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Banana inflorescence and menstrual health: An exploratory cross-sectional study in Tamil Nadu, India

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Banana inflorescence (*Vazhaipoo*) has long been part of the food traditions of women in Tamil Nadu's banana-growing regions, and this study aimed to document the association between traditional dietary practices involving banana inflorescence and menstrual health management. Using an exploratory cross-sectional design, we interviewed 384 women across key banana-cultivating districts through semi-structured schedules. Nearly all participants (98.70%) reported perceived relief from menstrual complaints following regular consumption. Among the reported benefits, relief from menstrual cramps was the most common (27.86%), followed by reduction in premenstrual syndrome (PMS) symptoms (24.74%) and improved regulation of menstrual cycles (17.71%). Common medicinal preparations included *Vazhaipoo Poriyal* and *Kootu*, typically cooked with *Hingu* (asafetida) and *Tila taila* (sesame oil). To explore the phytochemical basis of these health benefits, the IMPPAT database was consulted, which revealed the presence of compounds such asquercetin, β-sitosterol, saponins, tannins, and leucocyanidin, all of which possess anti-inflammatory, estrogenic, or astringent properties. Participants also reported secondary benefits related to digestive health and blood sugar regulation. The primary barrier to wider adoption was the labor-intensive and time-consuming preparation process, despite the ingredient being widely available and inexpensive. These findings support the potential role of banana inflorescence as a functional food for women's health, while pointing to the clear need for clinical trials and evidence-based dietary guidelines.

Keywords: Banana, Inflorescence, Menstrual health, Tamil Nadu, Traditional preparations

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Herbal remedies constitute a fundamental component of traditional healing systems and are regarded as one of the oldest forms of healthcare practiced by humans[1]. The World Health Organization reports that over 80% of the global population relies on traditional herbal medicine for healthcare concerns[2]; these remedies are also regarded as relatively safe[3]. Many tribal and rural communities in India (referred to here as 'indigenous' in the sense of communities with deep-rooted, place-specific cultural and traditional knowledge systems, distinct from the broader urban population) rely on culturally based food traditions to regulate irregular menstruation, demonstrating the importance of dietary patterns in preserving reproductive and menstrual health. The National Family Health Survey (NFHS-5, 2019–2021) reported that a substantial proportion of Indian households continue to follow traditional dietary practices during menstruation, pregnancy, and the postpartum period[4]. These culturally embedded dietary practices are believed to support women's reproductive and menstrual health[5]. However, despite their widespread use, many of these practices remain poorly documented and scientifically underexplored. This gap is precisely what the field of ethnogynaecology seeks to address, as it is at the intersection of ethnomedicine and women's reproductive health, drawing upon community-held knowledge to understand and validate traditional healing practices[6].

Menstruation is a normal and central part of a woman's reproductive life, yet for many women it brings with it a range of disorders that significantly reduce quality of life. These conditions vary considerably in presentation and severity: some women experience menorrhagia, where bleeding is unusually heavy and prolonged; others suffer from dysmenorrhea, which involves intense abdominal cramping. The condition oligomenorrhea refers to the menstrual cycle

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frequency being lower than normal, whereas leucorrhea involves abnormal whitish vaginal discharge. Further, at the extreme level, amenorrhea is characterized by the total absence of menstrual cycles, while hypomenorrhea involves a cycle with low menstrual blood flow. In contemporary medical practice, these conditions are usually treated by hormonal medications, nonsteroidal anti-inflammatory drugs, or even surgery in certain cases. However, although these approaches may be effective, they also involve adverse effects or complications and may not be accessible to all patients. Plant-based medicines have served as the foundation of healthcare systems across various civilizations for centuries[7].

Bananas serve as both a major staple food and fruit, with yearly production exceeding 100 million tons globally[8]. One edible by-product of banana plants is the inflorescence. In several nations, traditional medicine uses banana inflorescence as a common treatment for ailments like diarrhea, gastric spasms, diabetes mellitus, hypermenorrhea, and asthma[9]. Banana inflorescence is highly valued for its antioxidant properties, which are essential in neutralizing free radical damage and lowering the risk of chronic health problems. The plant is abundant in phytochemicals including phenolics, alkaloids, glycosides, steroids, saponins, tannins, flavonoids, and terpenoids[10]. The therapeutic potential includes antioxidant[11], anticancer[12], and antidiabetic activities[13].

While previous ethnobotanical studies have documented traditional plant use for menstrual health in India, comprehensive documentation specifically focused on banana inflorescence-based dietary practices in Tamil Nadu's banana-growing belts remains limited. The current study was designed to address this gap. On one hand, we aimed to record and preserve the indigenous dietary knowledge among women across Tamil Nadu's banana-cultivating regions, specifically regarding menstrual health management. The study also aimed to examine the known phytochemical constituents and pharmacological properties of banana inflorescence to scientifically contextualize the reported traditional benefits.

Materials and Methods

Description of study area

Field investigations were conducted in the districts of Theni, Tiruchirappalli, Erode, Coimbatore, Thanjavur, Dindigul, Karur, Kanyakumari, Cuddalore and Tirunelveli (Fig. 1). These districts are located between 8.08° and 11.45° North latitude and 77.00° and 79.85° East longitude. The elevation in these districts ranges from 50 meters to 2,637 meters above sea level. Tiruchirappalli is one of the leading banana-producing districts, because it is close to the Cauvery River. The Cauvery River provides plenty of water for irrigation. The soil is good for growing *Poovan*, *Rasthali* and *Nendran* bananas. Tirunelveli was also known for the cultivation of Nendran bananas with quality as it gets water from the Tamirabarani River. The weather in these districts is tropical. They get an average of 800 to 1,500 mm of rain every year. These districts are characterized by extensive traditional knowledge regarding banana cultivation and medicinal applications, especially gynecological problems. Banana cultivation and its medicinal uses are very important in these districts. Communities in these districts have been cultivating bananas and utilizing their medicinal properties for generations. These districts provide favorable agro-climatic and cultural conditions for banana cultivation and its medicinal applications.

Fig. 1 — Study area in Tamil Nadu covering 10 Banana-growing Districts (Source: Wikimedia Commons, accessed on 12 March 2026; map redrawn and modified by the authors using Adobe Photoshop 7.0)

Techniques for selecting study sites and informants

The sample size determination was done using the formula for determining sample size by Taro Yamane (1967)[14]:

$$n = N / (1 + N e^2)$$

Based on the population of 10,000 women and a margin of error of 5%, the sample size would be 384. The estimation of population was made following consultation with the local agricultural extension officers and review of health centre records from the selected districts. The study population comprised women aged between 18 and 60 who had prior knowledge of banana inflorescence and thus constituted the finite population. Ten districts were purposively selected for the study based on three main criteria: (i) ranking among the top banana growing districts of the state recognized by the State Horticulture Department, (ii) having a traditional history of using banana inflorescence in their diet and (iii) covering different agro-climatic regions of the state providing opportunity for comparison across various environments. Purposive sampling was employed to recruit approximately 38 women from each district to include diversity in age groups, experience and knowledge about banana inflorescence. The inclusion criteria were (i) women between 18 and 60 years of age, (ii) living in the selected banana growing districts for not less than five years and (iii) having practical knowledge or experience related to use of banana inflorescence. The exclusion criteria included women without previous knowledge of banana inflorescence and those unwilling to participate.

Ethnographical data collection

The study employed the methodology and procedures recommended by Martin (1995)[15] for the documentation of traditional indigenous food recipes that use banana inflorescence and evaluating their significance in menstrual health management. Before data collection, an introductory session was held with the local community leaders to familiarize them with the purpose of the research. Prior informed consent was obtained from all participants before data collection, and the study adhered to the Code of Ethics of the International Society of Ethnobiology (ISE).

Information relating to ethnobotany was gathered through semi-structured interviews, focus group discussions, field-guided observations, and simultaneous interviews conducted during live demonstration of recipe preparation. A semi-structured interview schedule was prepared to record information on recipes, preparation method, ingredients, cooking method and attributed health benefits of banana inflorescence. Content validation of the interview schedule was performed by five subject experts in ethnobotany and women's health, and pretesting the tool involved interviewing twenty respondents.

Interviews were conducted in Tamil, the local language, but later transcribed in English for analysis. During the interview, live demonstrations of banana inflorescence-based recipe preparations were observed with participants' permission. This enabled the researchers to conduct simultaneous interviews to gather further information related to choice of ingredients, regional variations in preparation, and traditional beliefs about certain recipes.

Data analysis

Several ethnobotanical indices were computed for evaluating the cultural importance of banana inflorescence. The Use Report (UR) for each species was enumerated as the total number of informants who mentioned each of the given Use Categories. Number of Use (NU) per species was computed by tallying the total number of Use Categories mentioned[17]. The Cultural Importance (CI) index was employed to quantify both the diversity and frequency of use reports[16]. The Relative Importance (RI) index was used to evaluate the species' versatility and relative utility across different use categories[16]. The Frequency of Citation (FC) was computed as the percentage of informants who mentioned at least one use for the species[17].

In addition, Cultural Food Significance Index (CFSI) was computed using the formula proposed by Pieroni (2001) as:

$$CFSI = QI \times AI \times FUI \times PUI \times MFFI \times TSAI \times FMRI \times 10^{-2}$$

This calculated CFSI score was 1980 for banana inflorescence indicating significant cultural importance and value as a food resource. Specifically, Quotient of Informant Awareness (QI) was greater than 90% while Availability Index (AI) was 4.0. Food Use Intensity (FUI) was assessed to be weekly to monthly. Part Use Index (PUI) was 0.75. Multiple

Food Forms Index (MFFI) was evidenced in the varied culinary preparations like *poriyal*, *adai*, *kootu*, and *vadai*. The taste scores (TSAI) were in between 7.5 and 9, Food Medicinal Role Index (FMRI) ranged from 3 to 5.

Qualitative data from open-ended responses were analysed thematically to explore informants' cultural beliefs, patterns of intergenerational knowledge transmission, and socio-economic factors influencing the use of banana inflorescence. Descriptive statistical analyses were performed using SPSS version 26.0 (IBM Corp., USA), and results were expressed as frequencies and percentages.

Phytochemical profiling using IMPPAT database

The IMPPAT (Indian Medicinal Plants, Phytochemistry and Therapeutics) database[18] is a curated, integrated database that encompasses the indigenous medicinal plants of India, the chemical constituents present in these plants and the therapeutic activities of these constituents. In this investigation, phytochemical information on banana inflorescence (*Musa* spp.) was retrieved from the IMPPAT 2.0 database, to identify potential bioactive constituents that may contribute to the proposed therapeutic activity against menstrual health related problems. It should be clarified that only phytochemical constituents from raw banana inflorescence were present in the IMPPAT database and the constituents present in boiled or fried banana inflorescence are likely to be different. Nonetheless, this may be considered as a starting point for hypothesis generation for further pharmacological investigations.

Results

Socio-demographic characteristics of informants

A total of 384 respondents participated in the study, ranging in age from 18 to above 50 years, including 37.23%, 34.9%, 25.26% and 2.6% respondents within the age bracket of 26-35, 36-50, 18-25, and >50 years respectively. A majority of the respondents 70.83% were married, while, 29.17% were unmarried. The educational backgrounds of respondents were classified into six categories: senior secondary (42.19%), under graduate (28.13%), secondary school (9.90%), upper primary education (9.64%), post graduate (7.81%) and no formal education (2.34%). An almost equal number of respondents resided in the 10 major banana growing districts. However, majority of them resided in semi-urban areas (68.49%) than urban (24.22%) and rural (7.29%). The socio-demographic profile is shown in (Table 1).

Indigenous dietary knowledge and practical application of banana inflorescence on menstruation

This study investigated the traditional food knowledge and application of banana inflorescence on menstruation. The findings presented in (Table 2) demonstrate the usage patterns and awareness levels among 384 respondents.

Awareness and consumption patterns

All respondents (100%) were aware of the edibility of banana inflorescence. Regarding consumption frequency, 57% of respondents consumed banana inflorescence on a monthly basis and 43% consumed it on a weekly basis.

Health benefits

All respondents (100%) were aware of the menstrual health benefits associated with banana

Table 1 — Socio-demographic characteristics of informants (n=384)

Characteristics	Category	Frequency (n)	%
Age	18–25	97	25.3%
	26–35	143	37.2%
	36–50	134	34.9%
	Over 50	10	2.6%
Marital Status	Married	272	70.83%
	Unmarried	112	29.17%
Education	Upper Primary	37	9.64%
	Secondary	38	9.90%
	Senior Secondary	162	42.19%
	Undergraduate	108	28.13%
	Postgraduate	30	7.81%
	No Formal Education	9	2.34%
Occupation	Self-employed	69	17.97%
	Private (Organised)	38	9.90%
	Private (Unorganised)	37	9.64%
	Government (Office)	6	1.56%
	Government (Field)	1	0.26%
	Student	31	8.07%
	Employed (Working)	151	39.32%
	Unemployed (Non-working)	51	13.28%
Residence	Semi-urban	263	68.49%
	Urban	93	24.22%
	Rural	28	7.29%
District	Thiruchirappalli, Theni, Erode, Coimbatore, Kanyakumari, Tuticorin, Cuddalore, Karur, Thirunelveli	38 each	9.90% each
	Dindigul	42	10.94%

inflorescence. 27.86% of respondents reported reduced menstrual cramps, while 24.74% reported relief from premenstrual syndrome (PMS), and 17.71% reported that it helped regulate menstrual cycles (Fig. 2).

Source of knowledge

Health professionals were identified as the primary source of information by 66.9% of respondents, where as 33.1% obtained information from family traditions, indicating both traditional familial knowledge and modern healthcare systems contributed to knowledge acquisition.

Motivational factors and cultural practices

The primary reason for continued consumption of banana inflorescence is for its health benefits (98.18%), while cultural practice was 1.82%. All respondents (100%) had consumed banana inflorescence at least once. Within households, 78.91% prepared it specifically for medicinal

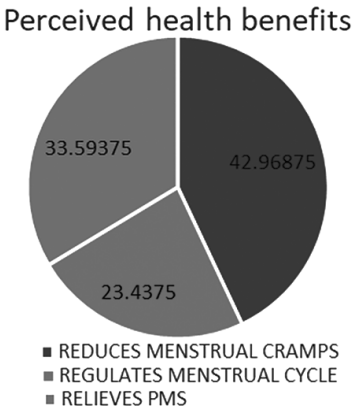

Fig. 2 — Percentage of health benefits

Table 2 — Frequency distribution of indigenous dietary knowledge and practical application of Banana inflorescence for menstrual health (n=384)

Variable	Response	Count (n)	Percentage (%)
Awareness of banana inflorescence as a food product	Yes	384	100.00
Frequency of consumption	Weekly	165	43.00
	Monthly	219	57.00
Awareness of health benefits for menstrual health	Yes	384	100.00
Perceived benefits	Reduces menstrual cramps	107	27.86
	Regulates menstrual cycle	68	17.71
	Relieves premenstrual syndrome (PMS)	95	24.74
	Reduces menstrual flow	64	16.67
	Other menstrual benefits	50	13.02
Symptom reduction observed	Yes	379	98.70
	Never experienced menstrual symptoms	5	1.30
First source of learning	Health professionals	257	66.90
	Family tradition	127	33.10
Motivation to consume regularly	Health benefits	377	98.18
	Cultural practice	7	1.82
Grew up in household using banana inflorescence	Yes	384	100.00
Occasions of preparation	Medicinal purpose	303	78.91
	Everyday meals	27	7.03
	When available	54	14.06
Dietary intake window	Within a week (4–7 days)	50	13.02
	Within two weeks (8–14 days)	210	54.69
	Within a month (15–30 days)	124	32.29
Used for other medicinal purposes	Yes	353	91.93
	No	31	8.07
Other medicinal benefits	Blood sugar regulation	185	52.40
	Digestive health	168	47.60
Increased use during menstrual events	Irregular menstruation	179	46.61
	During menstruation	164	42.71
	Before menstruation	10	2.60
	No specific timing	31	8.07
Perceived as preventive	Yes	384	100.00
Health improvements reported	Yes	358	93.23
	Not sure	26	6.77
Type of health improvements	Improved digestion	215	60.06
	Stable blood sugar levels	143	39.94

purposes, while 14.06% prepared it when available and 7.03% of respondents prepared it for their daily diet.

Dietary scheduling and medicinal use

Regarding dietary use during menstruation, 54.68% reported consuming it within two weeks, followed by 32.29% within a month and 13.02% within one week. Additionally, 91.93% reported using it for other health-related purposes, among them, 52.4% reported its use for blood sugar regulation, while 47.6% reported improved digestion.

Usage during menstrual cycle

A large proportion of respondents (42.71%) consumed it during menstruation and 46.61% during irregular menstruation while a smaller proportion (2.6%) consumed it during the premenstrual period and 8.07% of respondents reported no menstrual cycle-related use.

Preventive and therapeutic outcomes

All participants (100%) perceived banana inflorescence as beneficial in preventing menstrual health problems. Around 93.23% participants indicated improvements in overall health following regular consumption. About 60.06% of respondents reported improved digestion and 39.94% reported improved blood sugar stability.

Traditional recipes and preparation methods using banana inflorescence for menstrual health management

Out of 384 informants, the majority (63.54%) obtained banana inflorescence from local markets followed by harvesting at home (36.46%). All informants stated that it is in expensive as the cost per inflorescence was below INR 50. The most frequently mentioned varieties were *Poovan* (34.38%) and *Karpooravalli* (32.55%) followed by mixed varieties including *Monthan*, *Rasthali* and *Nendran*. The commonly prepared recipes are *Vazhaipoo Poriyal* (stir fry – Fig. 3), *Vazhaipoo Kootu* (lentil dish – Fig. 4) and *Vazhaipoo Vadai* (fritters – Fig. 5) as reported by 62.76% of informants (Table 3).

Regarding the preparation methods, boiling (26.82%) was the most widely used preparation method, followed by curry-based preparations (18.75%) and fried preparations (15.10%). Ingredients commonly incorporated for their perceived therapeutic benefits included *Tila taila*– sesame oil (20.31%), moong dal (17.97%), *Hingu*- asafetida (11.72%), grated coconut (11.72%) and ghee (9.38%). Common preparation techniques included soaking in washed rice water (28.91%), butter milk soaking (24.48%) and addition of salt just after chopping (18.49%). 74.48% of participants considered one bowl to be one serving.

Challenges and barriers to regular consumption of banana inflorescence

All participants (n=384) identified preparation difficulty as the primary barrier to regular consumption. All participants reported no prohibitive cultural or social beliefs associated with the use of banana inflorescence. The most frequent secondary hindrance was the laborious cleaning process (Fig. 6), reported by 73.18% (n=281) of participants. The time-consuming nature of preparation was reported by 24.22% (n=93), while only 2.60% (n=10) referred to bitter taste as a constraining factor (Table 4).

Fig. 3 — *Vazhaipoo poriyal* (stir fry)

Fig. 4 — *Vazhaipoo Kootu* (Lentil dish)

Discussion

This ethnobotanical study explores, documents, and scientifically contextualizes the indigenous dietary practices involving banana inflorescence for managing menstrual health among women in the banana-growing belts of Tamil Nadu. A total number of 384 informants participated, providing rich data about inter-generational knowledge transfer and the associated perceived therapeutic benefits of traditional eating patterns. All the informants (100%) were aware of banana inflorescence as a functional food for menstrual wellness, and 98.70% reported perceived symptomatic relief after consuming it. Regular dietary consumption was associated with relief from menstrual cramps (27.86%), pre-menstrual syndrome (24.74%) and improvements in irregular menstruation were also frequently reported (17.71%). These observations are supported by phytochemical evidence from the IMPPAT database, which

Fig. 5 — *Vazhaipoo Vadai* (Fritters)

Fig. 6 — Collection and laborious cleaning/preparation of banana inflorescence

Table 3 — Traditional recipes and preparation methods using Banana inflorescence for menstrual health management

Parameter	Most common response	Other notable responses
Source of inflorescence	Purchased from markets (63.54%)	Home-grown (36.46%)
Cost per piece	Below ₹50 (100%)	—
Affordability	Yes (100%)	—
Common varieties	Poovan (34.38%)	Karpooravalli (32.55%), Monthan, Rasthali, Nendran
Popular recipes	Poriyal, Kootu, Vadai (62.76%)	Adai, Soup, Curry, Rasam
Effective preparation method	Boiled (26.82%)	Curry (18.75%), Fried (15.10%)
Typical serving size	One bowl (74.48%)	Two bowls (25.52%)
Frequency of use	Weekly (57.03%)	Monthly (42.97%)
Timing of consumption	During menstrual cycle (54.7%)	No specific timing (45.3%)
Enhancing ingredients	Tila Taila (20.31%)	Moong dal (17.97%), Coconut (11.72%), Hingu (11.72%), Ghee (9.38%)
Preparation techniques	Soaking in rice water (28.91%)	Buttermilk soak (24.48%), Salt after cutting (18.49%)

Table 4 — Challenges and barriers to regular consumption of Banana inflorescence among respondents (n=384)

Category	Specific challenge / response	Count (n)	Percentage (%)
Main challenge	Difficulty in preparation	384	100.00
Cultural / cocial beliefs	No social belief is a barrier	384	100.00
Other challenges	Laborious cleaning process	281	73.18
	Time-consuming process	93	24.22
	Bitter taste	10	2.60

identified the presence of several bio active compounds including quercetin, β-sitosterol, leucocyanidin, tannins, saponins, flavonoids[18] that possess anti-inflammatory, anti-oxidant, hemostatic, and phytoestrogenic properties and may contribute to the alleviation of symptoms of menstrual disorders. Quercetin and saponins may inhibit prostaglandin synthesis, thereby reducing uterine contractions and menstrual cramps[19,20]. Leucocyanidin, a potent bioflavonoid, has been reported to strengthen capillary integrity and vascularity, thereby reducing the intensity of menorrhagia[21]. Tannins also possess astringent properties which may contribute to reduced endometrial bleeding[22]. The phytoestrogen named β-sitosterol may contribute to hormonal regulation through interactions with estrogen receptors[23].

As per Ayurvedic medicine, banana inflorescence (*Vazhaipoo*) possesses *Kashaya rasa* (astringent) and *Sheetavirya* (cold potency), and is traditionally indicated in conditions such as *Raktapradara* and *Yonivyapad*[24]. In Ayurveda, it is described as possessing *Deepana*, and *Grahi* properties for correcting the *Agni*, and clearing *Ama*. Its therapeutic relevance is emphasized in formulations like *Kadalyadi Ghrita*, in which *Kadali Pushpa* is specified for its *Yonidoshahara, Asraghni* properties[25]. *Uttara Basti* (intra-uterine oil application) of *Kadali pushpataila* was reported effective for the management of infertility. It has a greater absorption capacity across the uterovaginal route as compared to transdermal route and bypasses first pass hepatic metabolism[26].

Deeply ingrained traditional uses, primarily using the cultivars *Poovan* and *Karpooravalli*, were identified for preparations such as *Vazhaipoo Poriyal*, *Vazhaipoo Kootu,* and *Vazhaipoo Vadai.* The frequent use of boiled preparations containing *Hingu, Tila taila*, and moong dal may indicate potential synergistic dietary benefits in supporting digestive and menstrual health. Soaking in rice-washed water or buttermilk may help reduce bitterness and improve palatability. Nearly all respondents (98.18%) reported health benefits as their primary motivation for consumption, rather than social or ritualistic aspects (1.82%), suggesting a transition toward functionally oriented dietary practices.

However, some limitations hinder constant use. The lengthy preparation time (24.22%) and intensive manual cleaning process (73.18%) were significant difficulties despite the low cost and availability of raw ingredients. Value-added products such as pre-processed or ready-to-cook banana inflorescence may help overcome these practical barriers and lead to sustained use and better health outcomes. To the best of our knowledge, no controlled clinical studies have scientifically validated these traditional practices. The present study does not provide any pharmacological data or results from controlled clinical trials. Significantly, the results obtained are based on the self-reported symptomatic improvement experienced by the respondents and cannot be considered as therapeutic evidence; yet, the observed association between self-reported outcomes and phytochemical evidence is hypothesis-generating and calls for broader future research. Future studies should include phytochemical investigations, hormonal pathway analyses, and controlled clinical trials using validated symptom assessment scales.

This study is based on self-reported outcomes, which may be subject to recall bias and social desirability bias. Reported benefits could partly reflect traditional familiarity with banana inflorescence and cultural perceptions of its efficacy rather than objective physiological changes. Moreover, phytochemical profiling was derived from the IMPPAT database, which lists compounds present in raw banana inflorescence. Cooking methods such as boiling, frying, or soaking are likely to alter the phytochemical composition substantially, and this variability must be considered when interpreting the results. Future research should therefore incorporate controlled clinical trials, standardized preparation methods, and biochemical analyses of cooked inflorescence to validate these findings.

Conclusion

This study highlights the traditional use of banana inflorescence in women's health and its potential relevance in integrative medicine. The widespread use of banana inflorescence for dysmenorrhea along with the phytochemical data available from the IMPPAT database suggest that banana inflorescence may serve as a promising dietary adjunct in women’s healthcare. The current study reinforces the relevance of traditional dietary knowledge within contemporary integrative healthcare contexts. Further ethnopharmacological validation and translational research may facilitate the development of evidence-based dietary interventions involving banana inflorescence as an affordable and culturally acceptable dietary intervention for menstrual health.

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Author Contributions

DS conceptualised the study, performed formal analysis, and contributed to statistical analysis. US assisted in conceptualisation, formal analysis, and resource management. VK participated in formal analysis, resources, supervision, and manuscript review. GL conducted statistical analysis. SJ contributed to resources and manuscript review. DS and US supervised the project. All authors critically reviewed and approved the final manuscript.

Conflict of Interest

The authors claim no conflicts of interest in this research.

Ethics Approval

This study has been approved by the Institutional Ethics Committee (IEC) of D. Y. Patil College of Ayurved and Research Centre, Pimpri, Pune, Maharashtra (IEC Approval No: DYPCARC/IEC/935/2024 dated:10/01/2025). The study was conducted in accordance with the principles of the Declaration of Helsinki. Participants were informed about the objectives and benefits of the study and provided their informed written and/or oral consent before data collection, and the study adhered to the Code of Ethics of the International Society of Ethnobiology (ISE).

Informed Consent

Informed written and/or oral consent was obtained from all subjects prior to participation in this study. All participants were apprised of the study's nature and their right to withdraw at any point. Informed consent has also been taken from persons for publication of their images.

Declaration of Generative AI in Scientific Writing

During the preparation of this work, the authors used Grammarly, solely for the purpose of polishing the author-written text. This assistance was limited to improving language, checking grammar, spelling, and enhancing sentence clarity and readability. After using the tool, the authors reviewed and edited all content as needed and took full responsibility for the scientific content of the publication. All scientific ideation, data generation, analysis, interpretation, and the initial drafting of the manuscript were performed by the authors.

Data Availability

The data used in this study were obtained from the corresponding author on request and within the bounds of ethical standards and participant consent. The master chart and the IEC certificate were made available as supplementary material.

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