



Ethnomedicinal plants used by women for reproductive health in tehsil Ramshehar of district Solan, Himachal Pradesh

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Research

Abstract

Background: Traditional knowledge of ethnomedicinal plants for women reproductive health remains inadequately documented across many Himalayan regions of India. Therefore, this study documented ethnogynaecological plants used in tehsil Ramshehar, district Solan, Himachal Pradesh.

Methods: Ethnomedicinal information was collected by conducting interviews and group discussion with 89 informants, predominantly women by using semi-structured questionnaire between April 2024 and April 2025. Plant specimens were taxonomically identified and quantitative indices like Fidelity Level, Informant Consensus Factor (ICF), Use Value (UV) and Relative Frequency of Citation (RFC) were applied on ethnomedicinal data to determine the significance and validity of traditional knowledge.

Results: Forty six plant species representing 43 genera and 30 families were documented for their traditional role in treating several reproductive issues like infertility, menorrhagia, menstrual cramps and postpartum care. Fabaceae was the dominant family followed by Amaranthaceae and Moraceae. Seeds (33%) were the most frequently utilized plant parts for therapeutic purposes followed by leaves (17%). The menstrual disorders are the most important ailment category classified based on informant consensus factor. *Trigonella foenum-graecum* recorded the highest use value (UV) and relative frequency of citation (RFC) highlighting its broad acceptance and use in the community. 27 species exhibited 100% FL indicating complete consensus among informants.

Conclusion: The findings indicate that many rural women continue to depend on traditional plant-based remedies for managing reproductive health concerns, emphasizing that this knowledge remains an important part of local healthcare and deserves long-term preservation. The research contributes to a better understanding of women's reproductive healthcare practices in the region. Furthermore, integrate ethnobotanical knowledge with ecological information contributes to the conservation and sustainable management of medicinal plant resources while highlighting their potential for future pharmacological studies.

Keywords: Allopathy, Conservation, Ethnomedicinal, Fertility, Maternal health, Menstrual disorders.

Background

Reproductive health is defined as a state of complete physical, mental and social well-being concerning the reproductive system and its functions. It is not just the absence of a disease or illness but also includes overall well-being in reproductive processes (Adhikari *et al.* 2018). Worldwide, reproductive health issues are a leading cause of illness and death among women (Wijeratne *et al.* 2024). Reproductive health issues may be from a wide range of factors, including hormonal irregularities, infections, lifestyle practices, inadequate nutrition, insufficient physical activity and exposure to environmental pollutants. In addition, genetic susceptibility and limited access to proper healthcare can also significantly contribute to their development (Norman & Clark 1998). These concerns include high rates of maternal death, unsafe termination of pregnancies, infections transmitted through sexual contact, problems related to the menstrual cycle, insufficient awareness and restricted availability of reproductive health services (Ribeiro *et al.* 2008).

Menstruation is a central component of the female reproductive cycle. In many cases, it is linked with various conditions that can negatively impact the quality of life in females. Some of the commonly observed menstrual disorders in the research area include menorrhagia, characterized by excessively heavy and prolonged bleeding at regular intervals, dysmenorrhea marked by painful menstruation often accompanied by abdominal cramps, oligomenorrhea referring to infrequent or irregular menstrual cycles, leucorrhea linked with white vaginal discharge, amenorrhea characterized by the absence or abnormal cessation of menstruation and hypomenorrhea marked by unusually light menstrual flow (Bhatia *et al.* 2014). Throughout history, women have made efforts to boost their fertility through societal support, but it has not always been consistent.

For centuries, diverse cultures have relied on herbal remedies to manage women's reproductive health conditions (Bhatt G 2026). In recent times, there has been a growing interest in plant-based approaches to support fertility, particularly as a response to the adverse impact of industrial pollutants on reproductive health (Lans 2007). Practitioners of traditional medicine who rely on indigenous plants have continued to play a significant role in addressing female infertility. This cost-effective approach is widely accessible and provides important support for individuals who lack access to modern medical treatments (Ogwuet *et al.* 2017). Based on estimates from the World Health Organization (1999), reproductive health issues remain a major global concern, with approximately 340 million new cases of treatable sexually transmitted infections (STIs) including syphilis, gonorrhea, chlamydia, and trichomoniasis reported each year among individuals aged 15–49. In many developing nations, STIs and their associated complications are among the five leading reasons adults seek medical care. These infections may cause immediate symptoms as well as long-term health problems, including persistent infections and severe outcomes such as infertility, ectopic pregnancy, cervical cancer, and premature mortality in both infants and adults (Bussmann & Glenn 2010).

Pregnant women in rural areas often rely on local midwives for childbirth instead of consulting gynecologists. This preference is largely due to factors such as long distances to healthcare facilities and financial constraints, which make it difficult for them to access hospitals or multispecialty centers. During prenatal, childbirth and postnatal period women undergo various health risks that can result in significant mortality, particularly in remote and underserved regions of developing countries (Sharma & Sharma 2023).

Ethnomedicinal research plays a crucial role in informing healthcare strategies and supporting conservation efforts across various regions of the world (Osaki *et al.* 2022). Ethnomedicinal studies are fundamental for documenting traditional knowledge of medicinal plants that may contribute to discovery of novel plant derived medicines of global importance (Balunas & Kinghorn 2005). The emergence of ethnobotany as an independent scientific discipline, with a strong emphasis on documenting indigenous knowledge of medicinal plants, has facilitated the discovery of numerous novel therapeutic drugs (Jain *et al.* 2022).

Ethnomedicinal plants play a significant role in maternal healthcare, including both pre- and postnatal care, across rural and urban communities worldwide. Across diverse ethnic groups, medicinal plants have long been utilized to address a range of obstetric and gynecological conditions, such as fertility disorders, family planning, pregnancy complications, and childbirth-related problems. The associated traditional knowledge is largely maintained by experienced older women and traditional birth attendants, who pass it on to younger generations through family traditions (Torri 2013). Although ethnogynecological knowledge has been documented from several regions of India including parts of Himachal Pradesh comprehensive and systematic documentation of traditional plant-based remedies for gynecological disorders remains limited.

Existing studies from Himachal Pradesh are largely confined to districts such as Mandi and Shimla while investigations from Solan district have primarily focused on general ethnomedicinal practices rather than ethnogynaecological knowledge. Consequently, traditional gynecological healthcare practices in Solan and its adjoining areas remain inadequately documented (Rawat & Kharwal 2011, Priya & Rawat 2025, Sharma *et al.* 2026).

Therefore, the present study was initiated with the aim of investigating the ethnomedicinal plants of the Ramshehar region. This research aims to offer valuable insights into the cultural practices and traditional knowledge related to female's health and reproductive care. This area of research enables medical anthropologists to explore how various communities address gynecological concerns, facilitating the documentation of healthcare practices that are culturally appropriate and sensitive. Additionally, it can uncover the invaluable traditional knowledge that may provide alternative or complementary therapeutic options for managing these conditions.

Materials and Methods

Study area

The current investigation was undertaken in Ramshehar tehsil of district Solan (H.P.), situated within the Shivalik range of the North Western Himalayas. To document traditional ethnobotanical knowledge, field surveys were systematically carried out across 17 villages in Ramshehar Tehsil (Jukhar, Loharghat, Lunas, Kohu, Nand, Doli, Saur, Jainagar, Bhiokhri, Dharmana, Okhu, Beheri, Chamdar, Manlog Kalan, Matuli, Ramshahr, and Baila (Fig.1). The area is positioned between 31°05' to 31°15' North latitude and 76°47' to 76°58' East longitudes, with an average altitude of around 1,100 meters above sea level. The climate of the study area is characterized by moderate, pleasant summers, with temperatures between 26 °C and 32 °C, while winters are cold, with temperatures varying between 4°C and 8°C. The region receives approximately 1,262 mm of rainfall annually, and its vegetation is largely dominated by pine forests.

Field study

A field survey was carried out from 2024-2025 to document a wide range of plant specimens associated with ethnomedicinal information. Ethnomedicinal information was documented through face-to-face interviews, group discussions, and guided field visits. Data were obtained from 89 informants using a semi-structured questionnaire following the methodology of Jain and Goel (1995). Interviews were conducted in local Pahari dialects and Hindi to ensure comfortable communication and accurate recording of traditional knowledge. The purpose of the investigation was explained to each participant before data gathering, ensuring that participation was voluntary. Prior informed consent was obtained from each informant, either orally or in writing according to their preference and literacy level, in accordance with the International Society of Ethnobiology (ISE) Code of Ethics (2008). During field investigations, plant specimens were photographed and collected with guidance from local informants. The collected plant specimens were processed through pressing, drying, and mounting on herbarium sheets in accordance with standard herbarium procedures (Jain & Rao 1977). The prepared voucher specimens were subsequently deposited in the Herbarium of Himachal Pradesh University, Shimla, for future reference and verification. Preliminary identification was carried out using national, state, district, and regional floras (Collett 1902, Chowdhery & Wadhwa 1984, Polunin & Stainton 1984, Chauhan 1999, Dhaliwal & Sharma 1999). Relevant online databases like <http://www.worldfloraonline.org/> and <https://powo.science.kew.org/> were also consulted for this purpose. The conservation status of plants was also verified from the IUCN website (for global status) and ENVIS Centre on Medicinal Plants (for regional status). Plant specimens were taxonomically authenticated and cross-verified using the herbarium records at the Forest Research Institute (FRI), Dehradun. The conservation status of plants was also verified from the IUCN website (for global status) and ENVIS Centre on Medicinal Plants (for regional status).

Data collection

Ethnomedicinal indices

The collected information was analysed using the following quantitative ethnobotanical indices.

Use value (UV)

The ethnobotanical importance of a plant species can be quantified through its Use Value (UV), which is calculated using the formula presented below (Rana *et al.* 2021).

$$UV = \sum \frac{u}{n}$$

UV refers to use value, Σu indicates the total numbers of use reports mentioned by each informant for a particular species, for a particular species, while n represents the total number of informants. A plant is considered to have a high use value when it has many reported uses and a low use value when only a few use reports are recorded informants.

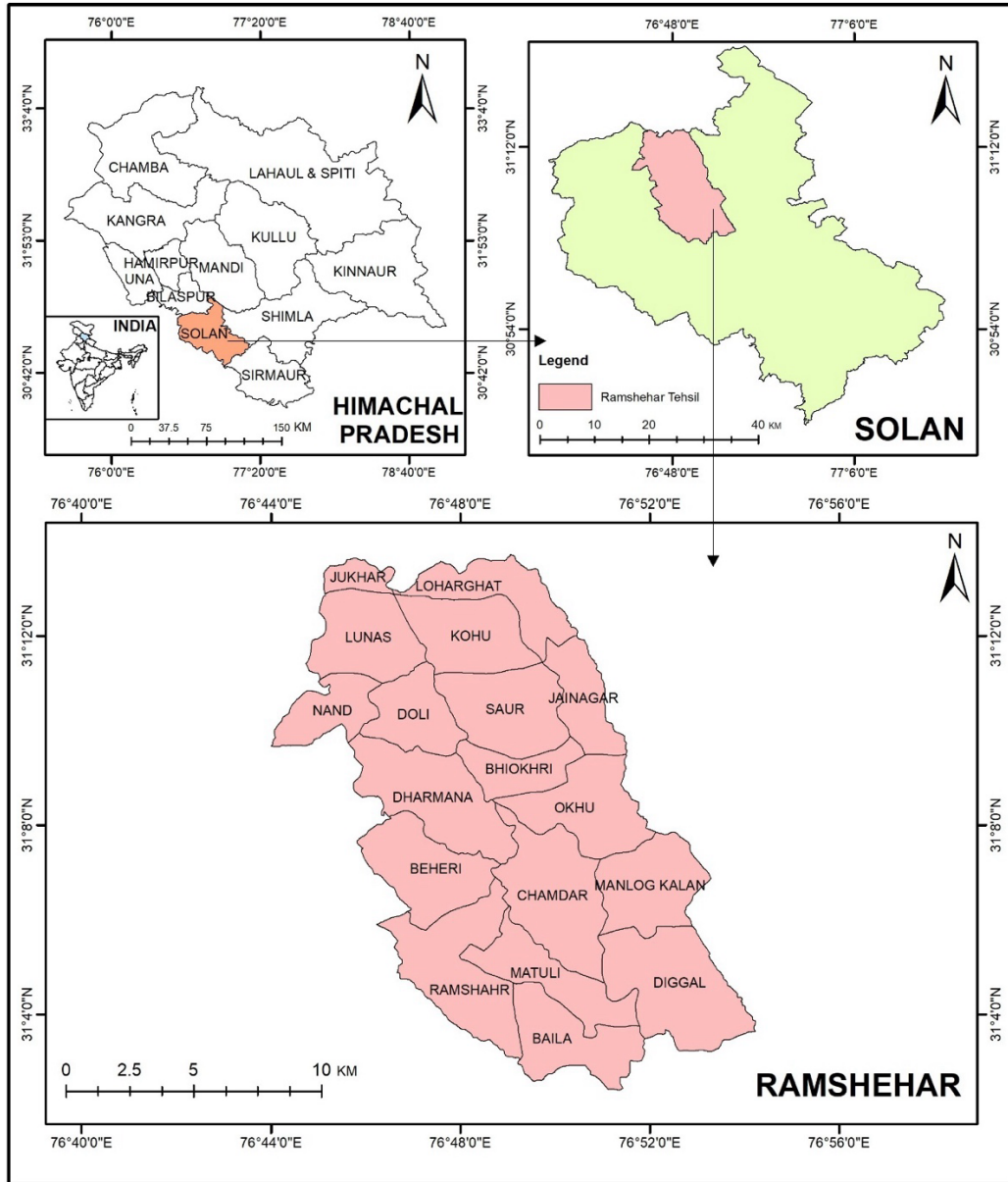


Figure 1. Location map of the research area.

Informant consensus factor (ICF)

The ICF is measured according to the formula given by (Trotter and Logan 1986) as follows:

$$ICF = \frac{Nur - Nt}{Nur - 1}$$

where Nur represents the total number of use reports recorded for a particular disease category, while Nt denotes the number of plant species employed to treat that disease category.

Relative frequency of citation (RFC)

It was determined by dividing the number of informants who cited a particular species by the total number of participants involved in the survey (N), following the method proposed by (Tardio & Pardo-de-Santayana 2008).

$$RFC = \frac{FCs}{N} = \sum_{i=1}^N UR_i / N$$

It can also be derived by dividing the combined use reports (UR) for a particular species, irrespective of the reported use category, by the overall number of informants interviewed.

Fidelity Level (FL%)

It determines the most suitable species for treating a specific condition (Friedman *et al.* 1986).

$$FL(\%) = \frac{Np}{N} \times 100$$

Using the following equation, Np represents the number of reports citing a particular species for a specific ailment and N represents the total number of reports for any given species. Plants with high FLs (near 100%) are used almost exclusively in one way, whereas plants with low FLs are used in numerous ways.

Perceptions of ayurvedic and allopathic treatments among informants

Before data collection, all informants were thoroughly informed about the study's focus and a comparison on both ayurvedic and allopathic treatment preferences in relation to reproductive health. Written or verbal consent was specifically obtained to document their knowledge, experiences and opinions regarding these medical systems. Participants were queried on their treatment preferences, perceived effectiveness, and patterns of use of ayurvedic and allopathic remedies for reproductive health concerns. Participation was entirely voluntary, and all information provided was kept strictly confidential to protect the privacy of the informants.

Results and Discussion

Demography of informants

The ethnobotanical survey included interviews with 89 participants, consisting of 81 women and 8 men. Among the male respondents, four were traditional healers, whereas the remaining four were elderly individual. Among the 81 female participants, only two were identified as traditional healers, whereas the remaining respondents comprised housewives, elderly women, and traditional midwives representing different age groups. Using snowball sampling, 89 informants were interviewed, with peer referrals directing the survey predominantly toward women as the primary custodians of reproductive healthcare. Consequently, data regarding treatment preferences for reproductive health disorders were derived mainly from female respondents. Prior research similarly highlights the central role of women in safeguarding and transmitting indigenous practices related to maternal and reproductive health (Garima & Das 2024). The described medicinal plants were cross-checked several times (3-4) with different informants and the information is regarded as valid if mentioned by at least 3 informants. It was observed that 7.87% of the respondents were illiterate, 17.98% studied up to primary level, 48.31% studied up to intermediate level, 25.84% studied up to secondary level in the respondent category (Table 1). Only those male informants (8) who were traditional healers/collector of plants were selected.

Table 1. Demography of informants

Category	Female	Male	Total
Informants	81(91.01%)	8(8.99%)	89(100.00%)
Age group			
35-44	14(17.28%)	1(12.50%)	15(16.85%)
45-54	20(24.70%)	1(12.50%)	21(23.59%)
55-64	30(37.04%)	1(12.50%)	31(34.83%)
65-74	12(14.81%)	3(37.50%)	15(16.85%)
75-84	5(6.17%)	2(25.00%)	7(7.86%)
Education Level			
Intermediate Level (12 th class)	41(50.61%)	2(25.00%)	43(48.31%)
Secondary Level (6-10 th class)	21(25.92%)	2(25.00%)	23(25.84%)
Primary Level (1-5 th class)	13(16.04%)	3(37.50%)	16(17.98%)
No Schooling	6(7.40%)	1(12.50%)	7(7.87%)
Profession			
Housewife/ Housemaker	50(61.73%)	2(25%)	52(58.43%)
Agriculture/Farming	20(24.69%)	3(37%)	23(25.84%)
Traditional Healers/Midwives	6(7.41%)	2(25%)	8(8.99%)
Retired/Elderly	5(6.17%)	1(12.50%)	6(6.74%)
Religion			
Hindu	72(88.89%)	5(62.50%)	77(86.52%)
Muslim	5(6.17%)	2(25.00%)	7(7.87%)
Sikh	4(4.94%)	1(12.50%)	5(5.61%)

Diversity of the plant composition

The ethnobotanical survey conducted in Ramshehar tehsil, district Solan, documented 46 ethnomedicinal plant species representing 43 genera and 30 plant families. Among the documented medicinal plants, Fabaceae was the most frequently reported family with 8 species, followed by Amaranthaceae and Moraceae with 3 species each. Apiaceae, Combretaceae, Lamiaceae, Lythraceae and Zingiberaceae were represented by 2 species each and the remaining plant families contributed one species each (Fig.2). The predominance of Fabaceae in the current study is consistent with earlier reports highlighting its frequent use in the management of reproductive health disorders (Balamurugan *et al.* 2018). The widespread utilization of this family may be associated with the diverse bioactive constituents it contains, particularly those exhibiting anti-inflammatory and antispasmodic activities (Mongalo *et al.* 2025).

Life Forms

Herbs accounted for 45.65% of the recorded species, trees accounted for 34.78%, shrubs for 15.22% and climbers for 4.35% (Fig. 3). The predominance of herbs in the present study is likely associated with their widespread occurrence, easy availability and convenient collection within the study area, as observed during field investigations. Previous studies have also indicated that many herbaceous species are rich in bioactive constituents capable of supporting hormonal regulation and reducing menstrual-related discomfort (Dennehy 2006). Their broad therapeutic potential, coupled with simple preparation and administration, has contributed to the continued reliance on herbs in traditional healthcare systems for the treatment of female reproductive disorders (Masullo *et al.* 2015). Differences in the preferred growth forms of medicinal plants across regions may reflect variations in local vegetation, environmental conditions, traditional healing practices and the ethnomedicinal knowledge preserved within individual communities.

Plant Parts utilized

Among the plant parts utilized for treating ailments, seeds were predominant (33%), followed by leaves (17%), bark (14%), roots (10%), fruits, rhizome, resin seed kernel and whole plant (4% each) while flowers, gum and tubers were represented marginally 2% each (Fig.4). Their widespread use may be associated with their easy availability, prolonged storage capacity and the presence of biologically active constituents, including flavonoids and tannins, which are known for their antioxidant and anti-inflammatory activities and may contribute to reproductive health. Seeds serve as reservoirs of nutrients and secondary metabolites, many of which have been reported to influence hormonal regulation and support reproductive functions (Bhattarai *et al.* 2006). The repeated selection of particular plant parts in traditional remedies may further indicate that local communities perceive them to possess greater medicinal efficacy than other parts of the same plant (Kala 2005). The ethnomedicinal information documented during the survey was systematically presented in tabular form, including the botanical name, vernacular name, family, growth habit, and plant parts used (Table 2).

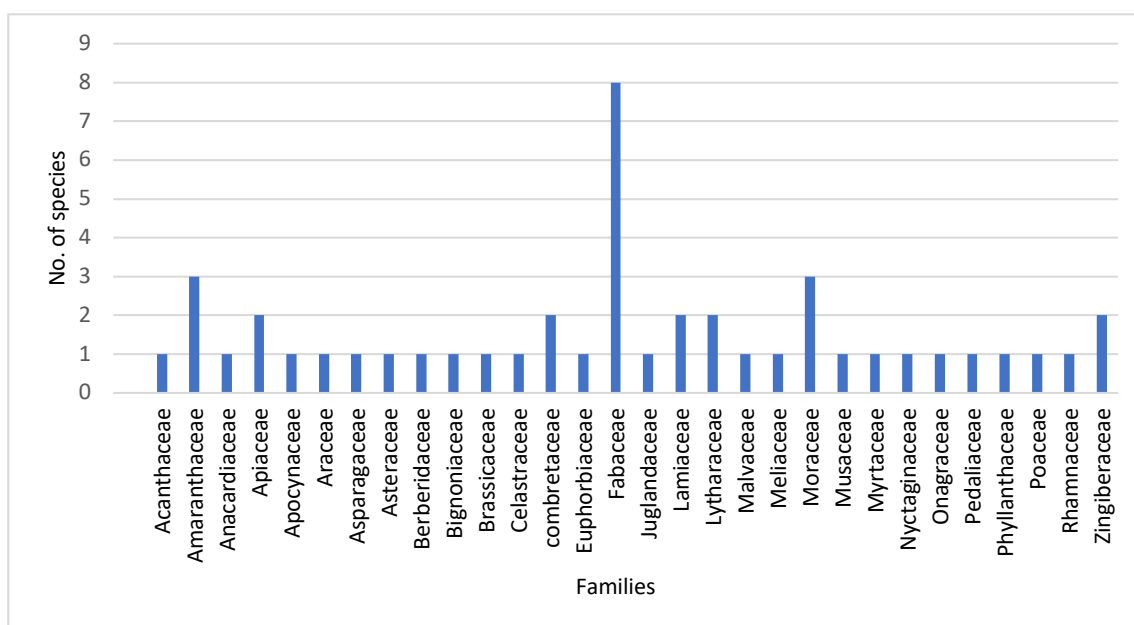


Figure 2. Family-wise representation of ethnomedicinal plant species documented from study area.

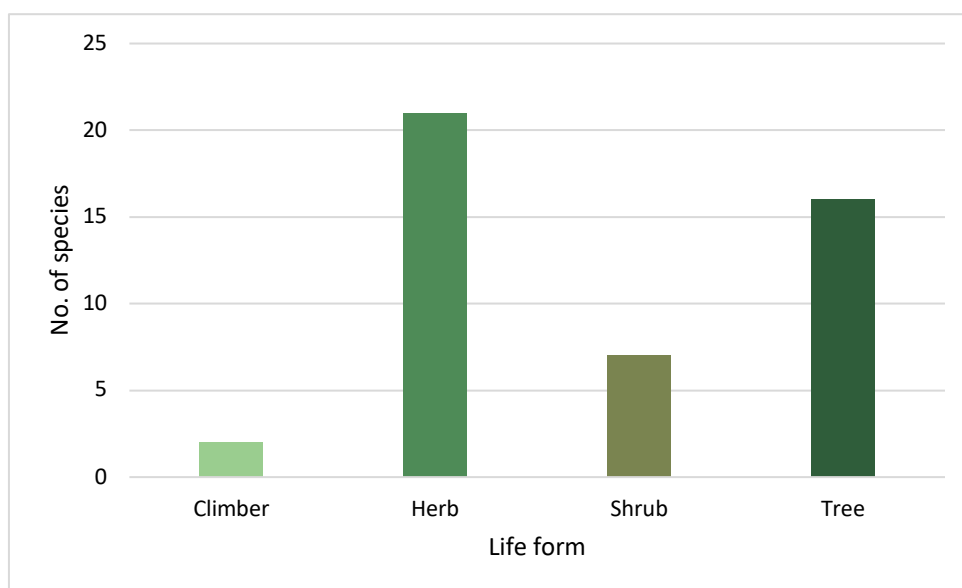


Figure 3. Bar graph showing number of species under each life form.

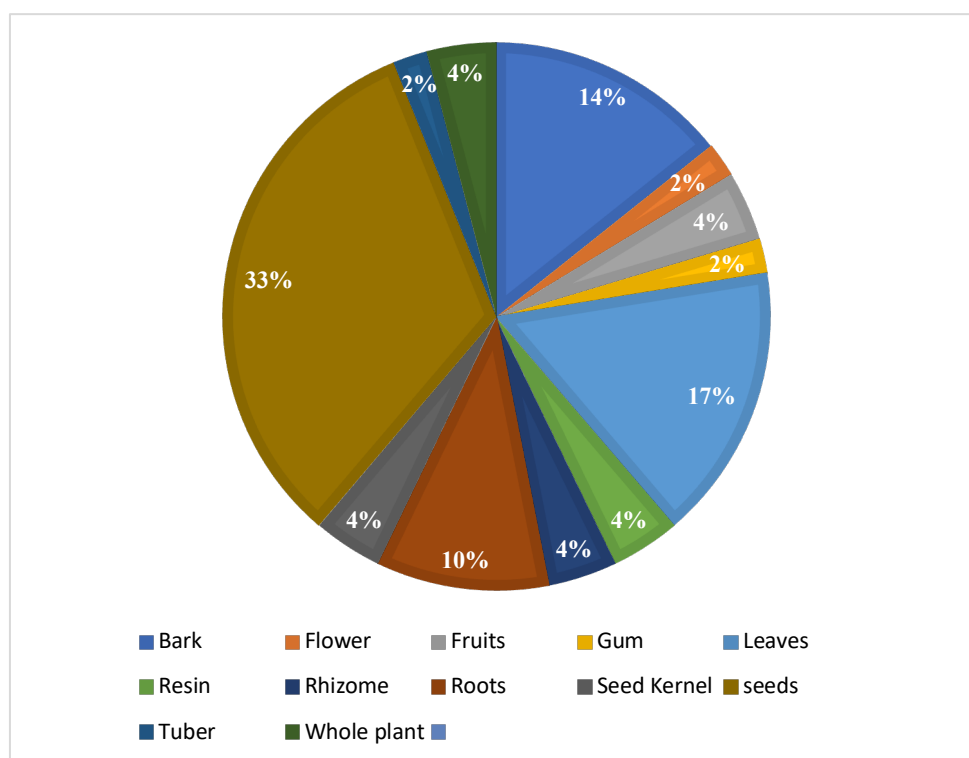


Figure 4. Pie chart illustrating the distribution of plant parts utilized to treat various reproductive health issues.

Mode of Preparation and Administration Route

Decoctions emerged as the primary method (34.5%), followed by powdered preparations (25.9%) and traditional dietary confections such as laddoos, kheer, and halwa (17.2%), with the remaining 22.4% comprising pastes, fresh juices, and topical applications. The predominance of decoctions in our study aligns with findings from Tanzanian ethnogynaecological review literature, which similarly highlights water-based decoctions as the primary preparation method for remedies managing female infertility and menstrual disorders (Kacholi *et al.*, 2023). The oral ingestion (95.74%) appears to be the most prominent pathway of systemic delivery in managing gynecological conditions. Similar patterns regarding the mode of administration for ethnogynaecological remedies have been documented across other regional studies in India (Surendran *et al.*, 2023).

Table 2. List of plant species along with their use value and relative frequency of citation utilized for reproductive health problems.

Family	Botanical Name / Voucher No.	Local Name	Habit	Parts Used	Preparation	Administration	Disease Treated	Use Report
Acanthaceae	<i>Justicia adhatoda</i> L. / HPU-ER-DR-737	Chiti Basuti	Shrub	Leaves	20ml decoction of dried leaves administered to facilitate easy delivery.	Oral	Facilitates easy delivery (48)	48
Amaranthaceae	<i>Achyranthes bidentata</i> Blume /HPU-ER-DR-602	Puthkanda	Herb	Root	Root decoction (20ml) administered to women after menstruation for 10 days to prevent conception.	Oral	Contraceptive (60)	60
Amaranthaceae	<i>Amaranthus viridis</i> L. /HPU-ER-DR-620	Chaulayi	Herb	Seeds	Ladoo's prepared from seeds traditionally consumed to reduce menstrual pain.	Oral	Dysmenorrhea (36)	36
Amaranthaceae	<i>Chenopodium album</i> L. /HPU-ER-DR-667	Bathu	Herb	Seeds	Ladoo's prepared with (200gm) seeds mixed with 80gm of jaggary consumed for 5-7 days to manage dysmenorrhea. 2-3 Ladoo's taken twice a day for 3-5 days to induce abortion.	Oral	Dysmenorrhea (31), Abortifacient (36)	67
Anacardiaceae	<i>Mangifera indica</i> L. /HPU-ER-DR-750	Aamb	Tree	Seed kernel	15gm powder of seed in boiled cow milk (150ml) taken two times a day for 10-15 days to cure vaginal discharge.	Oral	Vaginal discharge (23)	23
Apiaceae	<i>Centella asiatica</i> (L.) Urb. /HPU-ER-DR-663	Brahmi, Katoru	Herb	Leaves	10ml leaf juice administered orally for 15 days to manage oligomenorrhea. 4-5 leaves with crystalized sugar (Candy sugar) consumed on empty stomach for 21 days to manage menorrhagia.	Oral	Oligomenorrhea (32), Menorrhagia (26)	58
Apiaceae	<i>Coriandrum sativum</i> L. /HPU-ER-DR-671	Ben	Herb	Seeds	50ml decoction of seeds administered for 21 days to manage menorrhagia.	Oral	Menorrhagia (26)	26
Apocynaceae	<i>Calotropis gigantea</i> (L.)W.T.Aiton / HPU-ER-DR-649	Aak	Herb	Roots	Root decoction (2ml) mixed with paste of <i>Piper longum</i> (1gm) taken on empty stomach for 10 days to cure leucorrhea. The paste of root (4-5gm) consumed 3-5 days to induce abortion.	Oral	Leucorrhea (26), Induce abortion (37)	63
Araceae	<i>Amorphophallus paeoniifolius</i> (Dennst.) Nicolson /HPU-ER-DR-621	Zimmikand	Herb	Tuber	The cooked tuber used as an emmenagogue and abortifacient.	Oral	Emmenagogue (25), Abortifacient (39)	64
Asparagaceae	<i>Asparagus adscendens</i> Roxb. /HPU-ER-DR-627	Sansmullu	Shrub	Roots	Powdered root (3gm) dissolved 100ml of water and consumed once daily before	Oral	Leucorrhea (42), Dysmenorrhea (22)	64

					breakfast for 21 days to manage leucorrhea and dysmenorrhea.			
Asteraceae	<i>Artemisia vulgaris</i> L. / HPU-ER-DR-626	Chau	Herb	Seeds	Powdered seeds mixed with mustard oil massaged over the body to relieve post-partum back pain.	Topical	Post-partum care (45)	45
Berberidaceae	<i>Berberis lycium</i> Royle /HPU-ER-DR-633	Kashmal	Shrub	Roots	Root powder (5gm) in a cup of milk taken to manage leucorrhea. Root decoction (25-30ml) taken for 10 days to reduce post-delivery pains.	Oral	Leucorrhea (47), Postpartum care (20)	67
Bignoniaceae	<i>Oroxylum indicum</i> (L.) Kurz /HPU-ER-DR-772	Tatpalanga	Tree	Bark	Decoction of bark (10ml) mixed with (1gm) of salt taken two times a day for 20 days to treat menorrhagia.	Oral	Menorrhagia (31)	31
Brassicaceae	<i>Lepidium sativum</i> L. /HPU-ER-DR-741	Halo	Herb	Seeds	Kheer (milk-based preparation) made from its seeds consumed 2-3 days to manage dysmenorrhea.	Oral	Dysmenorrhea (41)	41
Celastraceae	<i>Celastrus paniculatus</i> Willd. /HPU-ER-DR-659	Chunkaroo	Climber	Seeds	5gm Seed powder in warm milk consumed twice a day for 25-30 days in leucorrhea. 100gm seed powder mixed with (50gm) dry fruits consumed for 40 days as a tonic to reduce internal inflammation and good for postpartum recovery.	Oral	Leucorrhea (35), postpartum care (32)	67
Combretaceae	<i>Terminalia anogeissiana</i> Gere & Boatwr. /HPU-ER-DR-623	Chhalo	Tree	Gum	Ladoo's prepared with 50gm gum and 100gm of dry fruits. Take 2-3 laddoos daily for 40 days after delivery to alleviate back pain and promote tissue recovery.	Oral	Postpartum care (26)	26
Combretaceae	<i>Terminalia arjuna</i> (Roxb. ex DC.) Wight & Arn. /HPU-ER-DR-828	Arjan	Tree	Bark	5gm bark powder boiled in 100ml cow milk then filtered. Add candy sugar in it taken (25-30ml) thrice a day for 10 days to cure oligomenorrhea.	Oral	Oligomenorrhea (14)	14
Euphorbiaceae	<i>Ricinus communis</i> L. /HPU-ER-DR-800	Arind	Shrub	Leaves	Warm leaves placed as a poultice on the breast for get relief from pain and swelling.	Oral	Breast pain and swelling (40)	40
Fabaceae	<i>Cassia fistula</i> L./ HPU-ER-DR-650	Palaas	Tree	Fruit	(20ml) decoction of fruit pulp taken to facilitates parturition.	Oral	Facilitates parturition (43)	43
Fabaceae	<i>Senegalia catechu</i> (L.f.) P.J.H. Hurter & Mabb. /HPU-ER-DR-811	Khair	Tree	Resin	5gm resin mixed in hot milk (200ml) consumed during labour pain for easy delivery.	Oral	Easy delivery (52)	52

Fabaceae	<i>Senna tora</i> (L.) Roxb. /HPU-ER-DR-654	Punad	Herb	Seeds	25-30ml decoction of seeds taken on an empty stomach daily for 15 days as an abortifacient.	Oral	Abortifacient (34)	34
Fabaceae	<i>Trigonella foenum-graecum</i> L. /HPU-ER-DR-839	Metho	Herb	Seeds	'Khichdi' (Porridge) prepared with 10-15gm seeds consumed during labour pain helps easy delivery. 20-25ml decoction of 5gm seeds consumed before breakfast once a day for 7 days to manage dysmenorrhea.	Oral	Easy delivery (48), Dysmenorrhea (20)	68
Fabaceae	<i>Abrus precatorius</i> L. /HPU-ER-DR-601	Ratti	Climber	Seeds	Powdered seeds (1 tablespoon) mixed in 150ml of hot water and consumed orally for 15 days to alleviate dysmenorrhea.	Oral	Dysmenorrhea (35)	35
Fabaceae	<i>Bauhinia variegata</i> L. /HPU-ER-DR-632	Karyalo	Tree	Bark	Powdered buds (5gm) dissolved in 100ml of water taken twice daily for a month to enhance lactation. Decoction of bark (40-50ml) consumed before breakfast for 30 days to manage uterus fibroids.	Oral	Galactagogue (42) Uterus fibroids (20)	62
Fabaceae	<i>Butea monosperma</i> (Lam.) /HPU-ER-DR-642	Palah	Tree	Resin	Ladoo's made from fried gum (100gm) mixed with (50gm) dry fruits taken two times a day for 10 days to manage leucorrhea. Decoction of bark (20ml) taken two times a day for 10-20 days to recover postpartum hemorrhage.	Oral	Leucorrhea (36), Postpartum (25)	61
Fabaceae	<i>Dalbergia sissoo</i> Roxb. ex DC. /HPU-ER-DR-681	Taali	Tree	Leaves	15-20ml decoction of leaves administered once daily on empty stomach for 15 days in gonorrhea. 5gm powder of leaves mixed with honey (2-3 tablespoon) taken twice a day for 10 days to manage amenorrhea, dysmenorrhea and menorrhagia.	Oral	Gonorrhea (6), Amenorrhea (10), Dysmenorrhea (11), Menorrhagia (12)	39
Juglandaceae	<i>Juglans regia</i> L. /HPU-ER-DR-735	Khod	Tree	Kernel	10-15gm of kernel consumed once a day for 3-5 days to manage dysmenorrhea.	Oral	Dysmenorrhea (33)	33
Lamiaceae	<i>Ocimum basilicum</i> L. /HPU-ER-DR-769	Pabri	Herb	Seeds	20-25ml decoction of seeds taken once daily for 15 days to manage gonorrhea.	Oral	Gonorrhea (49)	49
Lamiaceae	<i>Vitex negundo</i> L. /HPU-ER-DR-850	Bana, Smalu	Shrub	Leaves	30ml decoction of leaves administered once daily for 5-7 days to manage fever, shivering	Oral	Fever (49), Hypomenorrhea (18)	67

					and cold after delivery. 20-25ml decoction of leaves taken once daily for 3-5 days to manage low period flow.			
Lythraceae	<i>Punica granatum</i> L. /HPU-ER-DR-794	Daru	Shrub	Seeds,	3gm powdered seeds mixed in yoghurt (10gm) consumed before breakfast once a day for 10 days to manage white discharge.	Oral	White discharge (42)	42
Lythraceae	<i>Woodfordia fruticosa</i> (L.) Kurz /HPU-ER-DR-851	Dhanwi	Shrub	Flowers	5gm powder of dried flower with (2 tablespoons) of honey taken once daily for 30 days to manage leucorrhea.	Oral	Leucorrhea (42)	42
Malvaceae	<i>Sida cordifolia</i> L. /HPU-ER-DR-817	Jeed	Herb	Seeds	1 tablespoon of seeds mixed in butter consumed daily for 10-15 days to manage menorrhagia and gonorrhea.	Oral	Menorrhagia (17), Gonorrhea (32)	49
Meliaceae	<i>Azadirachta indica</i> A.Juss. / HPU-ER-DR-628	Neem	Tree	Leaves	Leaf extract (20ml) administered orally twice a day for 15 days to manage menorrhagia.	Oral	Menorrhagia (21)	21
Moraceae	<i>Ficus benghalensis</i> L. /HPU-ER-DR-705	Barota	Tree	Bark, Seed	Powdered bark (5gm) mixed with honey (2 tablespoon) consumed for a month to manage leucorrhea. 5 gm seed powder in a cup of warm milk taken for 40 days to increase lactation.	Oral	Leucorrhea (29), Lactation (21)	50
Moraceae	<i>Ficus racemosa</i> L. /HPU-ER-DR-710	Gular	Tree	Bark	20 ml decoction of bark taken on an empty stomach daily for 21 days to promote contraception.	Oral	Contraceptive (37)	37
Moraceae	<i>Ficus religiosa</i> L. /HPU-ER-DR-711	Peepal	Tree	Seed	5gm seed powder mixed with root powder of <i>Asparagus adscendens</i> (10gm) and fruit powder of <i>Phyllanthus emblica</i> (5gm). Take 5gm of this mixture twice daily with a cup of milk before meal for 21 days to promote conception.	Oral	Promote conception (31)	31
Musaceae	<i>Musa paradisiaca</i> L. /HPU-ER-DR-763	Kela	Herb	Flowers	20ml decoction of flowers administered once daily for 5-7 days to manage leucorrhea.	Oral	Leucorrhea (35)	35
Myrtaceae	<i>Syzygium cumini</i> (L.) Skeels /HPU-ER-DR-826	Jaman	Tree	Bark	5gm bark powder with (100 ml) of cow milk consumed two times a day for 7 days to manage leucorrhea.	Oral	Leuconrrhea (43)	43
Nyctaginaceae	<i>Boerhavia diffusa</i> L./HPU-ER-DR-636	Punara	Herb	Whole Plant, Roots	Whole plant decoction (15-20ml) consumed before breakfast once	Oral	Leucorrhea (31), Hasten delivery (24)	55

					a day for 15 days in leucorrhea. The paste of fresh roots (5gm) with a cup of hot water to hasten delivery.			
Onagraceae	<i>Oenothera rosea</i> Aiton /HPU-ER-DR-771	Pyaji Phool	Herb	Leaves	10-15ml decoction of leaves administered on an empty stomach for 21 days to manage leucorrhea.	Oral	Leucorrhea (29)	29
Pedaliaceae	<i>Sesamum indicum</i> L. /HPU-ER-DR-815	Til	Herb	Seeds	Ladoo's prepared with (100gm) sesame seeds and (50gm) jaggery. Take 2-3 ladoo's daily for 3-5 days to alleviate scanty menstrual bleeding.	Oral	Hypomenorrhea (32)	32
Phyllanthaceae	<i>Phyllanthus urinaria</i> L. /HPU-ER-DR-781	Bhuiamla	Herb	Whole	20-25ml decoction of whole plant taken once a day for 15 days to cure menorrhagia. 5-10gm paste mixed in water consumed once daily for 10 days to treat gonorrhea.	Oral	Menorrhagia (10), Gonorrhea (13)	23
Poaceae	<i>Triticum aestivum</i> L. /HPU-ER-DR-841	Kanak	Herb	Seeds	A traditional formulation prepared by cooking 50 g of wheat starch in clarified butter (<i>ghee</i>) is administered orally at a dose of 10–15 g daily for 5–7 days during the first trimester to manage vaginal bleeding and spotting. Halwa, a traditional preparation composed of flour and clarified butter (<i>ghee</i>), consumed at a dose of 50–100 gm daily for 40 days during the postpartum period for recovery purposes.	Oral	Implantation bleeding (37) postpartum care (29)	66
Rhamnaceae	<i>Ziziphus mauritiana</i> Lam. /HPU-ER-DR-860	Ber	Tree	Bark, Fruits	10-15gm paste of stem bark mixed in water taken two times a day for 20 days to treat dysmenorrhea. 5gm powder of shade dried fruits mixed with 5gm jaggery taken two times a day for 10 days to manage leucorrhea.	Oral	Dysmenorrhea (27), Leucorrhea (26)	53
Zingiberaceae	<i>Curcuma longa</i> L. /HPU-ER-DR-679	Halaji, Halaj	Herb	Rhizome	Paste of rhizome (200gm) mixed with dry fruits (250gm). Take 5gm of this mixture twice daily with a cup of hot milk for 40 days to	Oral, Topical	Postpartum care (65)	65

					recover postpartum injuries. 5gm powder of rhizome mixed with hot mustard oil (10ml) applied on external stitches.			
Zingiberaceae	<i>Zingiber officinale</i> Roscoe /HPU-ER-DR-856	Aada	Herb	Rhizome	Ladoo's prepared from 100 g of dried rhizome powder and 50 g of jaggery. Take 1–2 laddoo's daily for 40 days during the postpartum period for postnatal care. 25-30ml decoction of rhizome taken once daily for 3-5 days during menstrual cycle to manage dysmenorrhea.	Oral	Dysmenorrhea (19), postpartum care (47)	66

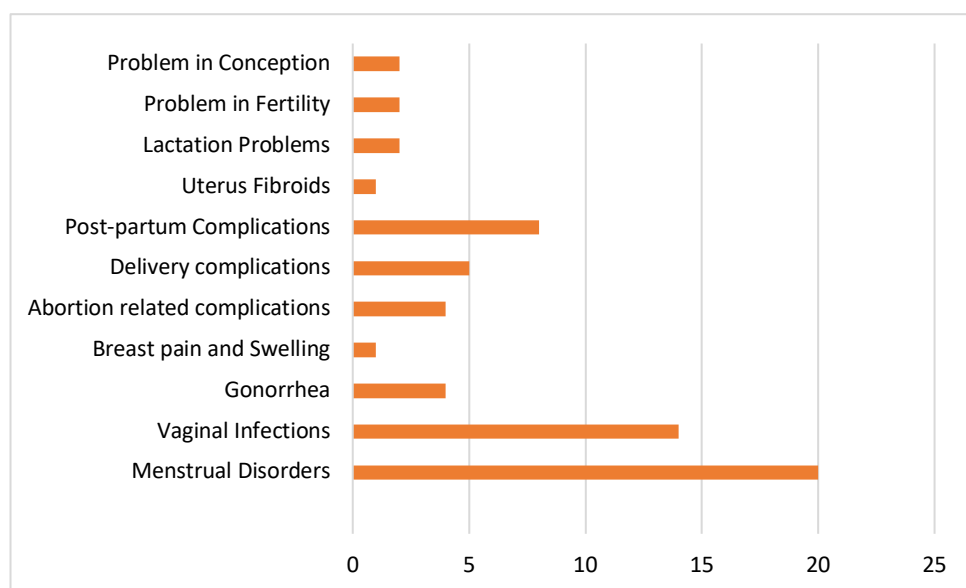


Figure 5. Number of plant species used for various reproductive disorders.

Quantitative analysis

Use value

Plant species with highest use value (UV) were *Trigonella foenum-graecum* (0.76) followed by *Berberis lycium*, *Celastrus paniculatus*, *Chenopodium album* and *Vitex negundo* (0.75 each) *Triticum aestivum* and *Zingiber officinale* (0.74 each) *Curcuma longa* (0.73), *Amorphophallus paeoniifolius* and *Asparagus adscendens* (0.71 each) and *Calotropis gigantea* (0.70) as shown in the (Table 3).

Relative frequency of citation

Highly cited plant species for reproductive problems were *Trigonella foenum-graecum* (0.87), *Celastrus paniculatus* (0.85), *Curcuma longa* (0.84), *Lepidium sativum* and *Senna tora* (0.82 each), *Chenopodium album* (0.80), *Zingiber officinale* (0.78), *Asparagus adscendens* and *Sida cordifolia* (0.77 each), *Senegalia catechu* (0.71), and *Calotropis gigantea* (0.70) as shown in the (Table 3). The high Use Value (UV) and Relative Frequency of Citation (RFC) recorded for *Trigonella foenum-graecum*, as well as other frequently reported species, may be attributed to their perceived therapeutic potential and their widespread distribution across the study area. Their extensive occurrence facilitates easy access for local communities, thereby promoting their continued use in traditional medicinal practices (Rahman 2014). It has been found that out of a total 46, 3 species were data deficient, 22 falls under the Least Concern (LC) category while the status of remaining 21 species is not assessed till date following the IUCN criteria for Red Listing.

Table 3. List of ethnomedicinal plant with their use value (UV) and relative frequency of citation (RFC).

Botanical Name	Disease Treated	UV	RFC	Conservation Status
<i>Abrus precatorius</i> L.	Dysmenorrhea (35)	0.39	0.44	-
<i>Achyranthes bidentata</i> Blume	Contraceptive (60)	0.67	0.40	-
<i>Amaranthus viridis</i> L.	Dysmenorrhea (36)	0.40	0.61	-
<i>Amorphophallus paeoniifolius</i> (Dennst.) Nicolson	Emmenagogue (25), Abortifacient (39)	0.71	0.67	LC
<i>Artemisia vulgaris</i> L.	Postpartum care (45)	0.50	0.39	LC
<i>Asparagus adscendens</i> Roxb.	Leucorrhea (42), Dysmenorrhea (22)	0.71	0.77	-
<i>Azadirachta indica</i> A.Juss.	Menorrhagia (21)	0.23	0.28	LC
<i>Bauhinia variegata</i> L.	Galactagogue (42) Uterus fibroids (20)	0.69	0.62	LC
<i>Berberis lycium</i> Royle	Leucorrhea (47), Postpartum care (20)	0.75	0.66	LC
<i>Boerhavia diffusa</i> L.	Leucorrhea (31), Hasten delivery (24)	0.61	0.60	LC
<i>Butea monosperma</i> (Lam.) Kuntze	Leucorrhea (36), Postpartum (25)	0.68	0.40	LC
<i>Calotropis gigantea</i> (L.) W.T.Aiton	Leucorrhea (26), Induce abortion (37)	0.70	0.70	-

<i>Cassia fistula</i> L.	Facilitates parturition (43)	0.48	0.52	LC
<i>Celastrus paniculatus</i> Willd.	Leucorrhea (35), postpartum care (32)	0.75	0.85	-
<i>Centella asiatica</i> (L.) Urb.	Oligomenorrhea (32), Menorrhagia (26)	0.65	0.66	LC
<i>Chenopodium album</i> L.	Dysmenorrhea (31), Abortifacient (36)	0.75	0.80	-
<i>Coriandrum sativum</i> L.	Menorrhagia (26)	0.29	0.52	-
<i>Curcuma longa</i> L.	Postpartum care (65)	0.73	0.84	DD
<i>Dalbergia sissoo</i> Roxb. ex DC.	Gonorrhea (6), Amenorrhea (10), Dysmenorrhea (11), Menorrhagia (12)	0.43	0.60	LC
<i>Ficus benghalensis</i> L.	Leucorrhea (29), Lactation (21)	0.56	0.42	-
<i>Ficus racemosa</i> L.	Contraceptive (37)	0.41	0.40	LC
<i>Ficus religiosa</i> L.	Promote conception (31)	0.34	0.30	-
<i>Juglans regia</i> L.	Dysmenorrhea (33)	0.37	0.62	LC
<i>Justicia adhatoda</i> L.	Facilitates easy delivery (48)	0.53	0.64	LC
<i>Lepidium sativum</i> L.	Dysmenorrhea (41)	0.46	0.82	-
<i>Mangifera indica</i> L.	Vaginal discharge (23)	0.25	0.34	DD
<i>Musa paradisiaca</i> L.	Leucorrhea (35)	0.39	0.55	-
<i>Ocimum basilicum</i> L.	Gonorrhea (49)	0.55	0.57	-
<i>Oenothera rosea</i> L'Her. ex Aiton	Leucorrhea (29)	0.32	0.32	-
<i>Oroxylum indicum</i> (L.) Kurz	Menorrhagia (31)	0.34	0.43	LC
<i>Phyllanthus urinaria</i> L.	Menorrhagia (10), Gonorrhea (13)	0.41	0.80	-
<i>Punica granatum</i> L.	White discharge (42)	0.47	0.69	LC
<i>Ricinus communis</i> L.	Breast pain and swelling (40)	0.44	0.42	LC
<i>Senegalia catechu</i> (L.f.) P.J.H. Hurter & Mabb.	Easy delivery (52)	0.58	0.71	LC
<i>Senna tora</i> (L.) Roxb.	Abortifacient (34)	0.38	0.82	-
<i>Sesamum indicum</i> L.	Hypomenorrhea (32)	0.35	0.68	-
<i>Sida cordifolia</i> L.	Menorrhagia (17), Gonorrhea (32)	0.55	0.77	-
<i>Syzygium cumini</i> (L.) Skeels	Leucorrhea (43)	0.48	0.55	LC
<i>Terminalia anogeissiana</i> Gere & Boatwr.	Postpartum care (26)	0.29	0.62	-
<i>Terminalia arjuna</i> (Roxb. ex DC.) Wight & Arn.	Oligomenorrhea (14)	0.15	0.54	LC
<i>Trigonella foenum-graecum</i> L.	Easy delivery (48), Dysmenorrhea (20)	0.76	0.87	-
<i>Triticum aestivum</i> L.	Implantation bleeding (37) postpartum care (29)	0.74	0.67	-
<i>Vitex negundo</i> L.	Fever (49), Hypomenorrhea (18)	0.75	0.66	LC
<i>Woodfordia fruticosa</i> (L.) Kurz	Leucorrhea (42)	0.47	0.61	LC
<i>Zingiber officinale</i> Roscoe	Dysmenorrhea (19), postpartum care (47)	0.74	0.78	DD
<i>Ziziphus mauritiana</i> Lam.	Dysmenorrhea (27), Leucorrhea (26)	0.59	0.63	LC

Informant consensus factor

Informant consensus factor measures the level of agreement among informants regarding the specific plant species used to treat each disease category. High ICF values (close to 1) indicate strong consensus and shared traditional knowledge for treating specific ailments, whereas low values indicate low agreement among informants. To determine the informant consensus factor (ICF), similar ailments were grouped into 11 major categories following their use reports (Table 4). In these categories, menstrual disorders were found to be cured by 20 species followed by vaginal infection (14 spp.); post-partum care (8 spp.); delivery (5 spp.); abortifacient and STD (4 species each); Contraceptive, galactagogue and fertility promoters (2 species each); Mastalgia and uterus fibroids 1 species each.

The range of informant consensus factor (ICF) values was between 0.96 and 1. Uterus fibroids and mastalgia have the highest ICF value (ICF=1) followed by contraceptive, delivery, fertility promoters and galactagogue (ICF=0.98 each); abortifacient,

post-partum care and vaginal infection (ICF=0.97 each). The menstrual disorder and sexually transmitted disease (STD) categories exhibited the lowest Informant Consensus Factor (ICF) value (0.96) among all the recorded ailment categories. The highest ICF values (ICF=1) were calculated for uterus fibroids and mastalgia which means that all the informants agreed that the use of these plants (*Ricinus communis* and *Bauhinia variegata*) is sufficient to cure uterine fibroids and mastalgia. Among the recorded ailment categories, menstrual disorders showed the lowest ICF value (0.96). Similar observations have been documented by (Rehman *et al.* 2022, Sharma *et al.* 2023).

Table 4. Value of informant consensus factor (ICF) for each disease category.

Use category	No. of Species	Use Citation	ICF
Abortifacient (Induce abortion)	4	146	0.97
Contraceptive (Prevent conception)	2	97	0.98
Delivery (Easy delivery, Hasten delivery)	5	215	0.98
Fertility-promoters(Promotes conception, Implantation bleeding)	2	68	0.98
Galactagogue (Lactation)	2	63	0.98
Mastalgia(Breast pain and Swelling)	1	40	1.00
Menstrual disorders(Amenorrhea, Dysmenorrhea, Emmenagogue, Hypomenorrhea, Menorrhagia, Oligomenorrhea)	20	549	0.96
STD (Gonorrhea)	4	100	0.96
Post-partum care(Internal injuries, inflammation, External stitches, Back pain, Fever)	8	289	0.97
Uterine fibroids	1	20	1.00
Vaginal Infection(Leucorrhea, Vaginal discharge)	14	486	0.97

Fidelity Level (FL%)

The Fidelity Level (FL) of the documented ethnomedicinal plants ranged from 15.38% to 100%. A total of 27 species exhibited an FL of 100%, reflecting complete agreement among the informants on their use for specific reproductive health conditions. These included *Abrus precatorius* (Dysmenorrhea), *Achyranthes bidentata* (Contraceptive), *Amaranthus viridis* (Dysmenorrhea), *Amorphophallus paeoniifolius* (Emmenagogue, Abortifacient), *Artemisia vulgaris* (Postpartum care), *Azadirachta indica* (Menorrhagia), *Cassia fistula* (Facilitates parturition), *Coriandrum sativum* (Menorrhagia), *Curcuma longa* (Postpartum care), *Ficus racemosa* (Contraceptive), *Ficus religiosa* (Promote conception), *Juglans regia* (Dysmenorrhea), *Justicia adhatoda* (Facilitates easy delivery), *Lepidium sativum* (Dysmenorrhea), *Mangifera indica* (Vaginal discharge), *Musa paradisiaca* (Leucorrhea), *Ocimum basilicum* (Gonorrhea) and several other species (Table 5). In contrast, the lowest FL value (15.38%) was recorded for *Dalbergia sissoo*, which was used for the management of gonorrhea. The Fidelity Level (FL) analysis revealed a high degree of agreement among the informants regarding the use of medicinal plants for female reproductive health disorders. 27 plant species with a FL of 100% indicates that these plants are consistently recognized and preferred for the treatment of specific reproductive ailments, reflecting the strong preservation and reliability of indigenous ethnomedicinal knowledge in the study area. Similar observations have been reported by (Chaudhury *et al.* 2017, Khadim *et al.* 2023). Conversely, the comparatively low FL recorded for a few species in the present study suggests lower informant consensus, which may be associated with multiple therapeutic applications, restricted use, or variations in traditional knowledge among informants. Overall, the FL values obtained in the present investigation demonstrate that ethnomedicinal knowledge related to female reproductive healthcare remains well conserved and continues to be an integral component of the local primary healthcare system.

Table 5. Fidelity level (FL%) of ethnomedicinal plants used for female reproductive health disorders.

Plant species	Disorders	Citations	FL%
<i>Abrus precatorius</i> L.	Dysmenorrhea	35	100.00
<i>Achyranthes bidentata</i> Blume	Contraceptive	60	100.00
<i>Amaranthus viridis</i> L.	Dysmenorrhea	36	100.00
<i>Amorphophallus paeoniifolius</i> (Dennst.) Nicolson	Emmenagogue	25	39.06
	Abortifacient	39	60.93
<i>Artemisia vulgaris</i> L.	Postpartum care	45	100.00
<i>Asparagus adscendens</i> Roxb.	Leucorrhea	42	65.62

	Dysmenorrhea	22	34.37
<i>Azadirachta indica</i> A.Juss.	Menorrhagia	21	100.00
<i>Bauhinia variegata</i> L.	Galactagogue	42	67.74
	Uterus fibroids	20	32.25
<i>Berberis lycium</i> Royle	Leucorrhea	47	70.14
	Postpartum care	20	29.85
<i>Boerhavia diffusa</i> L.	Leucorrhea	31	56.36
	Hasten delivery	24	43.63
<i>Butea monosperma</i> (Lam.) Kuntze	Leucorrhea	36	59.01
	Postpartum	25	40.98
<i>Calotropis gigantea</i> (L.) W.T.Aiton	Leucorrhea	26	41.26
	Induce abortion	37	58.73
<i>Cassia fistula</i> L.	Facilitates parturition	43	100.00
<i>Celastrus paniculatus</i> Willd.	Leucorrhea	35	52.23
	Postpartum care	32	47.76
<i>Centella asiatica</i> (L.) Urb.	Oligomenorrhea	32	55.17
	Menorrhagia	26	44.82
<i>Chenopodium album</i> L.	Dysmenorrhea	31	46.26
	Abortifacient	36	53.73
<i>Coriandrum sativum</i> L.	Menorrhagia	26	100.00
<i>Curcuma longa</i> L.	Postpartum care	65	100.00
<i>Dalbergia sissoo</i> Roxb. ex DC.	Gonorrhea	6	15.38
	Amenorrhea	10	25.64
	Dysmenorrhea	11	28.20
	Menorrhagia	12	30.76
<i>Ficus benghalensis</i> L.	Leucorrhea	29	58.00
	Lactation	21	42.00
<i>Ficus racemosa</i> L.	Contraceptive	37	100.00
<i>Ficus religiosa</i> L.	Promote conception	31	100.00
<i>Juglans regia</i> L.	Dysmenorrhea	33	100.00
<i>Justicia adhatoda</i> L.	Facilitates easy delivery	48	100.00
<i>Lepidium sativum</i> L.	Dysmenorrhea	41	100.00
<i>Mangifera indica</i> L.	Vaginal discharge	23	100.00
<i>Musa paradisiaca</i> L.	Leucorrhea	35	100.00
<i>Ocimum basilicum</i> L.	Gonorrhea	49	100.00
<i>Oenothera rosea</i> Aiton	Leucorrhea	29	100.00
<i>Oroxylum indicum</i> (L.) Kurz	Menorrhagia	31	100.00
<i>Phyllanthus urinaria</i> L.	Menorrhagia	10	43.47
	Gonorrhea	13	56.52
<i>Punica granatum</i> L.	White discharge	42	100.00
<i>Ricinus communis</i> L.	Breast pain and swelling	40	100.00
<i>Senegalia catechu</i> (L.f.) P.J.H. Hurter & Mabb.	Easy delivery	52	100.00
<i>Senna tora</i> (L.) Roxb.	Abortifacient	34	100.00
<i>Sesamum indicum</i> L.	Hypomenorrhea	32	100.00
<i>Sida cordifolia</i> L.	Menorrhagia	17	34.69
	Gonorrhea	32	65.30
<i>Syzygium cumini</i> (L.) Skeels	Leucorrhea	43	100.00
<i>Terminalia anogeissian</i> aGere & Boatwr.	Postpartum care	26	100.00
<i>Terminalia arjuna</i> (Roxb. ex DC.) Wight & Arn.	Oligomenorrhea	14	100.00
<i>Trigonella foenum-graecum</i> L.	Easy delivery	48	70.59
	Dysmenorrhea	20	29.41

<i>Triticum aestivum</i> L.	Implantation bleeding	37	56.06
	Postpartum care	29	43.93
<i>Vitex negundo</i> L.	Fever	49	73.13
	Hypomenorrhea	18	26.86
<i>Woodfordia fruticosa</i> (L.) Kurz	Leucorrhea	42	100.00
<i>Zingiber officinale</i> Roscoe	Dysmenorrhea	19	28.78
	Postpartum care	47	71.21
<i>Ziziphus mauritiana</i> Lam.	Dysmenorrhea	27	50.94
	Leucorrhea	26	49.05

Perceptions of ayurvedic and allopathic treatments among informants

A total of 89 informants were surveyed, out of which 81 were female. Data regarding treatment preferences for reproductive health problems were collected exclusively from female informants. Overall ayurvedic treatment was more commonly preferred than allopathic treatment. A higher preference for ayurvedic treatment was observed in conditions such as menstrual disorders (49), vaginal infections (53), breast pain and swelling (56), post-partum complications (55), uterus fibroids (43) and lactation problems (54). In contrast allopathic treatment was more preferred in cases of gonorrhea (52), abortion related complications (47), delivery complications (59) and fertility problems (57). For problem in conception, the preference was almost balanced with slightly more respondents favoring allopathic treatment (42) as compared to ayurvedic treatment (39), indicating a mixed approach depending on individual needs (Table 6). A consistent preference for ayurvedic treatment was observed in condition such as menstrual disorders, vaginal infections, breast pain, uterine fibroids, lactation problems and post-partum complications. These conditions are typically non emergent and recurrent in nature which may explain the inclination toward ayurveda, often perceived as safer, holistic and suitable for long-term management with minimal side effects. Conversely, allopathic treatment was predominantly preferred for conditions requiring immediate clinical intervention including gonorrhea, abortion related complications, delivery complications and fertility issues. The reliance on allopathy in this context reflects its perceived efficacy in rapid symptoms resolution and its critical role in managing life-threatening conditions. However, these preferences may also be shaped by socio-cultural beliefs, accessibility and awareness, which warrant further investigation.

Table 6. Preference for ayurvedic and allopathic treatment in reproductive health.

Reproductive health problem	Preference for Ayurvedic treatment (No. of informants)	Preference for allopathic treatment (No. of informants)	Reason/perceived benefit	
			Ayurvedic	Allopathic
Menstrual Disorders	49	32	Natural, fewer side effects	Quick pain relief
Vaginal Infections	53	28	Herbal, safe for long use	Fast recovery
Gonorrhea	29	52	Limited use, supportive care	Effective antibiotics, complete care.
Breast pain and Swelling	56	25	Reduce inflammation naturally	Immediate pain relief
Abortion related complications	34	47	Helps recovery, Improves strength	Emergency treatment, life saving
Delivery complications	22	59	Post delivery recovery support	Safe delivery
Postpartum complications	55	26	Improves immunity and healing	Quick treatment

Uterine fibroids	43	38	Non-surgical, gradual improvement	Surgery or fast symptom control
Lactation problems	54	27	Increase milk production naturally	Hormonal and medical support
Fertility problems	24	57	Improves reproductive health naturally	Advanced treatment
Conception problems	39	42	Helps in natural conception, improves fertility	Faster conception, quick and effective results

Bioprospecting potential

The documented medicinal plant species were found to contain diverse classes of bioactive phytochemicals (Table 7). These included flavonoids, tannins, alkaloids, saponins, phenolic compounds, glycosides, terpenoids, and lignans, along with characteristic metabolites such as curcumin, berberine, juglone, vasicine, catechin, sesamin, gingerol, shatavarins, and azadirachtin. The phytochemical profiles compiled from published studies indicate that the medicinal plant species documented in the present investigation are rich in diverse bioactive secondary metabolites. Although the present study did not involve phytochemical analysis, the reported occurrence of flavonoids, tannins, alkaloids, saponins, phenolic compounds, terpenoids, glycosides and lignans provides scientific support for the traditional use of these species in women's reproductive healthcare. These classes of phytochemicals have been widely recognized for their antioxidant, anti-inflammatory, antimicrobial, and tissue-protective properties, which may account for their traditional use in treating several gynecological conditions.

Several documented species also contain characteristic bioactive compounds that are considered pharmacologically important. For example, shatavarins in *Asparagus adscendens*, azadirachtin and nimbin in *Azadirachta indica*, berberine in *Berberis lycium*, curcumin in *Curcuma longa*, juglone in *Juglans regia*, vasicine in *Justicia adhatoda*, ricinoleic acid in *Ricinus communis*, catechin in *Senegalia catechu*, sesamin in *Sesamum indicum*, diosgenin in *Trigonella foenum-graecum*, and gingerol and shogaol in *Zingiber officinale* have previously been reported as important constituents of these species. The presence of these compounds supports the ethnomedicinal relevance of the documented plants and provides a scientific rationale for their continued traditional use.

Nevertheless, the present findings should be interpreted with caution because the phytochemical information was obtained from published literature rather than from chemical analyses of the collected plant materials. The concentration and composition of phytochemicals may vary according to geographical location, environmental conditions, plant part, developmental stage, and extraction method. Therefore, detailed phytochemical characterization and pharmacological validation of the locally used populations are required to confirm their therapeutic potential and to facilitate the development of evidence-based herbal formulations for women's reproductive healthcare.

Overall, these plants represent promising sources for the development of herbal therapeutics, nutraceuticals and reproductive health formulations. However further clinical and toxicological studies are needed to validate their safety and efficacy.

Table 7. Bioprospecting potential of some ethnomedicinal plants.

Botanical Name	Major phytochemical	References
<i>Asparagus adscendens</i> R. oxb.	Saponins, shatavarins, flavonoids	Saran <i>et al.</i> 2021.
<i>Azadirachta indica</i> A.Juss.	Azadirachtin, nimbin, flavonoids, tannins	Ghimeray <i>et al.</i> 2009.
<i>Bauhinia variegata</i> L.	Flavonoids, tannins, glycosides	Sharma <i>et al.</i> 2019.
<i>Berberis lycium</i> Royle	Berberine, alkaloids, tannins	Fiaz Bukhari <i>et al.</i> 2021.
<i>Curcuma longa</i> L.	Curcumin, terpenoids, flavonoids, phenolics	Fuloria <i>et al.</i> 2022.
<i>Dalbergia sissoo</i> Roxb. ex DC.	Flavonoids, tannins, saponins, phenolics	Naik <i>et al.</i> 2026

<i>Juglans regia</i> L.	Juglone, phenolics, flavonoids, omega fatty acids	Colaric <i>et al.</i> 2005.
<i>Justicia adhatoda</i> L.	Vasicine, alkaloids, flavonoids	Nasir <i>et al.</i> 2024.
<i>Ricinus communis</i> L.	Ricinoleic acid, alkaloids, flavonoids	Rampadarath & Puchooa 2016.
<i>Senegalia catechu</i> (L.f.) P.J.H. Hurter & Mabb.	Catechin, tannins, flavonoids	Zhang <i>et al.</i> 2022.
<i>Sesamum indicum</i> L.	Sesamin, lignans, flavonoids, phenolics	Kumar & Singh 2015.
<i>Terminalia arjuna</i> (Roxb. ex DC.) Wight & Arn.	Tannins, flavonoids, triterpenoids, glycosides	Khanna <i>et al.</i> 2025.
<i>Trigonella foenum-graecum</i> L.	Diosgenin, alkaloids, flavonoids, saponins	Patel <i>et al.</i> 2018, Steels <i>et al.</i> 2015.
<i>Zingiber officinale</i> Roscoe	Gingerol, shogaol, flavonoids, phenolics	Rahnama <i>et al.</i> 2012, Kashefiet <i>et al.</i> 2015.
<i>Ziziphus mauritiana</i> Lam.	Saponins, flavonoids, alkaloids	Shady <i>et al.</i> 2022, Deshpande <i>et al.</i> 2013.

Conclusion

The present study recorded a total of 46 ethnomedicinal plant species representing 43 genera and 30 plant families that rural populations significantly use to manage reproductive health conditions. Inhabitants of the study area hold rich indigenous knowledge inherited through generations, with women serving as the primary informants of these novel regional findings. The family Fabaceae predominated in the study area. Seeds were the primary plant part used in herbal preparations. Menstrual disorders represented the most prevalent reproductive health concern in the region. Among the recorded species, *Trigonella foenum-graecum* achieved the highest RFC (0.87) and UV (0.76) scores. Additionally, uterine fibroids and mastalgia yielded the maximum Informant Consensus Factor values (ICF = 1.00). Plants with the highest RFC, UV, and FL scores should be prioritized for phytochemical and pharmacological studies to ensure their safety and efficacy for widespread use. High fidelity level values across the studied species demonstrate that local ethnomedicinal knowledge for female reproductive healthcare remains strongly conserved and highly reliable for primary health needs. Informants strongly preferred Ayurvedic remedies for chronic, non-emergent reproductive conditions due to perceived safety, while favoring allopathic medicine for life-threatening or immediate health concerns. The present study bridges ethnomedicinal documentation with future pharmacological discovery and plant conservation. Ultimately, validating these traditional practices can create more inclusive, accessible healthcare in resource-limited regions.

Declarations

List of abbreviations: DD=Data Deficient; FL=Fidelity Level; ICF=Informant Consensus Factor; IUCN=International Union for Conservation of Nature; LC=Least Concern; RFC= Relative Frequency of Citation; UV=Use Value.

Ethics approval and consent to participate: All procedures performed in this study followed the ethical standards outlined in the International Society of Ethnobiology (ISE) Code of Ethics and the Prior Informed Consent was obtained from the participants before the interviews.

Consent for publication: Not applicable as the manuscript does not include any identifiable personal data, photographs or individual case information.

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