aristolochia indica L. (Aristolochiaceae)	Ishwarimul	Herb	Root	Powder with water, oral	Balamurugan et al, (2018)[11]; Devi Prasad et al, (2014)[24]
Asperagus racemosus Willd. (Liliaceae)	Shatawar	Herb	Root	-	Baranwal (2016)[27]
Bombax ceiba L. (Bombacaceae)	Simal	Tree	Root, Flower	Paste with cow milk, oral	Ajesh et al (2012)[9]; Sarkhel (2014)[18] Tripathi et al, (2010)[22]; Devi et al (2014)[24]; Dash et al, (2016)[57]; Behara, (2006)[61]
Bridelia retusa (L.) A. Juss. (Phyllanthaceae)	Ekdania	Tree	Stembark	-	Jansirani et al, (2018)[50]
Calotropis gigantea (L.) Dryand (Asclepiadaceae)	Arka	Shrub	Root	Decoction, oral	Tripathi et al, (2010)[22]
Centella asiatica (L.) Urban (Apiaceae)	Brahma-manduki	Herb	Leaves	Extract, oral	Balamurugan et al, (2018)[11]; Sarkhel (2014)[18]; Baranwal (2016)[27]
Cheilanthes farinosa (Forsk.) Kaulf. (Pteridaceae)	Chandi booti	Herb	Frond	Decoction, oral	Singh et al, (2012)[26]
Cissus quadrangularis L. (Vitaceae)	Hadjora	Shrub	Stem	Juice, oral	Balamurugan et al, (2018)[11]; Wadankar, et al

Continued.

Botanical name and (Family)	Local Name (Hindi/Sanskrit)	Habit	Part used	Mode of preparation, administration	Reference
					(2011)[60]
Coix lachryma-jobi L. (Poaceae)	Sankru	Herb	Fruit	Juice with milk and honey, oral	Taid et al, (2014)[38]
Commelina benghalensis L. (Commelinaceae)	Kanchara	Herb	Whole plant	Extract, oral	Bora et al, (2016)[30]
Cynodon dactylon Pers. (Poaceae)	Hariali	Herb	Leaves	Powder with honey, oral	Balamurugan et al, (2018)[11]; Sarkhel (2014)[18]
Cyoerus rotundus L. (Cyperaceae)	Motha	Herb	Whole plant	-	Das et al, (2013)[21]
Echinops echinatus Roxb. (Asteraceae)	Gokru	Herb	Root	Oral	Chouhan and Garg, (2020)[20]
Hibiscus rosasinensis L. (Malvaceae)	Jasum	Shrub	Flower	Juice, oral	Bora et al, (2016)[30]
Mucuna pruriens (L) DC. (Fabaceae)	Kiwach	Shrub	Seed	Decoction, oral	Devi Prasad et al, (2014)[24]
Plumbago zeylanica L. (Plumbaginaceae)	Chitrak	Herb	Root	Powder, oral	Sharma et al, (2018)[14]
Raphanus sativus L. (Brassicaceae)	Muli	Herb	Root	-	Wadankar et al (2011)[60]
Saraca asoca (Roxb.) Willd (Fabaceae)	Asoka	Tree	Root	Decoction, oral	Balamurugan et al, (2018)[11]
Tinospora cordifolia (Willd.) Miers. (Memispermaceae)	Giloy	Shrub	Root	Paste, oral	Pattanayak (2016)[28]
Withania somnifera (L.) Dunal. (Solanaceae)	Ashwagandha	Shrub	Stembark	Decoction, oral	Sarkhel (2014)[18]
Woodfordia fruticosa (L.) Kurz (Lythraceae)	Dhawai	Shrub	Root, flower	Powder with honey, oral	Shrivastava (2018)[58]; Shukla et al, (2008)[59]

DISCUSSION

In present review the information/data of total 202 plant species which belongs to 84 families have been provided, of which 62 are trees, 61 shrubs, 79 herbs and 03 climbers (Figure 1).

While plant part/s used as medicinal formulations for treating Infertility and related different disorders, are 44 bark, flower 24, fruit 22, leaf 101, frond 01, rhizome 09, root, 111, bulb 02, tuber 15, seed 33, stem 29, whole plant 34, latex 08, gum 01, however in 09 uses part not specified (Figure 2). During the data analysis it is observed that different methods of medicine preparation, such as, extract, decoction, paste, juice, infusion, powder, etc, are reported. While as far as mode of administration is concerned, most of the formulations are taken orally. The medicine is taken as such or with water/ milk/ honey/ ghee/ jaggery, etc. is observed.

The infertility in women has become a great challenge these times, as infertility problems are linked with several factors and related disorders related to reproductive system. Infertility may be due to different causes, such as, cervical problems, tubal diseases, ovarian diseases, uterine pathologies, congenital abnormalities, menstrual disorders and hormonal imbalance.[42]

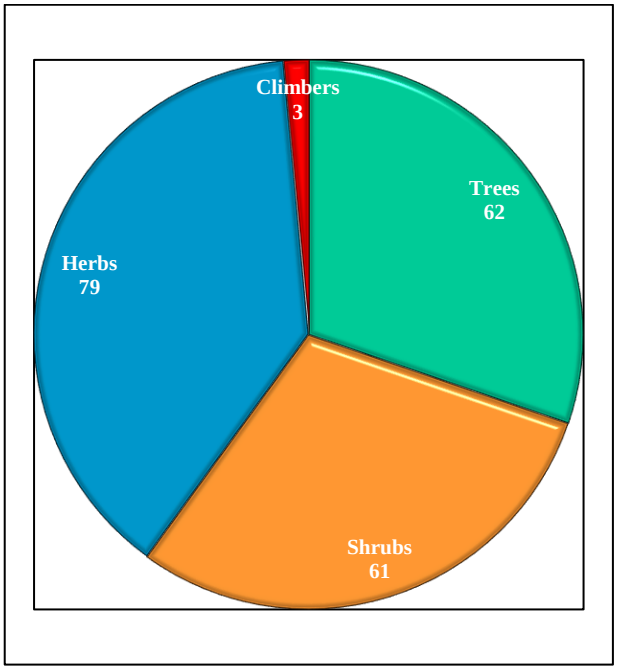

Figure 1: Habit wise number of plant species used for treating various ailments.

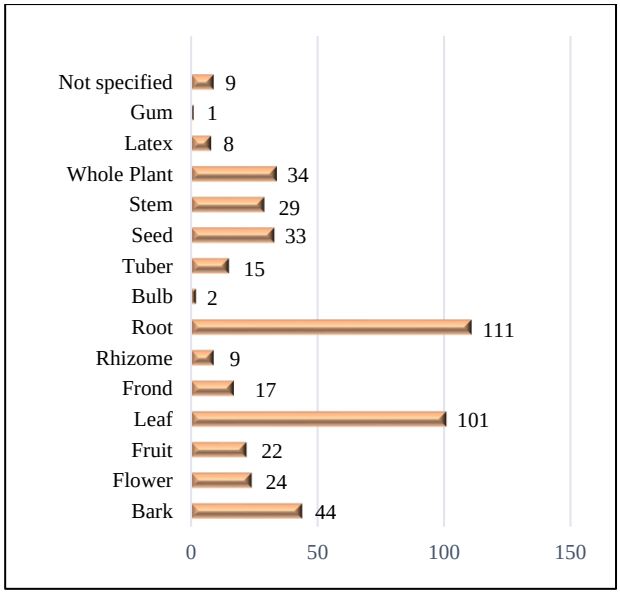

Figure 2: Number of plant parts used for 459 medicinal uses.

Several studies have been conducted on use of medicinal plants to treat infertility in different parts of India.[29,36,37,39,42,48,49,54] While studies under the title management of reproductive disorders have been done which cover infertility and related disoders.[24-26,38] Some review articles published, based on the studies done in India on medicinal plants to treat infertility.[27,35,44,46]

Figure 3 shows the use of number of plants for treating infertility and related disorders, of this most predominant disease/disorder is Infertility (with use 84 plants), besides this, leucorrhoea (79 plants), menorrhagia (53 plants), to dysmenorrhea (29 plants), amenorrhea (23 plants) and to regulate menstrual cycle (22 plants).

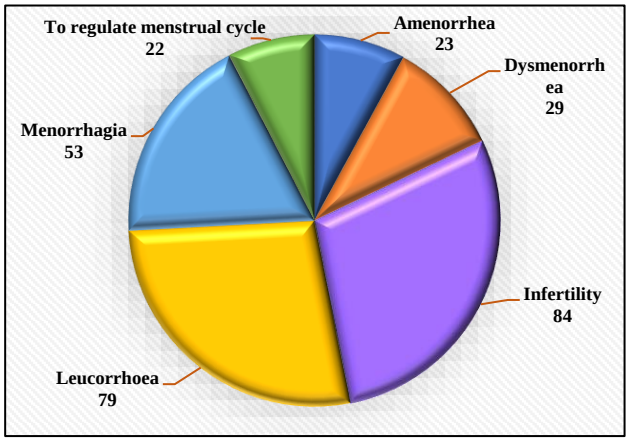

Figure 3: Medicinal plants used during infertility and related disorders.

CONCLUSION

The present study makes available the data based on 53 research publication on the medicinal plant used for female infertility and related disorders. Total 202 plant species are used in 459 recipes are reported. The analysis of the literature confirmed that the India has a rich wealth of traditional knowledge about the medicinal plants to treat infertility and related disorders. Irrespective of back ground or age, the verbal transfer of knowledge from one generation to another remains the foremost means of use of herbal recipes.

This study gives leads for further studies on biochemistry, pharmacognosy, pharmacology and drug discovery programs. Further investigations could be helpful to verify the claims made using a specific formulations or recipes. Subsequently, to provide the alternative medicine for the treatment of female infertility.

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