

## Original Article

# Effect of a Galactagogue Herbal Tea on Breast Milk Production and Prolactin Secretion by Mothers of Preterm Babies

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### ABSTRACT

**Background and Objectives:** Poor breast milk production is the most frequent cause of breastfeeding failure in preterm babies. The aim of our study is to evaluate the effect of herbal tea mixture containing stinging nettle (Natal, Hipp) on breast milk production and serum prolactin levels of mothers, and weight gain of preterm babies. **Materials and Methods:** We enrolled mothers and their babies who were less than 37 gestational week and less than 2000 g, fed with orogastric tube without any contraindication of enteral feeding in neonatal intensive care unit between November 2010 and June 2011. The mothers of treatment group ( $n = 32$ ) were consuming commercially available herbal mixture tea for 1 week. The mothers control group ( $n = 21$ ) received only the same advice on supportive measures as group I. Mothers in the placebo group ( $n = 32$ ) were given fruit tea for 1 week. The daily breast milk production of mothers and weight gain of preterm babies were recorded. Also, serum prolactin levels of the mothers were measured. **Results:** Increase of the milk production from the first to the seventh day was more prominent in mothers using herbal tea mixture. Increased rate in the amount of milk was 80% in the treatment, 34.3% in the placebo and 30% in the control group ( $P = 0.000$ ). There was no statistically significant difference in weight gain of babies between the two groups, due to formula feeding in case of insufficient breast milk. Serum prolactin levels of the mothers at the beginning and on the seventh day showed no significant difference. **Conclusions:** In mothers with premature babies and who are treated in neonatal intensive care unit, consumption of galactagogue herbal tea will increase lactation and prevent lack of human milk without any adverse effect.

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**KEYWORDS:** galactagogue, human milk, premature babies

## INTRODUCTION

Breast milk is the ideal form of nutrition for the infants in the first 6 months of life as it provides all nutrients that baby needs in order to grow healthy.<sup>[1]</sup> Beyond the neonatal period, continuing advantages of breastfeeding such as lowered prevalence of infection, diabetes, cardiorespiratory disorders, obesity, and allergic diseases make it an invaluable source of feeding.<sup>[2-5]</sup> Because necrotizing enterocolitis develops more commonly in premature babies fed with formula, it is getting further important to nourish these babies with human milk.<sup>[6]</sup> However, mothers of preterm babies often have difficulty in providing adequate

milk production. Several factors including keeping babies away from mothers, feeding with orogastric tube, anxiety of having a premature baby, and lack of stimulation of suckling may interfere with adequate milk output.<sup>[7]</sup> Therefore, most of the premature babies are deprived of maternal milk. In this situation, every effort to help mothers to establish adequate lactation is crucial for the premature infant's health.

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Galactogogues are substances that thought to assist in the initiation, continuation, or augmentation of breast milk production.<sup>[8,9]</sup> They include pharmaceutical agents and herbal supplements. In Europe and USA, licensed drugs with galactogogue effect (metoclopramid, sulfuride, domperidon, and chlorpromazine) and exogenous hormone treatments (thyroid and growth hormone) are widely used.<sup>[9-14]</sup> Other than drugs, more than 30 kinds of herbs are described in the literature.<sup>[8,13,15,16]</sup> There are reports in the literature showing that stinging nettle is one of the essential galactogogue in herbs.<sup>[17-19]</sup> Commercially available herbal tea mixture (Natal, Hipp) contain 1.0% of stinging nettle and six other herbs (melissa, caraway, anise, fennel, goat's rue, and lemon grass). It is sold at pharmacies with the permission of Ministry of Agriculture. However, there is no research on galactogogue effect on mothers of premature babies of this plant alone or in different herbal mixture preparations. The aim of our study is to evaluate the effects of herbal tea mixture with stinging nettle on daily milk production and serum prolactin levels of mothers, and weight gain of preterm babies.

## MATERIALS AND METHODS

This is a randomized controlled study [Figure 1]. A total of 155 premature infants with less than 37 weeks of gestation and weighing under 2000 g were admitted to the neonatal intensive care unit between January 2010 and June 2011. Newborns with congenital anomaly and acute problems such as pneumonia, sepsis, necrotizing enterocolitis were not involved in the study ( $n = 47$ ). Mothers with chronic disease, cigarette smoking, consuming alcohol, and any galactogogue drug or herb were not involved in the study ( $n = 10$ ). Three parents refused to be included in the study ( $n = 3$ ). A total of 95 preterm infants with less than 37 weeks of gestation and weighing under 2000 g who were enterally fed with orogastric tube and having no contraindication were 1-1 randomized into the three groups. All infants were fed with 150 mL/kg oz. in each 3 hours.

All mothers received the same advice on supportive measures. The treatment group ( $n = 36$ ) were recommended to consume commercially available herbal mixture tea (Natal, Hipp) containing 1.0% stinging nettle and six other different herbs. The control group ( $n = 25$ ) received only the same advice on supportive measures as group I. The placebo group ( $n = 34$ ) was given fruit tea containing hibiscus, rosehip fruit powder, lemon aroma, orange aroma, apple aroma, and vitamin C. Herbal tea in packages of 8 g granules was advised to be taken in a glass of water, twice a day by mothers of the treatment group. This herbal tea's ingredients are stinging nettle

(*Urtica dioica* L.), Melissa (*Melisa officinalis* L.), caraway (*Carum carvi* L.), anise (*Pimpinella anisum*), fennel (*Foeniculi vulgare* Mill), Goat's Rue (*Galega officinalis*), and lemon grass (*Cymbopogon citratus*). After the breastfeeding training, mothers who accepted milking in recommended way and were eager to breastfeed visiting hospital daily were enrolled. Mothers were told that tea was herbal and helpful to increase milk production. No special beverage was offered to group II mothers other than water. The same nurse consulted all mothers about milking and breastfeeding. They agreed to pump their milk eight times a day with an electrical pump (Medela) and record the amount of milk to a given form, during a week period. In every control, mothers were asked about adverse effects (gastrointestinal discomfort, allergic reactions, urticaria, pruritus, edema, and decreased urine volume) related to tea. Age, educational and socioeconomic status, history of smoking, grvida of the mother, delivery mode, gestational and postnatal age, sex, birthweight, and current weight of the baby were recorded. Four mothers from the treatment group, four mothers from the control group, and two mothers from the placebo group were lost to the follow-up.

At the beginning and on the seventh day of the trial, 2 mL of blood was drawn from mothers. Samples were centrifuged and kept in  $-300^{\circ}\text{C}$  until chemical analysis. After study was completed, prolactin levels were measured on Advia Centaur XP model analyzer (Siemens) with chemiluminometric method and reported in terms of nanograms per milliliter. The ethics committee of the Zeynep Kamil Maternity and Children's Training and Research Hospital approved the study. Written informed consent was obtained from all mothers before the study enrollment. Statistical analysis was conducted by using SPSS 13.0. One-way ANOVA and chi-square tests were performed for continuous and categorical variables, respectively.

## RESULTS

Demographic and clinical features of mothers and babies are given in Table 1. There was no statistically important difference between the groups in terms of age, educational status and grvida of mothers, birth weight, gestational age, sex, and postnatal age of babies. The milk production data in the three groups is summarized in Table 2 Increase in rate in the amount of milk was 80% in the treatment, 34.3% in the placebo and 30% in the control group ( $P = 0.000$ ) [Table 2]. During the trial period, there was no statistically significant difference in weight gain of babies between the three groups [Table 2]. Serum prolactin levels of the mothers at the beginning and the seventh day showed no significant difference

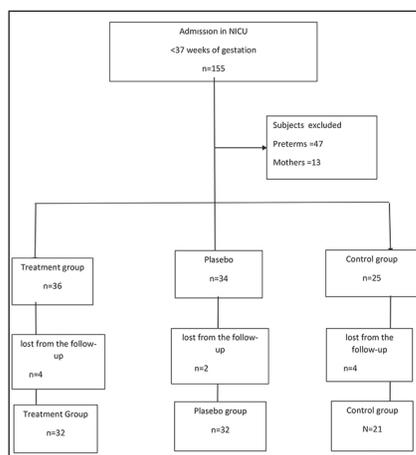
**Table 1: Demographic features of mother and babies of the study population**

	Plasebo group <i>n</i> =32	Control group <i>n</i> =21	Treatment Group <i>n</i> =32	<i>p</i>
	Mean(min-max)	Mean(min-max)	Mean(min-max)	
Mothers	29.7	27.7	28.8	0.55
Age(year)	(22-41)	(19-36)	(18-40)	
Mothers	7.7	7.5	8.6	0.48
education	(4-16)	(5-14)	(0-17)	
Mothers	1.1	1.1	0.97	0.73
gravida	(0-3)	(0-3)	(0-3)	
Birth weight (gr)	1301	1258	1281	0.90
	(600-2020)	(820-1930)	(615-2210)	
Gestational age (week)	29.1	29.2	30.1	0.57
	(24-34)	(24-36)	(26-36)	
Postnatal age (day)	14.1	15.8	16.3	0.60
	3-39	4-40	4-47	

**Table 2: Breast milk production and serum prolactin levels of mothers, and weight gain of their preterm babies**

	Placebo group	Control group	Treatment group	<i>p</i>
	Mean (min-max) <i>n</i> =32	Mean (min-max) <i>n</i> =21	Mean (min-max) <i>n</i> =32	
Weights of babies				
1 st day (g)	1396(855-1986)	1384(1006-1803)	1388.48(920-2055)	0.98
7 th day (g)	1553 (1010-1995)	1551 (1110-2165)	1550 (1040-2200)	0.99
Difference between 1st and 7th day (ml/day)	183.3 (67-690)	181.0 (40-395)	161.0 (10-305)	0.63
Milk volüm				
1st day(ml/day)	355.6 (50-1010)	323.8 (50-890)	320.2 (10-1025)	0.81
7thday(ml/day)	477.7 (140-1200)	422.6 (40-1305)	577.5 (60-1250)	0.22
Difference between 1st and 7th day (ml/day)	122.1 (100-520)	100.2 (-60-415)	261.0 (10-954)	<i>p</i> 1=0.003 <i>p</i> 2=0.002
Prolactin				
1 st day (ng/ml)	62.2(4.35-266.83)	31.6(5.72-86.10)	58.2(3.31-257.85)	0.15
7 th day (ng/ml)	49.4(4.70-148.90)	37,7(4,88-111.63)	51.7(6.12-392.50)	0.68
Difference between 1st and 7th day (ng/ml)	-2.7(-200-146)	0.77(-58-66)	-9.2(-151-332)	0.86

*p*1 = placebo group/treatment group, *p*2 = control group/treatment group.



**Figure 1:** Distribution of the patients included in the study.

[Table 2]. None of the participants complained about adverse effects related to tea.

## DISCUSSION

Efficacy of mixture of herbal tea on daily milk production, serum prolactin level of mothers who had premature babies, and weight gain of newborns were compared. Herbal tea containing stinging nettle, caraway, anise, fennel, goat's rue, and lemon grass increased the daily milk production of mother. However, it did not show any effect on serum prolactin level of mothers and weight gain newborns. Contribution of the present study to the literature is the demonstration of increase in breast milk by herbal galactogogue in the mothers of preterm infants followed up in neonatal intensive care units,

without any adverse effect on mothers and infants. A shortfall of the study is not to be conducted as a double-blind trial.

Numerous herbal products including fenugreek, blessed thistle, milk thistle, goat's rue, marshmallow, fennel, torbangun, nettle, and black seed are believed to be galactogogue.<sup>[9]</sup> However, majority of studies performed with herbs, herbal medicines or herbal galactogogues have been conducted with an insufficient number sample and without designed well.<sup>[20,21]</sup> There are four reviews in the literature regarding galactogogues; all of which have reported that galactogogues are effective and useful during lactation. However, as a result of these studies the use of galactogogues has not routinely been recommended and the need for further better designed and executed studies have been underlined. These reviews evaluated effect of herbal galactogogues on term babies.<sup>[8,15,22,23]</sup> It was reported in the study by Peila *et al.*<sup>[24]</sup> that milk thistle'nin (*Silybum marianum*) did not increase breast milk in preterm infant under 32 weeks of gestation compared with placebo. Whereas, in our study we demonstrated that Hipp Natal increased breast milk compared with placebo and to the controls in the mothers of infants under 37 weeks of gestation.

Multiple studies have shown that there is poor correlation between serum prolactin level and milk production.<sup>[25-27]</sup> Thus, studies that rely on this measure alone do not provide usable evidence of galactogogue activity.<sup>[8,25-27]</sup> As in many studies, despite no increment in prolactin levels, augmentation of daily milk production shows that there are alternative mechanisms affected by galactogogues. In a study by Liu *et al.* on rats, herbal galactogogues were shown to regulate function and expression of the aquaporins receptors of mammary glands, increasing milk secretion.<sup>[28]</sup> In our study, we found that effect mechanism of galactogogues were not correlated with prolactin.

It is because infants were supplemented with formula feeding, as the amount of human milk provided by mothers did not meet the daily milk requirement of babies. It is known that premature formulas and supplemented human milk have higher amount of calories than human milk. Therefore, weight gain was found to be similar among preterm infants during the study period.

## CONCLUSIONS

We believe that after breastfeeding consultation to mothers whose babies are premature and treated in neonatal intensive care unit; consumption of galactogogue herbal tea will increase lactation and prevent the lack of human milk without any adverse effects.

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Nil

## Conflicts of interest

There are no conflicts of interest

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