Egyptian Pediatric Association Gazette xxx (xxxx) xxx–xxx

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Contents lists available at ScienceDirect

Egyptian Pediatric Association Gazette

journal homepage: www.elsevier.com/locate/epag

Evaluation of early postpartum fenugreek supplementation on expressed breast milk volume and prolactin levels variation

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A B S T R A C T

Background: The most common reason for the interruption of exclusive breastfeeding is the assumption of insufficient breast milk. Egyptian women have traditionally used fenugreek to increase milk flow and supplementation. However, this practice has not been scientifically evaluated or proved yet.
Objectives: The study aimed to evaluate the effect of the consumption of one of the herbal galactagogues (fenugreek) on expressed breastmilk volume and postpartum prolactin level change.
Methods: The study included 60 healthy mothers whom baby was admitted to Pediatric Ain shams University NICU for more than two weeks and used to express breast milk using manual breast pump. Mothers were divided into two equal groups as following: group 1 included 30 mothers who consumed three times 200 ml of fenugreek tea (50 gm of fenugreek seeds) with eight times breast pump and group 2 included 30 mothers who used breast pump 8 times per day without fenugreek consumption. Total daily volume of pumped breast milk was assessed at day 3, day 8 and day 15. Serum prolactin was withdrawn at day 3 and day 15 at 9 am.
Results: The results showed that the mean breastmilk volume increased earlier (at day 3) in the fenugreek group more than the control group (274.60 ± 46.97 ml, 246.37 ± 46.62 ml respectively $p < 0.005$). Yet at day 8 & 15 the net daily volume showed no significant difference between both groups. Prolactin level was significantly higher on day 3 in group of fenugreek than other group (152.77 ± 18.46 ng/ml versus 134.53 ± 17.35 ng/ml) with no significant difference later on.
Conclusion: Fenugreek consumption affects the early stage of lactogenesis and prolactin level but did not affect the established breastmilk volume or change in prolactin level at later stages so it can be used for mother satisfaction and reassurance in the early stages of lactation.

Introduction

Nutrients play an important role in the functioning and the development of the human body.[1] Breast milk has been accepted as the gold standard of infant nutrition. Although the World Health Organization recommends exclusively breastfeeding for the first six months of life, the adoption of exclusive breastfeeding as the primary mode of providing nutrition to young infants is challenging.[2] The perception of insufficient milk production is the most common worldwide maternal factor of the early cessation of breastfeeding.[3]

Many cultures believe that certain foods increase human milk production during breastfeeding. These foods are believed to have galactagogue properties.[4] Galactogogues are substances thought to assist in the initiation, continuation, or augmentation of breast milk production. They include pharmaceutical agents and herbal supplements. Special food items containing galactagogues are one option for improving human milk and supporting breastfeeding. Many galactagogues, including shatavari, fenugreek, fennel, milk thistle, chaste berry, and goat's rue, are used as herbal medicines and food supplements to improve human milk.[5] Fenugreek (Trigonella foenum-graecum), have been used since ancient times as a herbal galactagogue. Fenugreek is a Greek hayseed originating in the Mediterranean, Southern Europe, and Western Asia. Its seeds contain 50% fiber (30% soluble fiber and 20% insoluble fiber), One hundred grams of fenugreek contains 26.2 g of protein, 5.8 g of fat, 44.1 g of carbohydrate, and 333 kcal. Fenugreek is a natural source of iron, silicon, sodium, and thiamine.[6] Women around the world consume fenugreek seeds to facilitate lactation during the postpartum period. Although the exact mechanism for how fenugreek may work is not fully understood, it was thought that the seed contains hormone precursors that may increase milk production.[7] It is also believed that fenugreek stimulates sweat production and because breasts are modified sweat glands, one hypothesis is that this is how fenugreek may increase milk production.[8] Egyptian traditional galactagogue consumption is still observed today. However few scientific studies describe this practice. This study aimed to evaluate the efficacy of fenugreek as a traditional Egyptian galactagogue in increasing milk volume of expressed breast milk and prolactin level in preterm newborn mothers.

Peer review under responsibility of Egyptian Pediatric Association Gazette.
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https://doi.org/10.1016/j.epag.2018.07.003
Received 25 April 2018; Received in revised form 7 July 2018; Accepted 18 July 2018

Please cite this article as: Abdou, R.M., Egyptian Pediatric Association Gazette (2018), https://doi.org/10.1016/j.epag.2018.07.003

Methods

Study design

This study was a case-control study performed, on 60 healthy mothers whom newborn infants were admitted to Ain Shams University Pediatric hospital Neonatal Intensive Care Unit (NICU) in Egypt for more than two weeks and used to express breast milk using manual breast pump from June 2017 to December 2017. The study was explained to the mother by an expert neonatologist, and lactation consultant before recruitment in the study and they are included after verbal consent was taken.

Enrolled mothers were divided according to fenugreek consumption into cases and control. The case group (fenugreek group) included 30 mothers who consumed three times 200 ml of fenugreek tea (50 gm of fenugreek seeds) with eight times of breast pumping per day while the control group included 30 age-matched mothers who used breast pump eight times per day without fenugreek consumption.

Study participants

Eligibility requirements at screening included: mothers to newborn infants (32 weeks or less gestational age) who were older than 18 years, started pumping within 24 h from birth and were able to follow up daily with the lactation consultant and report the amount and follow instructions accurately.

Exclusion criteria included: a known contraindication to fenugreek, a history of infertility or induction pregnancy, any abnormalities in the breast growth or surgery, a chronic disease as hypertension, diabetes or thyroid dysfunction or any endocrinal disease, a severe nutrition deficiencies or anemia, or a history of allergy from the fenugreek or other food allergies were excluded from the study. Enrolled mothers were discontinued from the study if they withdrew their consent or if they were lost to follow up at any time during the study period.

Study procedures

All mothers were educated on the correct usage of the manual breast pump (medella®) by a lactation consultant, eight times a day during the study period. Enrolled mothers underwent a screening process at baseline that included medical history taking, a clinical examination, regular blood sugar assessment, and answered a diet questionnaire[9] (Appendix 1). Enrolled mothers were then observed for a period of 15 days that included three evaluation time points for breast milk volume; day 3, day 8 and day 15. Mothers were provided with a log book to record the time and volume of pumped milk.

Two mL peripheral blood (PB) samples were obtained from all enrolled mothers at 9 am on day 3 and day 15 of birth. PB samples were processed on the same day of sample collection. A 96-well plate has been pre-coated with anti-Prolactin IgG antibodies. Samples and standards and are added to the wells, where Prolactin in the sample and standards binds to the pre-coated antibody. Added Anti-Prolactin-HRP conjugate binds to the antibody-Prolactin complex. After incubation, the wells are washed to remove unbound material, and TMB substrate was then added which is catalyzed by HRP to produce blue coloration. The reaction was terminated by the addition of a “Stop Solution” which stops the color development and produces a color change from blue to yellow. The intensity of the signal was directly proportional to the amount of Prolactin in the sample, and the intensity was measured at 450 nm.

Statistical analysis

Data were analyzed using statistical package for social science (SPSS) for Windows (version 15.0.1). Means with standard deviations and counts with percentages were used to describe continuous and categorical variables, respectively. Comparisons of continuous variables among groups were made using paired *t*-test. Comparisons between categorical variables were performed using chi-square test. A *p*-value ≤ 0.05 was considered to be significant.

Results

Demographic and baseline characteristics are elaborated in Table 1 below.

The volume of expressed breast milk was significantly higher in the

Table 1
Demographic data of the studied groups.

		Control Group No. = 30	Fenugreek Group No. = 3	Test value	P-value	Sig.
Age of the mother	Mean ± SD Range	24.77 ± 3.59 19–34	23.30 ± 4.09 18–33	1.477·	0.145	NS
Previous location	0 1 2 3	13 (43.3%) 14 (46.7%) 2 (6.7%) 1 (3.3%)	20 (66.7%) 9 (30.0%) 1 (3.3%) 0 (0.0%)	3.905*	0.272	NS
Number of pregnancy	1.00 2.00 3.00	8 (26.7%) 16 (53.3%) 6 (20.0%)	14 (46.7%) 12 (40.0%) 4 (13.3%)	2.608*	0.271	NS
Type of delivery	CS Vaginal	14 (46.7%) 16 (53.3%)	19 (63.3%) 11 (36.7%)	1.684*	0.194	NS
Infant gender	Male Female	15 (50.0%) 15 (50.0%)	12 (40.0%) 18 (60.0%)	0.606*	0.436	NS
Mean age	Mean ± SD Range	22.70 ± 2.88 18–28	22.70 ± 2.88 18–28	0.000·	1.000	NS
Contraindication of location	Respiratory Surgical GIT	14 (46.7%) 9 (30.0%) 7 (23.3%)	12 (40.0%) 8 (26.7%) 10 (33.3%)	0.742*	0.690	NS
Nutritional score	Mean ± SD Range	4.33 ± 1.83 2–8	5.03 ± 1.87 2–8	−1.469P	0.147	NS

* Chi-square test.
· Independent *t*-test.