

ORIGINAL ARTICLE

Traditional Galactogogues and the Practices Related to Their Use by Post-Natal Women of India

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ABSTRACT

Introduction: Traditional galactogogue recipes are still being used, though not widely, and scientific studies on their use are scanty. This research aimed to study commonly used traditional galactogogue-recipes using primary sources, to bring about nutritional enhancement in most popular recipes and compare the standard and nutrified galactogogue-recipes for nutrients, phytochemicals and sensory qualities. **Methods:** A cross-sectional survey was carried out among 120 mothers (older than 20 years) residing in Indian states of Rajasthan and Uttar-Pradesh in their 0-1 year of lactation period who consented to be a part of the study. Background-information and use of galactogogues was collected with the help of self-designed, pre-tested questionnaires. Nutritive-value (moisture, ash, protein, fat, dietary-fibre, carbohydrate, iron, and calcium) of two of the most popular galactogogues *ajwain-laddu* and *harira* were calculated to find out the nutrient(s) lacking in it. *Ajwain-laddu* was nutrified using whole milk-powder, drumstick leaves powder and additional amount of clarified-butter. *Harira* was nutrified using poppy-seeds, niger-seeds and carrots. **Results:** The commonly used galactogogues were *ajwain-laddu*, *harira*, *Gond-laddu*, and *Sonth-laddu*. There was a significant difference between nutrient content of standard and nutrified-recipes ($p < 0.05$) whereas no statistical difference was observed for hedonic rating-scores ($p > 0.05$). **Conclusion:** Mothers were consuming traditional galactogogues foods in order to increase milk production and strongly believed that regular consumption of galactogogues has enhanced their milk production. To optimize the nutritional value of galactogogues, it is advisable to integrate ingredients abundant in phytochemicals and micronutrients. This can be accomplished while preserving the authentic taste and presentation of these galactogogue-recipes.

Malaysian Journal of Medicine and Health Sciences (2024) 20(1):143-151. doi:10.47836/mjmh.20.1.19

Keywords: Galactogogues, Lactation, Nutrition, Post-natal, Traditional food

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INTRODUCTION

India is distinctive in its own way. It is not bound to a single culture or language, but rather has a diverse range of cultures flowing through its vast lands. It is a multi-cultural and multi-lingual unit that includes people from all social and ethnic backgrounds. India's citizens eat a variety of cuisines, and their social and religious beliefs differ. Some Indian states have their own traditional foods, which they often prepare for religious and social occasions. As such, traditional foods are quite popular due to their unique characteristics. They promote food security, boost nutritional status, and provide a diverse diet. They are also well-endowed with several medicinal benefits (1). One such group of traditional foods are galactogogues, which are consumed by post-natal women as it is believed their consumption augment or initiate their breastmilk. Yet, there is a paucity of studies

on the usage of traditional galactogogues and their efficacy.

Breastmilk has long been regarded as primarily a source of infant nourishment (2), as it is considered a natural food for infants (3). It is the most significant source of nutrition in the first year of life for both term and preterm infants because of its well-documented beneficial effects on short and long-term outcomes (4). The World Health Organization targets increasing the rate of exclusive breastfeeding during the first 6 months to at least 50% by 2025 (5). It is also linked to a lower incidence of childhood illnesses and obesity, and the long-term advantages may include protection against type 2 diabetes and other non-communicable diseases (6). Lactation is a complex physiological system including physical, hormonal, and emotional aspects (7).

Insufficient or poor lactation has been characterised in Unani literature as 'Qillate laban' (8) and its failure or deficiency; also known as agalactia, it is a medical condition in which lactation is insufficient or fails completely due to insufficient breast milk production and/or failure of the milk let-down reflex in response to suckling (9). Some cases show insufficient milk

production, and its depletion can be caused by a variety of factors, including caesarean delivery, breast surgery, maternal illness, excessive smoking, separation between mother and infant, and psychosomatic illnesses (10). However, milk production can be enhanced by consuming various substances known as galactogogues (or lactogogues).

Galactogogues are substances that can be utilised to help initiate, maintain, or accelerate the amount of maternal milk synthesis (11). The use of herbal galactogogues thought to increase milk production has a long history and has garnered a lot of attention in many nations and cultures. Many herbal remedies have anecdotal reports that indicate their potential to increase human milk supply. Fenugreek, milk thistle, caraway, fennel, anise, cumin, omum (*Ajwain*), black seed, alfalfa, and red raspberry leaf remedies are among them (12-15). Women in North Sumatra, Indonesia, for example, used torbangun leaves (*Coleus amboinicus Lour*) as a galactogogue (16). *Shatavari* was thought to have substantial galactogogue activity among lactating women in India (17). Traditional cultures also frequently encourage mothers to use home-made galactogogues which also consists of these herbs as an ingredients. The majority of mothers preferred eating home-made galactogogues instead of pharmaceutical galactogogues. Mothers all over the world used traditional home-made preparations as galactogogues. Several varieties of home-made galactogogues are currently consumed by mostly all the lactating women in India, including *Ajwain laddu*, *Harira*, *Gond laddu*, *Sonth laddu*, Oatmeal, *Moong dal khichdi* and Wheat flour *halwa*.

Traditional foods are perceived as a long-lasting legacy passed down through the generations by our ancestors. This national legacy is steadily eroding as a result of changing lifestyles, and future generations may be completely bereft of it. The modern lifestyle is leading to an increase in the use of processed foods (18-19). In line with the above-stated facts, the present research work was carried out to collect information on traditional galactogogue recipes consumed by post-natal women and to sustain or preserve traditional knowledge of galactogogue foods so that it can benefit the upcoming generations as well. Another purpose was to compare the standard or traditional galactogogues with their nutrified counterparts with respect to nutrient, phytochemical and sensory qualities.

MATERIALS AND METHODS

The current study focused on preserving or conserving traditional knowledge of galactogogue foods so that future generations can benefit from it as well, and nutrification of commonly consumed galactogogue foods was also done to make them nutritionally adequate for consumption. The study addressed the current consumption patterns of traditional galactogogues

recipes by post-natal women. The information was also gathered to better understand how lactating women consume traditional galactogogue foods to boost milk production.

Participants

Sampling was purposive in nature in order to select those post-natal women who are nursing their infants and consuming some traditional galactogogue food regularly. These were selected from 400 lactating women initially contacted. Sample size of 400 was attained using the Taherdoost (2017) (20) formula of sample size calculation in cross sectional study. The lactating women were selected from the ones visiting maternal homes in selected cities of Rajasthan and Uttar Pradesh states in India. Data collection was done after gaining the approval of hospital authorities and Helsinki ethical guidelines (ICMR, 2017) (21) for studies on human subjects were also adhered to. This study had obtained ethical exemption from the institution ethical committee of Banasthali Vidyapith dated 23 September 2022 to conduct this study. Only those post-natal women were made a part of the study who signed the informed consent form, were above 20 years of age and were natives of Rajasthan or Uttar Pradesh. Post-natal women who were not nursing, or who were visiting the hospital for treatment of a persistent/chronic ailment were not included in the study. Thus, out of initially contacted 400 women, 120 lactating women (60 each from Rajasthan and Uttar Pradesh) were selected.

Data Collection Tools

A self-designed pre-tested questionnaire was used to collect information about socio-demographic characteristics as well as commonly consumed traditional galactogogues by post-natal women whose age was between 20-45 years and whose lactation period was between (0-1 year). The second part of the proforma was an open-ended questionnaire to gather information about use, frequency of consumption, ingredients and method of preparation of galactogogue. The accompanying family members were also consulted to have their inputs about ingredients and preparation of galactogogues used as well as the breastmilk augmenting effect of different ingredients in terms of the traditional knowledge they have received from their elders. The data was entered into MS Excel (2016) and traditional galactogogue recipes were enlisted. For the most common recipes a common ingredient and amount list was drawn after consulting key women and their nutritive value was calculated (IFCT, 2017) (22). Each recipe was critically analysed in consultation with experts that led to the possibilities of nutrification by addition of few other ingredients.

Standardization of Food Products

Nutrification of most commonly consumed galactogogue recipes were done. *Ajwain laddu* was prepared by incorporating 5 g of whole milk powder for protein, 5 g

of drumstick leaves for vitamin A and an additional 10 g of *ghee* (clarified butter) for energy with the standard amount of *ajwain* (10 g), 20 g of wheat flour, 10 g of *ghee* and 10 g of sugar, whereas nutrification of *harira* was done by incorporating 5 g of carrots for vitamin A, 5 g of niger seeds for iron and 5 g of poppy seeds for calcium with the standard amount of almonds (25 g), 25 g of jaggery, 1 g of ginger powder, 30 g of *ghee* and 250 ml of water.

Nutritional Analysis

Estimation of moisture was done using direct measurement, ash content was done by dry ashing method, protein was done using the Kjeldahl method, fat was done using Soxhlet method, dietary fibre by semi-automated fibre analyser and carbohydrate was calculated by difference (22). Iron estimation was done using Wong's method and calcium by titrimetric method (24). Both the standard as well as nutrified recipes were subjected to nutritional analysis.

Sensory Evaluation

For nutrification sensory evaluation was a part of recipe standardization for which two standard scales were used. The triangle test was used to select a panel of semi-trained judges. From this test, 15 panellists were selected to participate in the hedonic rating test. Nine points hedonic test was used in which numbers ranging from 1 to 9, and responses to verbal categories were considered as responses to numerical values along a preference continuum, i.e., a "numbers only" scale. The number 1 on this scale is considered to be "dislike extremely," while the number 9 is considered to be "like extremely".

Statistical Analysis

The statistical analysis was carried out with IBS SPSS-20.0, and multivariate linear regression was used to see if there was a relationship between demographic characteristics and galactogogues consumption, and a t-test was used to assess the significant difference between the nutritional content of standard and nutrified recipes.

RESULTS

Subject Characteristics

The socio-demographic characteristics of the subjects have been presented in table I. The mean age (years) of the subjects was 31.8 ± 7.03 . The age ranged from 20 to 45 years. The predominant age group was 31 to 35 years. In 57.5% of subjects, it was the first child, followed by second in 36.6% of subjects. None of the mothers reported living alone, the majority coming from joint families. Most of the subjects were from families following Hinduism. Nearly 80% of the subjects had attended college, yet with respect to working status, one fourth of the subjects were engaged in gainful employment.

Table I: Socio-Demographic Characteristics of the Subjects

Demographic variables		n (%)
Age (in years)	20-25	11 (9.1)
	26-30	25 (20.8)
	31-35	51 (42.5)
	36-40	22 (18.3)
	>40	8 (6.6)
	Not answered	3 (2.5)
Number of children	1	69 (57.5)
	2	44 (36.6)
	3	4 (3.3)
	>3	3 (2.5)
Family type	Nuclear	40 (33.3)
	Joint	77 (64.1)
	Extended	3 (2.5)
Religion	Hindu	111 (92.5)
	Muslim	5 (4.1)
	Christian	2 (1.6)
	Jain	2 (1.6)
Education of mother	Not educated	2 (1.6)
	Elementary	3 (2.5)
	Primary	1 (0.8)
	Secondary	4 (3.3)
	Sr higher secondary	9 (7.5)
	Graduated	38 (31.6)
	Post graduated	60 (50.0)
Working status of mother	Doctorate	3 (2.5)
	Housewife	88 (73.3)
	Regular job	27 (22.5)
	Works from home	5 (4.1)

Post-Delivery Information

As is apparent from table II, a total of 51.66% of the subjects underwent caesarean section; 29.16% belonged to the joint family and 20% belonged to the nuclear family. Among the 48.33% subjects who had normal delivery, 35% belonged to the joint family and 13.33% belonged to the nuclear family. More than a quarter of the subjects who belonged to the joint family had normal delivery. Among all infants whose mothers were a part of the study 50% had normal birth weight, half of them delivered through c-section and other half normally. A small percentage of the mothers reported the birth taking place before time and out of these 10 births 8 were by c-section and 2 normal. Colostrum is a panacea for infants but not all subjects reported giving colostrum as the first food to the baby. As per age old customs and traditions, the infants were given pre lacteal feeds other than mothers feed by nearly 38% of the mothers. As per standard Infant and Young Child Feeding (IYCF) guidelines breastfeeding should begin within 24 hours of birth but one third of the subjects did not report following the guideline. Similarly, another very crucial recommendation of exclusive breastfeeding was not followed by approximately one third of the subjects. Such practices become a cause of concern

Table II: Post-Delivery Information of the Subjects

Demographic variables		n (%)
Type of delivery	Normal	58 (48.3)
	C-Section	62 (51.6)
Birth weight of infant (in Kg)	<3	40 (33.3)
	3	60 (50.0)
	>3	20 (16.6)
Birth status of infant	On time	110 (91.6)
	Before time	10 (8.3)
First feed	Colostrum	75 (62.5)
	Formula milk	36 (30.0)
	Gavage Water	1 (0.8)
	Honey	7 (5.8)
Any other		1 (0.8)
Breastfeed since	Day 1	81 (67.5)
	Day 2	12 (10.0)
	Day 3	14 (11.6)
	Day 4	4 (3.3)
	Day 10	9 (7.5)
Breastfeeding manner	Exclusive	82 (68.3)
	Interspersed with formula milk	16 (13.3)
	Interspersed with bovine milk	22 (18.3)
Frequency of breastfeeding per day	Twice	2 (1.6)
	3-5 times	28 (23.3)
	6-8 times	31 (25.8)
	8-10 times	31 (25.8)
	Higher	28 (23.3)

when the study group primarily comprises educated women.

The p values obtained from multivariate linear regression indicate that the association between the consumption of galactogogues and the demographic variables considered in this study is not statistically significant. It implies that more factors affecting consumption of galactogogues should be taken into account in the study. However, the confidence interval estimate obtained for variable 'Age' is considered to be good as it is of smaller length with 95% confidence coefficient as shown in table III.

Use of Galactogogues

Since the mandatory inclusion criteria in this study was regular consumption of galactogogues, therefore, the proportion of the mothers consuming galactogogues remains 100%. During data collection 400 mothers were contacted out of which 120 could be selected as they fulfilled the essential requirement of regular galactogogue consumption. Daily milk consumption was practiced by all the lactating women but 54 (45%) lactating women considered milk to be a galactogogue while 66 (55%) did not. As reported by the subjects, following were the most popularly used galactogogue foods in the two states as shown in table IV.

Table III: Association between Socio Demographic Profile of Participants Residing in Rajasthan and Uttar Pradesh with Frequency of Consumption of Galactogogues

Variables	Frequency of consumption of galactogogues			
	Once daily		Twice daily	
	OR (95% CI)	p	OR (95% CI)	p
Age	0.91 (0.75-1.10)	0.33	0.88 (0.73-1.07)	0.20
Family type	1.08 (0.39-2.97)	0.87	1.15 (0.42-3.15)	0.78
Religion	0.24 (0.02-2.34)	0.22	1.09 (0.28-4.14)	0.89
Education of mother	1.00 (0.41-2.46)	0.98	0.77 (0.32-1.86)	0.57
Number of children	0.62 (0.21-1.86)	0.40	0.56 (0.19-1.69)	0.31

Reference value is thrice daily

Table IV: Galactogogues Commonly Used by the Subjects During Lactation

S.no	Galactogogues which act as milk enhancer	Frequency
1	Milk	54
2	Gond laddu	37
3	Harira (chواني)	34
4	Ajwain laddu	32
5	Cumin seeds	23
6	Sonth laddu	21
7	Panjeeri laddu	12
8	Cow milk	11
9	Omum seeds	11

Ajwain laddu: *Ajwain (Trachyspermum ammi)* is a traditional spice with medicinal effects well documented in Ayurveda treatises. Consuming this laddu for health benefits like weakness and recovery of post-pregnant women may be taken with a pinch of salt by the new-age generation. But the result of this warming food is the significant wisdom hidden in age old traditions of North India. The ingredients present in this laddu are wheat flour, *ajwain*, *ghee*, and sugar, but the major ingredient *ajwain*, helps in the augmentation of breastmilk and improves digestion (25).

Harira: *Harira*, also known as *chواني*, is a well-known traditional galactogogue recipe. It is highly nutritious, and thus, traditionally, it is considered as the optimal meal for post-natal women who need additional nutrients. Also, it contains ingredients like *gond*, *cumin seeds*, *carom seeds*, several dry fruits, *ghee*, and *jaggery*, but the key ingredients *gond* and *cumin seeds* help in the enhancement of milk and quickly reinstate lost energy and strength in the body. The consistency is like that of porridge and it can be eaten as a snack in between major meal (26).

Gond laddu: *Tragacanth gum (TG)*, locally known as *gond* is traditionally popular in northern Indian states. Laddu is one of the most popular sweet meals in India and its hundreds of variants are commonly eaten across the nation. It has holy significance and is offered to gods and goddesses on various occasions. As per the

traditional knowledge about *gond* laddu, it is a warming food and can be enjoyed in the winter months normally and after delivery too. It can be served as an excellent health booster and the ingredients used are *gond*, jaggery, wheat flour, and ghee (clarified butter), but the well-known ingredient *gond*, helps to increase the production of breastmilk, boost immunity, and speeds up the recovery post-delivery (27).

Sonth laddu: *Zingiber officinale Roscoe* (ZOR) (vernacular name - *Sonth*) is a well-known traditional herb or spice acknowledged for its medicinal and health benefits. It can be taken alone or can be used to prepare a variety of dishes and teas. *Sonth* laddu is a traditional Indian sweetmeat in which *Sonth* powder is added. The ingredients used to prepare *sonth* laddu are wheat flour, dry fruits, *sonth*, *ghee* (clarified butter), and jaggery. The most prominent ingredient, *sonth*, not only enhances the flavour of the laddu but also relieves back pain, heals post-delivery wounds, reduces inflammation, offers extra calories, and stimulates breastmilk production due to its warm nature (28).

Nutrition of *ajwain laddu*, and *harira* were done on the basis of nutrients that were low in the standard recipes. Standard *ajwain laddu* was relatively low in energy, protein and vitamin A, so to make up for that additional amount of ghee (10 g), whole milk powder (5 g) and dried drumstick leaves (5 g), were incorporated. In standard *harira*, vitamin A, iron and calcium were low. Carrots (5 g), niger (5 g) and poppy seeds (5 g) were incorporated in order to make *harira* nutrient dense.

In addition to those traditional foods, some spices and condiments like cumin seeds, omum seeds, fenugreek seeds, melon seeds, fennel, poppy seeds, asafoetida, ginger, were also being consumed directly by the subjects without adding them in any recipe. Other than that green gram *dal*, *masoor dal*, green leafy vegetables, fenugreek seeds, paneer, wheat-flour *halwa*, milk-almond *halwa*, *makhana kheer*, *sago kheer*, *shatavari*, oatmeal, *khichdi*, coconut water, *alsi laddu*, *methi-kamarkus laddu*, coconut *laddu*, and mutton were also being consumed by the lactating mother as galactogogues. Among 120 subjects 96% strongly believed that regular consumption of one of these galactogogues has enhanced their milk production.

In Rajasthan, 92% of subjects received advice about food that increases milk production from their families, which included their mother and mother-in-law, and 5% and 3% received information from nutritionists and doctors, respectively. Nearly 76% of subjects in Uttar Pradesh received information from their family, which included their mother, mother-in-law, grandmother, grand mother-in-law, sister-in-law, and 15%, 5% and 4% received information from doctors, nutritionists, and other relative, respectively.

Hedonic Test of Standard and Nutrified Recipes

The 9-point hedonic test was used to assess the overall acceptability of *ajwain laddu* and *harira*. The mean score for standard and nutrified *ajwain laddu* ranged from 6.6 to 7.4, whereas the mean score for standard and nutrified *harira* ranged from 8.0 to 8.2. The nutrified *ajwain laddu* and *harira* had a mean value of 7.4 ± 1.29 and 8.2 ± 0.67 , respectively, whereas the standard *ajwain laddu* and *harira* had a mean value of 6.6 ± 1.71 and 8 ± 0.65 which is lower than the nutrified recipes. The student's t-test was applied to hedonic rating scores which revealed that there was no significant difference between the standard and nutrified recipes when tested at $p \leq 0.05$ level.

Laboratory Analysis of Nutrients in Standard and Nutrified *Ajwain Laddu* and *Harira*

As presented in table V, the nutritional value of nutrified recipes of both *ajwain laddu* and *harira* is higher than the nutritive value of standard recipes, except for carbohydrates, and the mean scores of nutrified recipes are higher than the mean scores of standard recipes, in terms of all nutrients. When statistically analysed using the student's t-test revealed that there is significant difference in all the nutrients, between both standard and nutrified recipe of *ajwain laddu* and *harira* as the p values of moisture, ash, protein, fat, fiber, carbohydrates, calcium and iron of *ajwain laddu* came out to be $p=0.0001$, $p=0.002$, $p=0.022$, $p=0.002$, $p=0.041$, $p=0.001$, $p=0.001$ and $p=0.001$ respectively and the p values of *harira* for moisture, fat, protein, fat, fibre, carbohydrates, calcium, and iron are $p=0.002$, $p=0.001$, $p=0.04$, $p=0.004$, $p=0.004$, $p=0.001$, $p=0.0002$ and $p=0.0003$ respectively which is lesser when compared to $p \leq 0.05$ level. It can be stated that there is a significant difference between standard and nutrified recipes when compared to the $p \leq 0.05$ level. As a result, nutrified recipes will provide more nutrients and health benefits than standard recipes.

Qualitative phytochemical analysis revealed that glycosides and tannins were present and steroids and saponins were absent in both standard and nutrified

Table V: Laboratory Analysis of Nutrients in Standard and Nutrified *Ajwain Laddu* and *Harira*

Nutrients	Standard <i>Ajwain laddu</i>	Nutrified <i>Ajwain laddu</i>	p Values	Standard <i>Harira</i>	Nutrified <i>Harira</i>	p Values
Moisture (g/ 100g)	1.6	2.2	0.0001	8.85	10.98	0.002
Ash (g/ 100g)	2.5	4.1	0.002	5.67	7.67	0.001
Protein (g/ 100g)	6.05	6.65	0.022	10.41	12.04	0.04
Fat (g/ 100g)	34.8	38.4	0.002	55.52	57.52	0.004
Crude Fiber (g)	9.01	10.32	0.041	7.37	8.44	0.004
Carbohydrates (by difference) (g/ 100g)	46.04	38.33	0.001	26.20	21.82	0.001
Calcium (mg/ 100g)	13.04	28.05	0.001	20.45	45.94	0.0002
Iron (mg/ 100g)	5.98	6.16	0.001	11.64	26.84	0.0003

recipes of *ajwain laddu*. In *harira*, tannin was present and both saponins and steroids were absent in both standard and nutrified recipes, whereas glycosides were only present in the nutrified recipe.

DISCUSSION

Breastfeeding primarily for the first 6 months is advised, followed by continued breastfeeding and adequate complementary nutrition until the child is two years old or older. It is an imperative part of giving each child the most beneficial, healthy start in life. It is the first form of immunisation and is undoubtedly the best source of nutrition for a baby, which provides numerous health benefits (29). According to IYCF standards, the Indian government recommends that breastfeeding begin promptly after birth, preferably within one hour (30). In the current study, nearly two-thirds of mothers were breastfeeding their infants from day one, and 62 percent of new-borns received colostrum as their first meal; the remaining 33% delayed breastfeeding commencement. However, in India, several research suggest that commencement rates range from 16 to 54.5 percent (31). Another study has been done which shows 85.2% of women were aware of exclusive breastfeeding (32), which is somewhat consistent with this study in which nearly 69% of women were exclusively breastfeeding their infants.

Traditional galactogogues, have been preferred and consumed by lactating women since ancient times, which vary from culture to culture, and have been given a significant place in the food pattern of lactating mothers to enhance their milk production. Fennel, dates, garlic, ginger, anise, alfalfa, coconut, cumin, *shatavari*, *omum*, almonds, and barley are some of the plants and foods used around the world to help lactating women produce more milk (33). In traditional Indian customs, new mothers are provided with specific nourishing foods during the postpartum period. These foods are intentionally designed to be energy-rich and often contain ingredients such as ghee or clarified butter, cereals or millet, sugar or jaggery, nuts, seeds, and occasionally dried fruits. This dietary regimen is typically followed for a duration of 2 to 6 months and incorporates foods that offer essential minerals like calcium and iron (34). The women who participated in this study indicated that *ajwain laddu* and *harira* were the most frequently used, followed by *gond laddu* and *sonth laddu*. In addition, we also find that green gram *dal*, *masoor dal*, *makhana kheer*, *sago kheer*, *khichdi*, *shatavari*, coconut *laddu*, cumin, *omum*, *alsi laddu*, *methi-kamarkus laddu*, and mutton are popular galactogogues in India as many of these are globally available. In a study conducted by Joshi et al. (2000) in the Parbhani district of Maharashtra, the practices of lactating women were examined. Among the 100 women surveyed, it was discovered that 89% consumed garlic chutney and 97% consumed poppy seeds to promote

milk secretion. These women also held the belief that fenugreek seeds could help prevent inflammation and back pain. The study also encompassed urban women, where more than 90% consumed *sheera*, milk, *ghee* or clarified butter, and similar foods within the initial ten days after childbirth. Both rural and urban mothers, with a percentage exceeding 90%, included *gond laddu*, carom seeds, fenugreek seeds, and garden cress seeds in their diets (35).

Among the steps taken by lactating women to improve milk production, consumption of green leafy vegetables, soups, and fruits was the most frequent. Water, homemade composts, and fennel tea were prominently used drinks because they believed liquids improved milk production (36). A study done on lactating Mexican women listed a variety of methods for increasing milk output. Among the most commonly stated were supplementing and/or enhancing maternal nutrition and drinking habits. *Atole*, a flavourful, drinkable gruel made from *maizena* (corn-starch) or *masa* (tortilla flour), was the preferred dietary supplement. Milk and water were the most frequently recommended drinks by the women (37). In Ghana, lactating mothers commonly rely on a variety of special foods and herbs to augment the production of breast milk. These include *abemudro* (a blend of herbal ingredients), *ayoyo* (jute leaves), *nkontonmire* (cocoyam leaves), *kuuka* (dried baobab leaves), and tiger nuts. Additionally, hot lactogogues such as millet porridge, black tea, salt petre porridge, and *Tuo Zaafi* (a maize flour dish) are popular choices. Groundnut/peanut-based lactogogues consist of mashed kenkey, corn porridge, Aleefu (Amaranth) with groundnut, Bra leaves soup, Werewere (*Citrulus colocynthis*) soup, and groundnut-only soup (38). In Chinese studies conducted on animal models, the use of herbal galactogogues such as *Silitidil* (milk thistle extract) and Silymarin BIO-C (extract from *Silybum marianum* fruits) demonstrated a significant increase in serum prolactin levels in female rats. Moreover, the herbal decoction proved to be effective in enhancing milk production in lactating rats (39, 40). In a study carried out in the Cusco Region of Peru, it was observed that specific methods of consumption, such as "hak'achu soup" or "quinoa drink," were frequently associated with the use of galactogogues. These galactogogues were predominantly consumed in the form of soups or beverages (41). A study conducted in Ankara, Turkey, discovered that women hold the belief that specific food items possess the ability to improve the production of breast milk. These food items encompass onions, tea, compote, soups, *tahini halwa*, and dishes with cracked wheat, green leafy vegetables, rice, and various types of sweets (42). In this study, similar to others, most lactating women believed that consumption of various galactogogues like milk, green vegetables, fenugreek seeds, oatmeal, asafoetida, *paneer*, coconut water, and various halwas enhanced milk production. The outcomes of this study are in line with previous studies.

According to the majority of studies, health care specialists advise mothers on how to breastfeed and increase milk production (35). However, this was not the case in our study where most mothers reported receiving information about galactogogues from their family members. The reason that most of the information was passed down by family is linked to the fact that, in the absence of scientific data on galactogogues, such knowledge is not included in the training of healthcare providers. Considering that the most commonly known strategy was to consume an abundance of water and fluids that stimulated the lactating woman's liquid metabolism which further enhanced milk production.

This research study is subject to several limitations that merit attention and rectification. Firstly, the constrained sample size resulting from limited awareness of galactogogues within the population poses a hindrance to the generalizability of the findings. Furthermore, the study's geographical confinement to Rajasthan and Uttar Pradesh imposes restrictions on the extrapolation of the results to other regions and cultural milieus. Additionally, the study primarily focuses on traditional galactogogue recipes, disregarding herbal and pharmaceutical alternatives, and only analyzes a limited spectrum of minerals, namely iron and calcium. This narrow scope curtails the breadth of understanding in this domain.

To address these limitations, future research endeavors should strive to expand the sample size, bolster awareness among the population, broaden the geographical scope, and encompass a wider array of galactogogue types. By doing so, a more comprehensive understanding of galactogogue usage and its impact on breastfeeding outcomes can be attained.

CONCLUSION

Lactating women consume traditional galactogogue foods to enhance their milk production based on their beliefs and customs. Although traditional galactogogues foods are healthy and rich in certain nutrients, there may be some nutrients that are deficient or insufficient to fulfil the increased nutritional requirements of lactating mothers. Therefore, the addition of nutrient-rich ingredients can be done to further accentuate the nutritional profile of the traditional recipes so that they can provide more health benefits to lactating women other than milk enhancement. Due to modernisation, convictions for traditional food types are steadily declining. Thus, there is an urgent need to preserve traditional knowledge of galactogogue foods before traditional culture is utterly lost. Further research is largely needed to fully understand their effectiveness and safety as secondary data sources and related literature pertaining to traditional galactogogues in India are limited.

ACKNOWLEDGEMENTS

Authors are thankful to the hospital authority, subjects and their relatives.

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