



# **Rice Water: A Traditional Galactagogue of the Muthuvan Tribe in Kerala, India**

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## **Authors' contributions**

*This work was carried out in collaboration between both authors. Author NN conceptualized the study, did fieldwork, collected the data, and wrote of the manuscript. Author LAP supervised the study, did data analysis and wrote the manuscript. Both authors read and approved the final manuscript.*

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## **ABSTRACT**

In regions where breast milk insufficiency poses a challenge, traditional practices among communities, such as the Muthuvans of Kerala, highlight the use of rice water with salt as a natural galactagogue. While widely practiced in households across southern India, this cultural phenomenon remains underexplored in scientific literature. We studied the maternal perceptions and practices regarding galactagogues from 11 Muthuvan settlements in the Adimali panchayath of Idukki district of Kerala, India, through explorative field trips and interviews conducted from January to July 2019. Out of 92 respondents, opinions on lactation practices varied: 27% adhered to a traditional diet, 31% included supplementary foods, and 42% used rice water as galactagogues. The Muthuvans emphasize the efficacy of rice water in increasing milk production, based on their personal experiences. This remedy is particularly significant in contexts where access to other nutritive foods is limited. Future studies should delve into the nutritional and health implications of using rice water as a galactagogue, balancing its benefits with potential risks associated with environmental contaminants like arsenic.

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**Keywords:** Galactagogues; maternal perceptions; Muthuvan; rice water; traditional practices.

## 1. INTRODUCTION

Infant nutrition predominantly relies on breast milk during the first six months of life [1], continuing as a significant source of nutrition for up to two years as desired by both the child and mother, complemented with other foods [2]. Breast milk confers numerous benefits [3], including lower risks of allergic reactions, gastrointestinal ailments, and respiratory diseases for breastfed infants [4,5]. Moreover, breastfeeding mothers experience reduced risks of depression [6], ovarian and breast cancer, mastitis, and postpartum haemorrhage, while also benefiting from child spacing advantages [7,8].

Successful breastfeeding hinges on mechanisms like latch and suckling by the infant, supported by mammary tissue and maternal hormones such as prolactin (initiating milk production) and oxytocin (facilitating milk ejection) [9,10]. Breast milk's nutrients are synthesized by lactocytes and sourced from maternal stores and diet [11]. Breast milk insufficiency is often attributed more to maternal confidence than a clinical issue [12]. In severe cases, insufficient milk production can stem from factors like hormonal imbalances, insulin resistance, insufficient glandular tissue, micronutrient deficiencies, polycystic ovary syndrome, and thyroid disorders [13], impacting maternal-infant bonding and maternal mental health [14,15].

Galactagogues are substances, that stimulate prolactin release, thereby increasing lactation [16]. They encompass natural food products, herbal medicines, or prescribed drugs like domperidone and metoclopramide [16-18]. Various plant parts such as roots, tubers, fruits, seeds, leaves, flowers, and aerial parts are utilized as natural galactagogues [19]. In Colombia and the US, common galactagogues include *Cnicus benedictus*, *Foeniculum vulgare*, *Trigonella foenum-graecum*, and *Urtica dioica* [17,18]. For instance, *Trigonella foenum-graecum*, infused in herbal tea, increased breast milk production among mothers in Turkey, possibly due to phytoestrogens and diosgenin content [20].

A study in Thailand correlated increased milk volume with consumption of galactagogues like banana flower, basil, bottle gourd, chicken, egg, fish, pumpkin, seafood, and tofu [21]. Similarly,

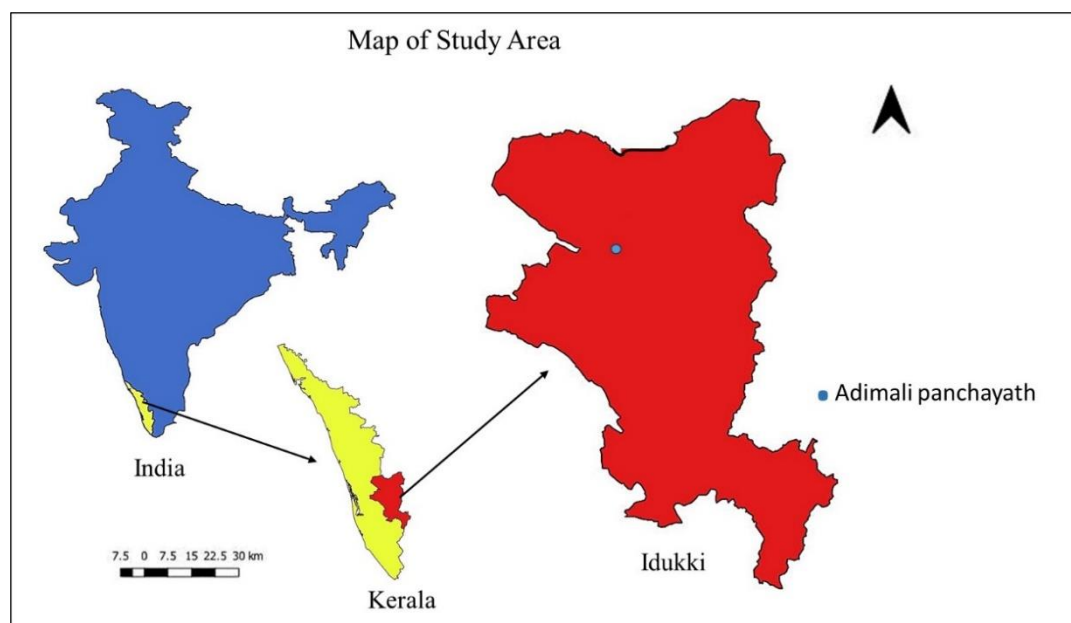
Australian breastfeeding women often receive recommendations for natural galactagogues like brewer's yeast, fenugreek, and lactation cookies [13]. Traditional knowledge among BaKongo communities in Angola also utilizes local plants like *Manihot esculenta*, *Arachis hypogaea*, *Sesamum indicum*, and others for lactation support [22]. Human milk composition is influenced by factors such as dietary intake, parity, body composition, and menstruation resumption after three months of lactation [11,23]. For example, the DARLING study found that maternal diet does not significantly affect protein content in breast milk. However, protein levels increase with maternal body weight and decrease with higher milk production [24].

The Muthuvans are an indigenous forest-dwelling community residing in the Anamalai hills of Idukki district of Kerala, India. They migrated from the plains of Madurai district, Tamil Nadu, settling across the Anamalai hill ranges in Kerala and Tamil Nadu. The name "Muthuvan" originates from the Tamil and Malayalam term "Muthugu," meaning "back," likely referring to their traditional practice of carrying belongings on their backs during migrations [25,26]. The Muthuvans traditionally consider the forest as their own, practicing sustainable living by rotating cultivation areas to maintain soil fertility. They cultivate crops like ragi (*Eleusine coracana*) and rice (*Oryza sativa*) and supplement their diet with wild fruits, leaves, and tubers [25,26]. Their diet includes nutritious foods gathered from the forest, believed to maintain health and prevent diseases. They rely on traditional medicines administered by community vaidyas (medicine men) rather than modern hospitals, preserving these practices through generations [25,27]. Here, we aimed to study the maternal perceptions and practices of the use of galactagogues among the Muthuvan community in the Adimali panchayath of Idukki district of Kerala, India.

## 2. MATERIALS AND METHODS

### 2.1 Study Area

The study was carried out in the Adimali panchayath of the Idukki district of Kerala, India (Fig. 1). Idukki, Kerala's second-largest district by area, has the lowest population density. The district spans approximately 9° 20' to 10° 23' N latitude and 76° 30' to 77° 30' E longitude, home



**Fig. 1. Location map of the Adimali panchayath in Idukki district, Kerala, India**

to indigenous communities including Malapandaram, Malappulayan, Malayarayar, Urali, Muthuvan, and Mannan.

## 2.2 Data Collection

We collected data based on explorative field trips, informal discussions, and semi-structured face-to-face interviews [28] conducted at 11 Muthuvan settlements in the Adimali panchayath of Idukki district from January to July 2019. These settlements were chosen based on accessibility, the presence of individuals knowledgeable about galactagogue use, and the willingness of respondents to participate. To facilitate rapport, a tribal representative accompanied the interviewer to introduce her to the respondents and outline the study's purpose. Snowball sampling was employed, where initial respondents referred others knowledgeable about breastfeeding and galactagogues. Verbal consent was obtained before data collection, ensuring anonymity and confidentiality. Given the Muthuvans' mixed dialects of Malayalam and Tamil, respondents were asked their preferred language (Malayalam or Tamil) for interviews. Questionnaires, originally in English, were translated into Malayalam and Tamil, and verified for accuracy by a tribal representative. Interviews, led by a single interviewer and aided by the tribal representative, were conducted in the respondent's chosen language to ensure the questions were properly conveyed.

Initially, settlements were visited to identify suitable women for interviews. Interested women participated in informal group discussions, from which 92 were selected based on their understanding of galactagogue use. Semi-structured interviews, conducted in homes at convenient times, lasted 30 to 45 minutes. Information on breastfeeding practices, galactagogues used, weaning foods, and pregnancy lifestyles was recorded on questionnaire sheets. Free-listing identified natural galactagogues, supplemented by non-specific prompting to capture additional insights.

## 2.3 Data analysis

The interview notes were analysed using an inductive reasoning approach. Transcripts were thoroughly reviewed multiple times to identify emergent practices supported by respondents' statements. Respondents' ages were categorized into three groups: young (20-39 years), middle-aged (40-59 years), and elderly (60-79 years). Based on the responses, lactation practices were classified into three categories: supplements, traditional diet, and galactagogues (such as the use of rice water).

## 3. RESULTS AND DISCUSSION

### 3.1 Literacy Status of the Respondents

Ninety-two Muthuvan women aged between 23 to 75 years were interviewed, to understand

breastfeeding practices and dietary traditions. Of these women, 28 were actively breastfeeding during the study, while the rest had breastfed at least once. Among the three age groups recognized, the education level of the respondents was high (48%) for the young group (20-39 years), followed by the middle-aged (36%) and old (16%). Elderly women were particularly sought for their extensive knowledge, recommended by other respondents. Education levels varied among the participants, with 52% having no formal education, 20% attending primary school, 14% completing high school, and a single respondent holding a graduate degree (Fig. 2).

### 3.2 Dietary Practices during Pregnancy

Traditionally, Muthuvan dietary habits emphasized daily consumption of locally sourced foods such as rice or ragi porridge, and wild vegetables like *Alternanthera sessilis* and *Amaranthus* sp. Tubers, particularly from *Dioscorea* sp., were also integral and valued for their nutritional richness and digestive benefits [29]. During pregnancy and lactation, Muthuvan women continued their routine diet without special dietary modifications, believing their daily diet provided sufficient nourishment. The practice of working until the last days of pregnancy and resuming work soon after childbirth, with the

infant secured on their backs, exemplified their resilience and customary approach to maternity. Breastfeeding among Muthuvan mothers typically continued for 6 months to 6 years, aligning with the child's demands. Supplementary foods, like rice or ragi porridge, were introduced around 6 months of age, gradually incorporating adult household foods. Breast milk insufficiency was rare, managed through dietary adjustments rather than specific galactagogues.

### 3.3 Transition in Dietary Preferences

Of the total 92 respondents, varied opinion was observed regarding lactation practices, only 27% followed the traditional diet, while 31% accepted supplementary foods, and 42% used rice water as galactagogues (Fig. 3). Among the three age groups, the traditional diet was maximum observed for middle-age respondents, followed by young and old (Fig. 4). While the supplementary foods were largely accepted by young (79%) and, in contrary, none of the old followed supplementary foods underlining their trust in ancestral wisdom (Fig. 5). The notable shift among younger Muthuvan mothers towards medical team-prescribed nutritional supplements, indicating evolving health practices influenced by modern medical interventions.

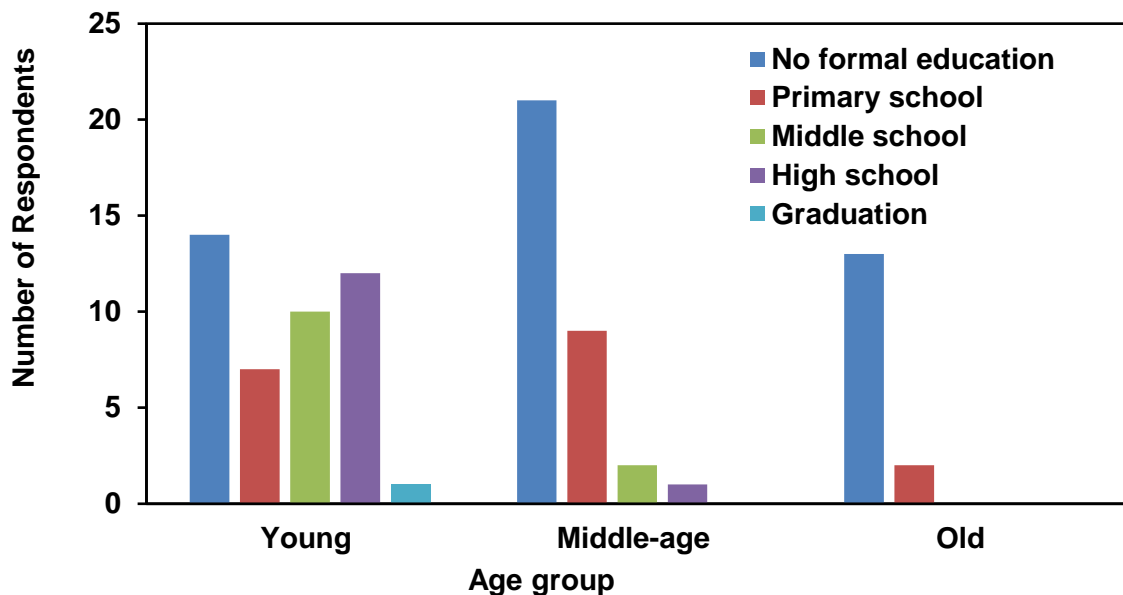


Fig. 2. Literacy status of the Muthuvan women respondents categorized by three age groups

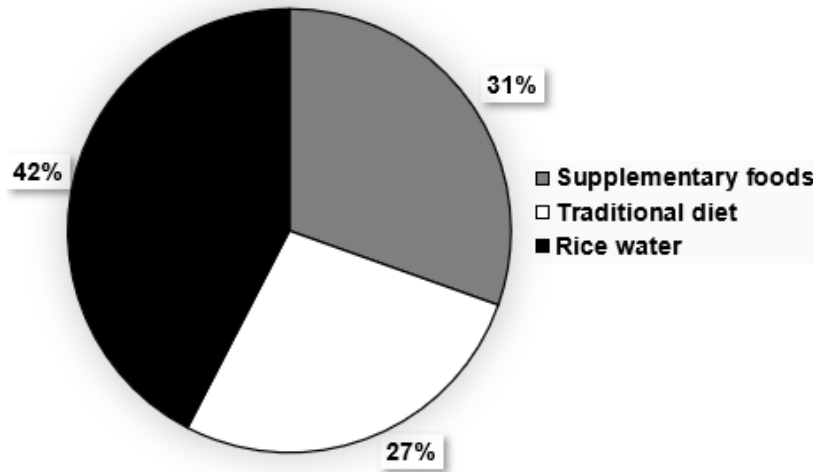


Fig. 3. Lactation practices among the muthuvan women respondents



Fig. 4. Traditional diet practice among the three age groups of Muthuvan women respondents

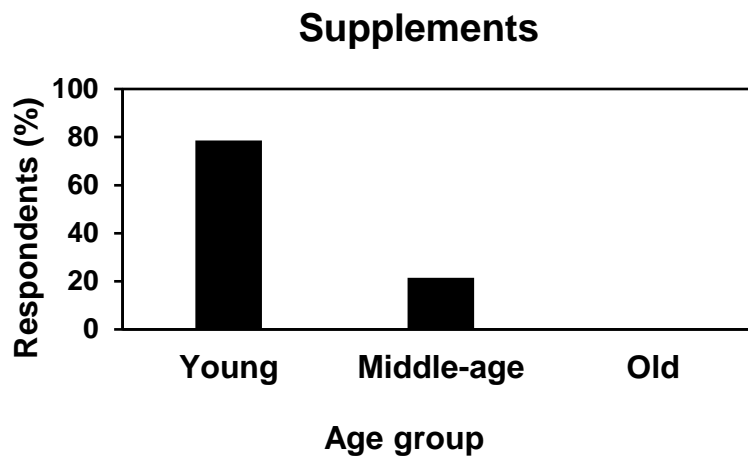
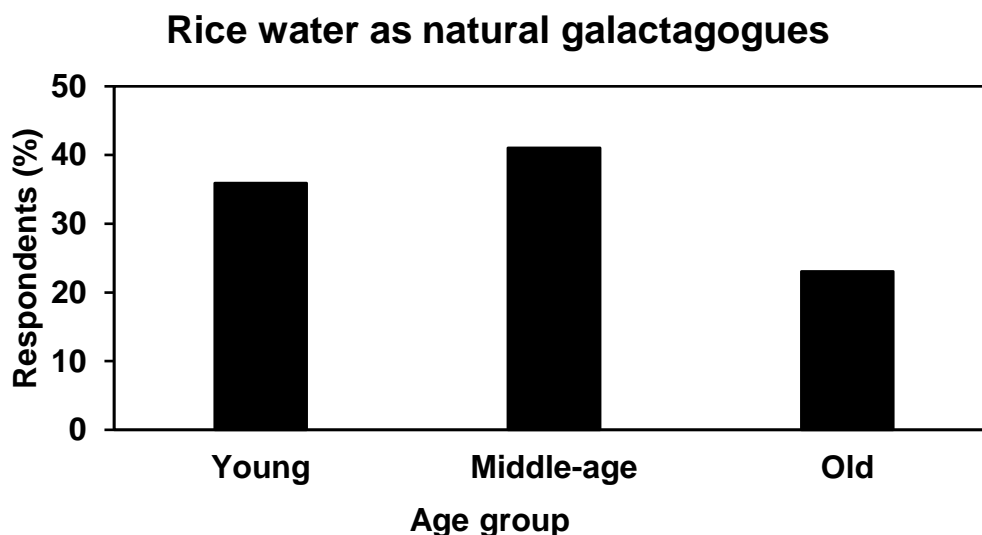


Fig. 5. Adoption of supplementary foods during lactation among the Muthuvan women respondents



**Fig. 6. Rice water as natural galactagogues during lactation issues among the three age groups of Muthuvan women respondents**

### 3.4 Use of Natural Galactagogues

While medical facilities and allopathic supplements have become more accessible, traditional practices persisted among Muthuvan women. They relied on natural galactagogues embedded in their diet, such as wild greens, sweet dishes made from green gram and jaggery, and rice water with salt during instances of breastfeeding challenges. In this study, 42% of the Muthuvan women respondents practiced rice water as a prevalent remedy for lactation issues (Fig. 3), exemplifying their reliance on natural solutions. Among them, a maximum share was observed for the middle-age group Muthuvan women followed by young and old groups (Fig. 6). The rice water was prepared from the traditionally cultivated rice from their fields, and it is consumed with salt after special rituals. Elders attest to its effectiveness, attributing it to its hydrating properties and starch content, which aid lactation [30].

Over time, cultural changes, including the shift from traditional rice and ragi cultivation to cash crops, have influenced dietary habits. Despite these changes, Muthuvan women retain their reliance on indigenous dietary practices for maintaining maternal and child health. Muthuvans traditionally maintain a healthy diet, relying on wild tubers, greens, and traditional medicines. Pregnancy and lactation are integrated into daily life, with no special dietary

emphasis during these phases due to their belief in consistently eating healthily [31,32]. During lactation, Muthuvan mothers use traditional foods believed to have galactagogue properties, such as wild greens (*Amaranthus* sp.), sweets made of green gram and jaggery, and ragi porridge. In cases of milk insufficiency, rice water with salt is utilized to rectify the situation, reflecting their reliance on traditional remedies over modern supplements [26].

Scientifically, rice water's effectiveness as a galactagogue remains anecdotal, with minimal research validating its benefits beyond anecdotal evidence. However, its use aligns with cultural beliefs as seen in other traditional medical practices [33]. Documenting Muthuvan practices underscores the importance of traditional ecological knowledge in healthcare, promoting sustainable living and community health resilience. Their reliance on forest resources and traditional medicines reflects a holistic approach to health, integrating cultural practices with environmental stewardship [25].

Further, traditional knowledge represents potential revenue-generating system that can uplift the economy of the indigenous communities. Integrating traditional knowledge with modern technology, enables the development of novel formulations. This strategic approach not only preserves indigenous wisdom but also facilitates the creation of innovative

products with global appeal, thereby enhancing both local livelihoods and national economic growth [34].

#### 4. CONCLUSION

We conclude that the Muthuvan community still holds the traditional dietary practices and natural galactagogues, particularly rice water, amidst modern healthcare advancements. Documenting such practices preserves cultural heritage and informs public health strategies, emphasizing the role of traditional ecological knowledge in sustainable development. Further research on rice water's biochemical composition and its impact on lactation could provide scientific insights into its galactagogue properties. Also, studies on environmental factors affecting traditional food sources and their nutritional benefits would support community health and sustainability initiatives. By bridging traditional knowledge with contemporary scientific investigation, a complete understanding of such practices can inform healthcare strategies and maternal nutrition policies in similar communities globally.

#### DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

#### ETHICAL APPROVAL AND CONSENT

Permissions: Approval for visiting and conducting interviews with the Indigenous people was obtained from the Scheduled Tribes Development Department (STDD), Kerala, (Permission number: D3-2530/18) and the Kerala Forest and Wildlife Department (Permission number: WL10-26578/2018). The officials certified the ethical aspects of the study after verifying the work proposal and questionnaire. In addition, interviews were conducted after obtaining informed verbal consent from the respondents.

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#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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