

Formulation of Galactagogue Rich Recipes - Its Acceptability and Awareness Program to Pregnant and Lactating Women

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Abstract

Breastfeeding is a fundamental pillar of child nutrition, with important implications for the health welfare due to its impact on morbidity and mortality, especially among children under one year of age. The process of secretion and production of milk in alveolus of breast after the birth of child is called lactation. Therefore, many use galactagogues to increase the milk production. Galactagogue helps in increasing the prolactin hormone levels. The present study was aimed with the objective to formulate galactagogue rich recipes and to assess the knowledge on galactagogue and create awareness to pregnant and lactating women using developed aids. The study was carried out on 25 lactating women using interview schedule to assess their nutritional status, knowledge of breastfeeding practices and awareness of galactagogues. Galactagogue rich recipes such as galacta paratha, galacta tea, galacta pancake and galacta omelette were organoleptically evaluated by the 25 lactating women. Among the four galactagogue rich recipes galacta paratha received highest score and hence variations are shown. The nutrient content of the formulated galacta paratha (100g) was found to be 221.82 kcal of energy, 9.08g of protein, 4.78g of fat, 2.69mg of iron, 65.85mg of Calcium, 77.23µg of vitamin A, 5.38g of fibre and 35.20g of carbohydrates which indicates that galacta paratha was highly nutritious compared to other galactagogue rich recipes. Nutrition education and awareness program were given to pregnant and lactating women in groups using pamphlets and a 5-day menu was designed especially for lactating women. This study concluded that majority 60% of selected lactating women were not aware of the term galactagogues and about 60% of the selected lactating women experienced that their feeding pattern increased much after following prescribed menu. About 60% of the mothers breastfed their infant directly, 20% of them feed with the help of pumped milk and 20% of them breastfed both directly and by use of pumped milk.

Keywords: Breastfeeding, Galactagogue Rich Recipes, Lactating Women, Pregnant Women

1. Introduction

A Galactagogue is a substance that can help a breastfeeding mother raise her breast milk supply. The word itself is a union of the Greek term “galact-ogogue”. The meaning of “galact” is milk, and the meaning of “ogogue” is promoting or leading. It is a food that increases milk production in lactating mothers. Galactagogues may be derived from plants or synthetic, or endogenous. They may be used to induce lactation and to treat low milk supply¹.

Breastfeeding is a fundamental pillar of child nutrition, with important implications for health welfare

due to its impact on morbidity and mortality, especially among children under one year of age. The World Health Organization (WHO) recommends children to initiate breastfeeding within the first hour of birth and exclusively breastfeed for the first six months of life – meaning no other foods or liquids are provided, including water².

The United Nations Children’s Fund (UNICEF) describes breastfeeding as an important indicator, noting that “Breastmilk alone is the perfect food for all infants in the first six months of life.” In addition to being an ideal nutritional source for infants, exclusive breastfeeding is associated with a lower chance of dying from diarrhoea

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and acute respiratory infections and strengthens the infant's immune system. It also protects against chronic diseases such as obesity and diabetes³.

The process of secretion and production of milk in the alveolus of the breast after the birth of a child is called lactation. Today, most of women are unable to produce sufficient milk to meet the nutritional requirements of infants. There are many reasons for low milk production such as mental stress, hormonal problems, fear, etc. Therefore, many use lactagogues to increase the milk production⁴.

World Breastfeeding Week is celebrated every year from August 1st to 7th to encourage breastfeeding and improve the health of babies around the world. It commemorates the Innocenti Declaration signed in August 1990 by government policymakers - WHO, UNICEF and other organizations, to protect, promote and support breastfeeding. Breastfeeding is key to sustainable development strategies post-pandemic, as it improves nutrition, ensures food security and reduces inequalities between and within countries. The theme is aligned with the thematic area 1 of the WBW-SDG 2030 campaign which highlights the links between breastfeeding and good nutrition, food security and reduction of inequalities⁵.

2. Materials and Methods

2.1 Selection and Procurement of Raw Materials

For the present study, galactagogue rich foods namely chickpea flour, wheat flour, oats flour, almonds, fenugreek leaves, garlic, sweet potato, flax seeds, alfaalfa seeds, cumin, fennel, cardamom, banana, spinach, brown sugar, ghee, salt, dry fish, egg and milk were procured from a departmental store and were checked visually to be free from infestation.

2.2 Formulation of Galactagogues Rich Recipes

The following are the Galactagogue rich recipes:

- i) Galacta paratha
- ii) Galacta tea
- iii) Galacta pancake
- iv) Galacta omelette
- v) Formulation of galacta paratha

Table 1 presents the variations in formulated galacta paratha.

Table 1. Variations of formulated galacta paratha

Ingredients	Variation 1 (gm)	Variation 2 (gm)	Variation 3 (gm)
Wheat flour	100	100	100
Chick pea flour	60	80	60
Sweet potato	60	60	80
Flax seed powder	10	10	10
Alfaalfa seeds powder	10	10	10
Cumin seeds	5	5	5
Fenugreek leaves	20	20	20
Chillipowder	5	5	5
Coriander powder	5	5	5
Ghee	5	5	5
Oil	5	5	5
Salt	3	3	3

2.3 Computation of Nutrient Content of Prepared Recipes

Computation of nutrient for formulated recipes are very important, and it improves the quality of the product. So in this view the nutrients such as carbohydrates, protein, fat, calcium, iron, vitamin A of the prepared galactagogue rich recipes were calculated using Nutrive software.

2.4 Organoleptic Evaluation of Galactagogue Rich Recipes

The organoleptic evaluation of galactagogue rich recipes is to be carried out by Hedonicating test with the help of 25 lactating women. It includes appearance, colour, flavor, texture and taste. Using the scores obtained from the parameters, the overall acceptability of the product was determined using 9-point score card and tabulated.

2.5 Selection of Area and Subjects

For the current study, the pregnant and lactating mothers residing in Kollampalayam area of Erode district was selected because of the nativity and familiarity by convenience sampling method. Totally, 25 pregnant and lactating mothers were selected randomly from the area by purposive sampling technique. The pregnant women were selected from Private hospitals of Erode randomly.

2.6 Collection of Data

The data for this study was collected using formulated interview schedule. It consists of general information such as name, age, class, family type, family size, parent's educational status and the area of living and anthropometrical information. It also includes dietary habits such as number of meals per day, type of diet and food frequency. The interview schedule was developed by interviewer to collect on data such as breastfeeding practices and pattern, awareness of breast milk bank through personal interview method in order to access the knowledge of galactagogue rich foods.

2.7 Imparting Nutrition Education

Nutrition education for pregnant and lactating women and awareness program were given to pregnant and lactating women in groups. The effective tools used for nutrition education includes- Awareness video, Slideshow which comprises of PowerPoint presentation of WHO recommendation of breastfeeding, benefits of breastfeeding to mother and baby, importance of colostrum and galactagogue rich food and recipes. Pamphlets were also distributed which consists of foods to be included while breastfeeding and galactagogue rich

recipes. A Menu plan for five days menu which includes one low-cost menu was formulated to lactating women and were asked to adapt the menu planned.

3. Results and Discussion

3.1 Sociodemographic Characteristics

Regarding the sociodemographic characteristics (Table 2), majority (78%) of selected lactating women belonged to the age group of 20-30 years, and the infants belonged to the age group of 6-12 months. About 68% belonged to nuclear family. With respect to educational status majority (56%) were postgraduates. Considering the Body Mass Index classification majority of the selected lactating women (52%) were overweight.

3.2 Dietary Pattern and Health Status

On considering the dietary pattern of selected lactating women, vast majority (68%) were non-vegetarians and 48% of selected lactating women drank three litres of water per day. With respect to food consumption outside home majority (44%) of selected lactating women consumed food outside home on rare basis.

Table 2. Sociodemographic characteristics of selected lactating women

Variable		Number	Percentage %
Age in years (lactating women)	20-30	18	72
	30-40	7	28
Age in months (Infants)	0-6 months	9	36
	6-12 months	16	64
Educational qualification	SSLC	-	-
	HSC	2	8
	Undergraduates	9	36
	Postgraduates	14	56
Type of family	Nuclear	17	68
	Joint	8	32
BMI Classification	<18.5 (Underweight)	1	4
	18.5-24.9 (Normal)	8	32
	25-29.9 (Overweight)	13	52
	30-34.9 (Obesity class I)	2	8
	35-39.9 (Obesity class II)	1	4
	>40 (Obesity class III)	-	-
Total		25	100

Table 3. Dietary pattern and Health status of selected lactating women

Variable		Number	Percentage %
Type of diet	Vegetarian	5	20
	Non-vegetarian	17	68
	Ova-vegetarian	3	12
Water intake per day (in litres)	2L	10	40
	3L	12	48
	More than 3L	3	12
Food consumption outsidehome	Weekly	8	32
	Monthly	6	24
	Rarely	11	44
	6 hrs	11	44
	<6 hrs	8	32
Physical activity	Yes	16	64
	No	9	36
Medical problem	Gestational diabetes	6	24
	Thyroid	2	8
	Ulcer	2	8
	Anemia	2	8
	Digestion issues	1	4
	None	12	48
Total		25	100

Regarding the health status (Table 3), majority (44%) of selected lactating women slept for 6 hours daily and majority (64%) of selected lactating women were engaged in physical activity such as walking and exercises in their daily routine. The medical history of the selected lactating women revealed that 48% of selected lactating women did not suffer from any of the medical problem.

3.3 Knowledge of Breastfeeding Practices and Awareness of Galactagogues

Regarding the knowledge of breastfeeding practices (Table 4) majority of (76%) of selected lactating women were aware of colostrums and did not have any difficulties in breastfeeding their infants. With respect to exclusive breastfeeding majority of 52% of selected lactating women exclusively breastfed their infants up to six months. Considering breastfeeding pattern majority (80%) breastfed their infants whenever they demand, and majority (88%) of selected lactating women did not attend

any breastfeeding class. With respect to mode of feeding majority of (60%) selected lactating women breastfed their infants directly.

Considering the awareness of galactagogues majority (60%) of selected lactating women were not aware of the term galactagogues, and majority (80%) were not aware of preparing galactagogues recipes. Majority of the selected lactating women (52%) were not aware of commercial galactagogues and about 80% of selected lactating women did not consume any commercial galactagogues.

3.4 Impact of Menu on Milk Production

About 80% of selected lactating women followed the suggested menu, and majority (80%) experienced changes in breastmilk flow after the menu (Table 4). With respect to feeding pattern after following the planned menu, majority (60%) (Table 5) of selected lactating women experienced that their feeding pattern had increased much after following the menu.

Table 4. Knowledge of breastfeeding practices and awareness of galactagogues

Variables		Number	Percentage %
Knowledge about colostrum	Yes	19	76
	No	6	24
Breastfeeding difficulties	Yes	9	24
	No	16	76
Exclusive breastfeeding practices	Yes	13	52
	No	12	48
Breastfeeding pattern	On infant demand	20	80
	3-4 times a day	3	12
	Every 1 hr	2	8
Breastfeeding class experience	Yes	3	12
	No	22	88
Mode of breastfeeding	Directly	15	60
	Pumped milk	5	20
	Both	5	20
Awareness about galactagogues	Yes	10	40
	No	15	60
Awareness about galactagogue recipes	Yes	5	20
	No	20	80
Knowledge of commercial galactagogue	Yes	12	48
	No	13	52
Consumption of commercialgalactagogue	Daily	2	8
	Weekly	3	12
	Monthly	-	-
	None	20	80
Total		25	100

3.5 Organoleptic Evaluation of Galactagogue Rich Recipes

Galactagogue rich recipes such as galacta paratha, galacta tea, galacta pancake and galacta omelette was organoleptically evaluated (Table 6) by the 25 panel members, and the mean scores are presented in Table 6. Among the four galactagogues rich recipes galacta paratha received highest the score and it is highly acceptable by the panel members and hence, the galacta paratha was formulated with three variations are presented in Table 7.

Table 6 reveals that galacta paratha was highly acceptable and received highest score compared to other galactagogue

rich recipes, and from Table 7 it is noted that among the three variations, galacta paratha-variation 3(V3) received the highest overall acceptability score when compared to (V1) and (V2) because it received the maximum score for the appearance, colour, taste and texture.

3.6 Nutrient Calculation of Prepared Galactagogue Rich Recipes

The nutrient content of the prepared galactagogue recipes were calculated using Ntutive software. It reveals that nutrient content of galacta paratha (100g) was higher compared to other galactagogue rich recipes (tea, pancake and omelette) and presented in Table 8.

Table 5. Assessment of milk production after providing 5 days lactating menu

Variables		Number	Percentage %
Details on follow up of lactating menu	Yes	20	80
	No	5	20
Changes experienced in breastmilk flow	Yes	20	80
	No	5	20
Frequency of feeding pattern after prescribed menu	Increased much	15	60
	Increased slightly	5	20
	Same as before	5	20
Total		25	100

Table 6. Mean acceptability of galactagogues rich recipes

Criteria	Mean±Standard Deviation			
	Galacta Paratha	Galacta Tea	Galacta Pancake	Galacta Omelette
Appearance	8.8±0.40	8.28±0.45	8±0.81	7.56±0.82
Colour	8.6±0.48	7.56±0.49	7.84±0.74	7.48±0.82
Taste	8.84±0.36	7.9±0.65	7.80±0.69	7.44±0.94
Flavour	8.64±0.48	8.16±0.78	8±0.63	7.6±1.01
Texture	8.64±0.48	8.08±0.64	7.04±0.78	7.4±0.5
Overall acceptability	8.6±0.20	7.9±0.33	7.7±0.42	7.3±0.31

Table 7. Mean acceptability of galacta paratha

Criteria	Mean± Standard Deviation			F value
	V1	V2	V3	
Appearance	8.16±0.61	7.92±0.68	8.56±0.49	6.87 ^s
Colour	7.92±0.56	7.68±0.67	8.44±0.49	10.67 ^s
Taste	7.68±0.61	8.12±0.58	8.64±0.48	17.436 ^s
Texture	7.40±0.50	7.60±0.50	8.64±0.47	44.918 ^s
Overall acceptability	7.78±0.40	7.82±0.25	8.57±0.23	50.583 ^s
Groups compared	V1 and V2	V2 and V3	V1 and V3	-
t value	1.300**	5.81**	4.79**	-

^sSignificant at 1% level

3.7 Nutrient Calculation of Formulated Menu for Lactating Women

The nutrient calculation of suggested lactating menu for five days was calculated using Nutrive software with

respectively to RDA 2020, which is represented in Table 9. It reveals that all the suggested menu, including low-cost menu meet the Recommended Dietary Allowances 2020. By following the formulated menu plan, lactating women had adequate milk production.

Table 8. Nutrient calculation of prepared galactagogue rich recipes

Nutrients per100g	GalactaParatha	Galacta Tea	GalactaPancake	GalactaOmlette
Energy(kcal)	221.82	16.33	116.26	86.66
Protein(g)	9.08	0.57	5.43	8.10
Fat(g)	4.78	0.55	4.29	4.21
Iron(mg)	2.69	0.84	1.28	1.27
Calcium(mg)	65.85	2.72	40.32	44.50
Vitamin A(μ g)	77.23	0.45	0.27	33.45
Fibre(g)	5.38	2.09	0.96	0.78
Carbohydrates(g)	35.20	2.72	13.84	4.46

Table 9. Nutrient calculation of formulated menu for lactating women

Nutrients	RDA 2020	Day1 (Low cost)	Day 2	Day 3	Day 4	Day 5
Energy(kcal)	2260	2270.38	2377.46	2347.85	2424.41	2317.85
Protein(g)	62.6	81.02	81.24	76.77	66.42	75.63
Fat(g)	30	63.54	67.08	66.24	68.67	65.41
Calcium(mg)	1200	1277.16	1277.74	1222.43	1345.85	1500.71
Vitamin A(μ g)	950	1200 μ g	1467.05	1197.0	1176.28	1183.09
Iron(mg)	23	33.88	26.65	24.60	25.25	25.16

4. Conclusion

The current study concluded that the majority of selected lactating women were between the ages of 20-30 years and infants belonged to age group of 6-12 months. Predominantly most of the subjects were educated. All the selected lactating women were residing in urban locality. In view of dietary patterns majority 68% of selected lactating women were non-vegetarian, 20% of them were pure vegetarians and the remaining 12% were ova vegetarians. Regarding breastfeeding difficulties, majority of 76% of selected lactating women does not have any difficulties in breastfeeding their infants and remaining 24% had faced difficulties during breastfeeding. Considering the awareness about galactagogue, majority 60% of selected lactating women were not aware and rest 40% of them were aware of galactagogues. As far as feeding pattern is concerned, 60% breastfed their infants directly, 20% of them feed with the help of pumped milk and 20% of them breastfed both directly and by use of pumped milk. Majority (60%) of selected lactating women experienced that their feeding pattern is improved much after following prescribed menu.

Among the formulated galactagogue rich recipes, galacta paratha received maximum score in overall acceptability and it was accepted by the lactating mothers due to taste and texture. It also shows that nutrients present in galacta paratha were higher compared to other galactagogue rich recipes (tea, pancake and omlette). Lactating mothers can include galacta paratha as breakfast recipe.

5. References

- Hemalatha J, Jahan A. Role of Lactagogue in milk production. 2021; 1(5):74–5.
- World Health Organisation Infant and Young Child Feeding. WHO; 2018. Available from: <http://www.who.int>
- United Nations Children's Fund (UNICEF). The state of the World's Children 2014 in numbers: Every child counts, Nueva York; 2014.
- Victora CG, Bahl R, Barros A, França G, Horton S, Krasevec J, *et al.* Breastfeeding in the 21st century: Epidemiology, mechanism, and lifelong effect. 2016; 387:475-90. [https://doi.org/10.1016/S0140-6736\(15\)01024-7](https://doi.org/10.1016/S0140-6736(15)01024-7)
- Available from: <http://worldbreastfeedingweek.org/>