

## Original article

## Effect of fenugreek on breast milk production and weight gain among Infants in the first week of life

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## ABSTRACT

**Introduction:** Breast feeding is the best nutrition for infants. Most of the postnatal mothers face the problem of insufficient breast milk which affects the health and well-being of an infant.**Objective:** The aim of the study was to evaluate the effect of fenugreek on enhancing breast milk production and weight gain of infants in the first week of life.**Methods:** An experimental study with two groups ie, experimental and control group was conducted in a maternity centre, Bangalore. Sixty postnatal mothers were selected for the study and thirty each were randomly assigned to both experimental and control group. 7.5 g of fenugreek was soaked overnight and the subjects of experimental group were administered with this fenugreek water, daily once in the morning for a period of 7 days. The frequency of urination and weight of the babies both in experimental and control group were assessed and compared on first, third, fifth and seventh day.**Results:** There was an associate improvement in the signs of breast milk sufficiency within the fenugreek subjects when compared to the control group. The impact of fenugreek on breast milk was evident on the frequency of urination and weight gain in infants throughout their initial week of life.**Conclusions:** The study concluded that fenugreek enhances breast milk production among postnatal mothers and facilitates birth weight of infants within the initial week of life.

## 1. Introduction

Breast milk is considered to be an ideal and the optimal food source for newborns through one year of age.<sup>1</sup> It contains everything the baby needs for the first six months of life. The composition of breast milk even changes according to the baby's changing needs.<sup>2</sup> Breastfeeding promotes healthy weight gain and helps prevent childhood obesity. Lactation failure due to inadequate breast feeding or insufficient breast milk production can cause several problems in the initial days of life. The mortality and morbidity risks of infants who receive other nutrition are four times more than infants who are breast fed.<sup>3</sup>

According to the World Health Organization (WHO) and UNICEF 1.5 million babies die every year because they were not breastfed. Many more millions of babies suffer from infectious diseases and malnutrition, never reaching their full potential because they were bottle-fed.<sup>3,4</sup> The positive trend in Exclusive Breast Feeding in India is promising and provides a much-needed impetus for more concerted action on an area of nutrition where success seems possible.

One of the most joyous occasions that ever happen to a mother is

breast feeding her baby. Some mothers are fortunate to enjoy the opportunity but others who wish to breast feed their newborns are unable to do so mainly due to deficient support from the health team as well as their family. Studies show that India ranks low on breast feeding practices. Less than one fourth (21%) of children were breastfed within one hour of birth across the different districts of India.<sup>5</sup> A large number discontinue breastfeeding, because milk synthesis is poor or simply stops. The mother's inability to give milk causes huge feelings of inadequacy, grief, depression in mothers and redoubled health risks to the baby.<sup>6</sup> Women have tried many measures to overcome this problem which prevails all around the world. The practices include use of herbal tea with fenugreek and dates' syrup and many more.<sup>6,7</sup>

Fenugreek is one of the most popular galactogogues commonly used by the lactating mothers. The seeds of fenugreek stimulate hormone precursors leading to enhancement in the milk production. It is also thought that the increase in breast milk could be due to the presence of phytoestrogens and diosgenin contents in fenugreek.<sup>6,8,9</sup> Fenugreek is a herb from the pea family and is most popularly used herbal galactagogue throughout the world.<sup>8–12</sup> It is enlisted in the FDA's list of herbs

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usually considered safe.<sup>13</sup> It has been found that fenugreek is a potent stimulator of breast milk production that appears to be safe for mother and baby.<sup>14</sup> It is relatively easy to obtain, inexpensive and requires no major preparation. There has been no formal research on fenugreek, but an increasing amount of observational and anecdotal evidence points to its efficacy.<sup>13</sup>

The objectives of the study were.

1. To determine the effect of fenugreek on breast milk production in postnatal mothers as evidenced by frequency in urination among infants.
2. To determine the effect of fenugreek on weight gain among infants in experimental group.
3. To compare the effect of fenugreek on breast milk production and weight gain among infants in experimental and control groups.

## 2. Methodology

An experimental design was used to accomplish the aim to evaluate whether maternal consumption of fenugreek had any effects on the breast milk production and thereby change in pattern of weight gain and frequency in urination among infants in first week of life. This study was approved by the Institutional Ethical Committee. The dose of fenugreek was determined by reviewing the previous literatures, and the approval from the Department of AYUSH (Ayurveda, Yoga & Naturopathy, Unani, Siddha and Homeopathy).

The 60 postnatal mothers who had full term delivery and met the inclusion criteria were selected for the study from the Maternity Health Center located in an urban area of Bangalore. Statistical power analysis was calculated to determine the required sample size where power = 80%,  $\alpha = .05$ , level of confidence = 95%. Qualified participants were randomly assigned to experimental and control group, 30 mothers in each group by drawing of sequentially numbered sealed envelopes that contained a computer generated randomization code.

Inclusion criteria consisted of postnatal mothers a) of 0–1 week, b) with term healthy infants, c) with poor milk supply as reported to the health professionals d) willing to participate in the study. Exclusion criteria included Mothers with; a) documented mastitis, b) Breast engorgement c) inverted nipples, d) currently consuming any other herbals used to induce milk production, e) clinically ill, f) who had breast surgery. Infants were also assessed for poor sucking reflex.

The written consent for the study was obtained from all the participants after explaining to them about the study purpose and the procedure. Potential participants and those who met the criteria were approached individually. A code system was assigned to all the study participants to maintain the confidentiality of the data.

The demographic, obstetric and infant data were collected before the intervention. The sufficiency of breast milk was assessed among postnatal mothers using a checklist which include the number of breast feeding per day, complains of lack of breast milk and excessive cry of the newborn. The mothers in the experimental group were administered with water of 7.5 g of fenugreek soaked overnight once daily in the morning for a period of 7 days. The control group received routine care without any interventions. The number of wet diapers of the infant was noted and weights of the infants were recorded in a calibrated infantometer after changing the diaper in the morning at the fixed time. The frequency of urination and weight of the babies both in experimental and control group were compared on first, third, fifth and seventh day. Follow up forms were given to the mothers to note the frequency of urination in the coming 7 days.

The obtained data was entered into Microsoft excel and was statistically analyzed using statistical package for social sciences (SPSS) software. In this analysis, the independent variable was defined as fenugreek and dependent variables were infant weight and frequency of urination. The serial changes in frequency of urination and change in weight over the days were analyzed using ANOVA for repeated

**Table 1**  
Baseline Characteristics of the postnatal mothers( $n_1 = 30, n_2 = 30$ ).

Characteristics	Experimental group ( $n_1 = 30$ )		Control group ( $n_2 = 30$ )	
	Frequency	Percentage (%)	Frequency	Percentage (%)
<b>Age of the mother</b>				
18–21 Years	19	63%	13	43%
22–24 Years	6	20%	11	37%
25 Years and above	5	17%	6	20%
<b>Parity of mother</b>				
Primipara	20	67%	23	77%
Multi Para	10	33%	7	23%
<b>Educational status</b>				
No formal education	10	33%	11	37%
Primary education	8	27%	5	17%
High School	7	23%	8	26%
Higher Secondary	5	17%	5	17%
Graduate & Above			1	3%
<b>Occupation</b>				
Home maker	29	97%	26	86%
Self Employed			2	7%
Private Employee	1	3%	2	7%
<b>Religion</b>				
Hindu	20	67%	21	70%
Muslim	10	33%	9	30%
<b>Type of family</b>				
Nuclear	13	43%	11	37%
Joint	17	57%	19	63%
<b>Mode of Delivery</b>				
Normal Vaginal	29	97%	25	83%
Caesarean section	1	3%	5	17%
<b>Sex of the Baby</b>				
Male	19	63%	21	70%
Female	11	37%	9	30%

measure. Data was tested for sphericity using Mauchly's Test of sphericity. Since the Mauchly's test was significant, it indicated violation of assumption of sphericity; therefore we tend to use Greenhouse-Geisser and adjustments. The univariate approach was used to analyze within subject effects. If there was a notable interaction between the group and within subject factors (significant treatment  $\times$  time interaction), the simple effect analysis of between - group factors for all time level using multivariate analysis of variance model was used. To be identified as significant, values of  $P \leq 0.05$  was taken.

## 3. Results

The baseline characteristics of study subjects are shown in Table 1. The average age of the mothers in both the experimental and control group was 18–21 years. With regard to parity of mothers, 67% in experimental group and 77% control group were primi mothers. About 33% of mothers in experimental and 37% in control group had no formal education. The Majority of them were homemakers ie, 97% in experimental group and 87% in control group. Most of them were Hindus and belonged to joint families. The mode of delivery is concerned; 97% mothers in experimental group and 83% in control group had normal vaginal deliveries. The results also indicate that 63% of babies in experimental group and 70% in control group were males.

The data represented in Table 2 shows the baseline characteristics of infants. The birth weight of 83% of the infants in experimental group was less than 2.5 Kilograms, whereas in control group 50% of the babies were between 2.5 and 3 Kilograms. With regard to the number of breast feeding per day, majority of the mothers in both the groups ie, 60% in experimental group and 47% in control group were fed 3–4 times per day. An equal percentage (50%) of the babies in experimental group had 2–3 and 4–7 times urination per day. Whereas 53% of the infants in control group had frequency of urination as 4–7 times per

**Table 2**  
Baseline characteristics of the infants.

Characteristics	Experimental group (n <sub>1</sub> = 30)		Control group (n <sub>2</sub> = 30)	
	Frequency	Percentage (%)	Frequency	Percentage (%)
<b>Birth weight of the infant</b>				
<2.5 Kg	25	83	11	37
2.5 Kg - 3 Kg	5	17	15	50
>3 Kg	–	–	4	13
<b>No. of breast feeding/day</b>				
1-2times per day	4	13	2	7
3 - 4 times per day	18	60	14	47
5 - 6 times per day	5	17	10	33
7 - 9 times per day	3	10	4	13
<b>Urination in infants</b>				
2 - 3 times per day	15	50	14	47
4 - 7 times per day	15	50	16	53
<b>Initiation of breast feeding</b>				
Within Half an hour	–	–	5	17
Within One hour	29	97	25	83
More than 1 hour	1	3		

day. Most of the mothers had initiated breast feeding within 1 hour of delivery.

Table 3 shows that the mean score of experimental group (6.1) was higher than the control group (4.4). The obtained 't' value (6.814) is greater than the table value at 0.05 level of significance. Hence it was inferred that fenugreek had an effect on breast milk production which was evidenced by the increase in frequency in urination among infants.

Though there was no significant difference noted in overall weights of infants of both experimental and control group as shown in Table 4, the serial changes in the mean weights among infants in experimental and control groups indicate that there was a significant treatment time interaction. Tables 5 and 6 show the weights of infants on 1st, 3rd, 5th and 7th day. The obtained p-value (0.001) is significant at the 0.05 level in the experimental group whereas no significance was noted in the control group. This concludes that the infants in the experimental group had shown a significant increase in weight over the days.

Fig. 1 depicts the frequency of urination among the experimental group significantly increased from day I to day 5. The mean score was less on the 7th day. There was no significant difference noted in frequency of urination in control group over the days. Thus, it is inferred that increased frequency in urination of the infants in the first week is due to increased breast milk production among mothers by fenugreek consumption.

Fig. 2 indicates that there was significant increase in weight among infants of experimental group from day I to day 5. The mean score was less on the 7th day. There was no significant difference noted in weight in control group over the days. Thus, it is inferred that increase in weight of the infants in the first week is due to increased breast milk production among mothers by fenugreek consumption.

**4. Discussion**

The effect of fenugreek was determined by monitoring the

**Table 3**  
Comparison between the frequency of urination among groups (n<sub>1</sub> = 30, n<sub>2</sub> = 30).

Frequency of Urination	N	Mean	SD	t-Value	df	Sig. (p-value)
Experimental Group	30	6.1	0.9	6.814	58	0.001*
Control Group	30	4.4	1.1			

Note: \* refers Significant difference at 95% CL.

**Table 4**  
Comparison between weights among the groups (n<sub>1</sub> = 30, n<sub>2</sub> = 30).

Weight infant	N	Mean	SD	t-Value	df	Sig. (p-value)
Experimental Group	30	2.5	0.4	0.914	58	0.365
Control Group	30	2.6	0.5			

**Table 5**  
Comparison between weights of infants over days in experimental group. (n<sub>1</sub> = 30)

Comparison between weight of an infant over days (Experimental Group)	Summary			ANOVA TABLE	
	N	Mean	Std Deviation	Greenhouse-Geisser	
1st day	30	2.2	0.4	Sum of Squares	7.667
3rd day	30	2.3	0.4	df	3
5th day	30	2.6	0.6	Mean Square	3.376
7th day	30	2.8	0.5	F-test	25.170
				Sig. (p-value)	0.001*

\* The mean difference is significant at the 0.05 level.

**Table 6**  
Comparison between weights of infants over days in control group(n<sub>2</sub> = 30).

Comparison between weight of infant over days (Control Group)	Summary			ANOVA TABLE	
	N	Mean	Std Deviation	Greenhouse-Geisser	
1st day	30	2.7	0.6	Sum of Squares	0.492
3rd day	30	2.6	0.6	df	3
5th day	30	2.5	0.6	Mean Square	0.272
7th day	30	2.5	0.5	F-test	2.172
				Sig. (p-value)	0.0810

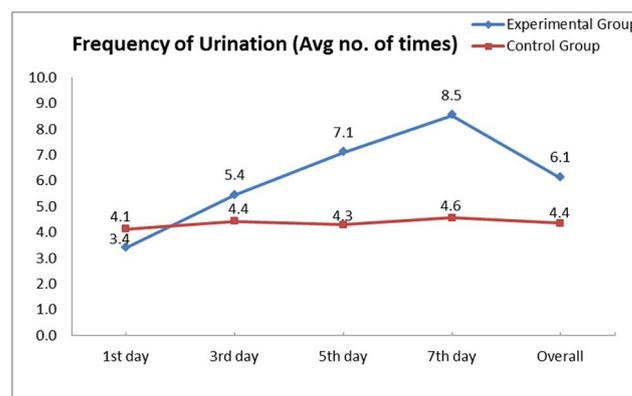


Fig. 1. Frequency of urination among the groups over the days.

frequency in urination and weight of infants in experimental group and was compared with the control group. Several herbal galactagogues have been reported to be useful for nursing mothers. The systematic review done by Mylove Mortel, Supriya D. Mehta on the efficacy of herbal galactagogues, revealed that fenugreek had increased the serum prolactin and oxytocin levels. The effect of fenugreek was also found on the breast milk volume, infant weight and the chemical composition of breast milk.<sup>15</sup>

The improvement in the signs of breast milk sufficiency was evident from our study when compared to the control group. There was a significant increase in frequency in urination and infants' weight which

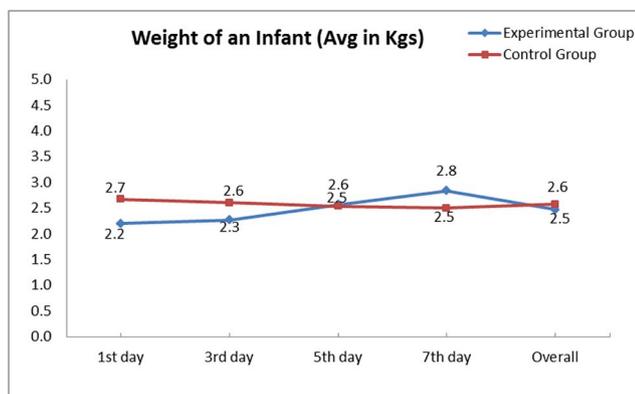


Fig. 2. Weight of infants among the groups over the days.

was identified in the experimental group whereas there was no significant change in the control group. Hence the study concluded that Fenugreek has an effect on breast milk production among postnatal mothers. The similar findings were revealed by a study of **Sim et al.** where the experimental group had shown the improvement in breast milk sufficiency due to the effect of fenugreek seeds.<sup>16</sup>

The findings of our study revealed that the breast milk production increased from day one of administration of fenugreek to postnatal mothers. This was supported by **Huggins and Gabay MP.** Similarly, the study reported that fenugreek was considered as galactagogue plant. An increase in the milk production was noted after 24–72 h among women who consumed fenugreek.<sup>8,14</sup> There were no side effects reported by these mothers.<sup>13</sup>

The amount of weight loss in infants is observed in the first week of life and catch up of birth weight is related to the sufficient and successful intake of breast milk. **Tulikyilmaz C et.al (2011)** observed that when compared to placebo and control groups the supplementation of herbal tea among mothers enhances breast milk production and facilitates the birth weight of infants in early postnatal days.<sup>17</sup> The study findings are in consistent with the results of the present study. Another study by **Srinivas,** also supports the findings of the present study where maternal galactagogue mix seems to be useful in enhancing breast milk production and Prolactin levels in postnatal mothers which facilitated infants' birth weight in early postnatal days.<sup>13</sup>

The results of a study conducted by **Sakka** revealed that the breast milk volume was more on the third postnatal day among mothers of dates and fenugreek groups when compared with the control group. Although the infants in all the groups showed a drop in weight after three days, the infants in the date's and fenugreek group showed an increase in weight on the seventh day.<sup>7</sup> This study supports the findings of present study. Nevertheless, in our study only fenugreek was used as a galactagogue for the experimental group.

The urine output in the experimental group increased with each day. This was evident with the number of times of urination among infants. Whereas the infant's weight in the experimental group had increased from Day I to Day 3 and dropped on Day 5. The significant rise in infants' weight was noted when compared to control group. This could be probably due to weight loss in all infant during the 10 days of birth. Therefore it was concluded that the fenugreek enhances the breast milk production during the early post-partum period. **Vida Ghasemi et.al** has reported the similar findings in their study.<sup>18</sup>

The fenugreek used in the present study had enhanced the breast milk production and this could have attributed to the better weight gain in infants in the fenugreek group. In the study of **Damanik et.al,** the parameters measured were the amount of breast milk production and difference in weight of infants. The results revealed that breast milk production was more in the mothers of *Coleus amboinicus* group than fenugreek, yet fenugreek was recommended as it was cheap and locally available.<sup>19</sup>

There were no reported negative side effects of fenugreek observed in either the mothers or the infants in the experimental group. These results were consistent with the findings of the study of **Vida Ghasemi et.al and Reeder C.**<sup>18,20</sup>

The study explains that the weight gain in infants at the end of the first week could probably be attributed to the increment in the prolactin levels of the breast feeding mothers who were receiving fenugreek which in turn, could have further improved the breast milk production and thereby augmenting adequate nutrition to the child. The overall weight gain and increase in frequency in urination among infants also suggest that there could have been a positive momentum in the Nutritional Status of the infants. The mean body weight gain of the infants belonging to experimental group was appreciably higher than the control group.

In the present study it was evident that the mothers were breast feeding their infants 1 to 2 times or 3 to 4 times per day. During the enquiry only a few postnatal mothers reported that they used other feeds such as formula milk and glucose water as they found that breast milk was not sufficient to their infants. **M Batal et al** also reported that majority of mothers began breast feeding the new-borns after 6 h and sweetened water, formula feeds, herbal tea, orange blossom water and water were the substitutes to the breast milk.<sup>21</sup> This directly contradicts the recommendation of exclusive breast feeding practices. Hence these variables were controlled by advising the mothers to strictly practice exclusive breast feeding. The change in frequency in feeding was not elicited in the present study.

The overall study results indicate that Fenugreek is effective in enhancing the breast milk and thereby increases the weight of the infants especially in the early days of life. The limitations of the study were; insufficient follow-up on postnatal mothers and infants, the uncontrolled dietary intake of fenugreek if any or other diet which could have interfered with the breast milk production.

## 5. Conclusion

Fenugreek, a galactagogue is useful for promoting and increasing breast milk production.

The current study demonstrates that the fenugreek was effective in breast milk production which was observed in the increase in frequency of urination and weight gain of infants during the first week of life. Oral administration of 7.5 g of fenugreek-soaked water daily does not have any observed side effects or malfunctions reported during the period of study. None of the subjects in the fenugreek group reported dislike to the taste nor discontinued the intervention.

The study suggests that the lactating mothers with complaints of insufficient milk may be advised to take fenugreek in the postnatal wards as a routine practice. However, use of fenugreek should never replace lactation evaluation and counseling for the postnatal mother. Further the Nurse lead clinics should be held at a regular basis as an integral component of antenatal and postnatal care to encourage mothers and families for right breast-feeding practices.

Breastfeeding is an important woman's issue, human rights issue, health issue and feminist issue. Breastfeeding empowers women. It provides optimum nutrition to the infant. The experience of the lactation clinic and other lactation practices that use fenugreek will motivate the research necessary to establish more scientific evidence of the herb's effectiveness in increasing milk production.

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