Original Article

doi:10.31674/mjn.2025.v17i02.010

MJN

Effect of Banana Stem Supplementation on Serum Prolactin Levels among Postnatal Mothers: A Pilot Study

Pinky Devi Phougeishangbam[1], Imran Khan[1*], M. Rameshwar Singh[2]

[1]Sharda School of Nursing Sciences & Research, Sharda University, 201306 Greater Noida, India
[2]Department of Obstetrics and Gynae, RIMS Hospital, 795004 Imphal West, India

**Corresponding Author's Email: Imran.khan8@sharda.ac.in*

ABSTRACT

Background: Breastmilk is an ideal food for newborns. Healthcare experts continuously advise exclusive breastfeeding for six months. However, many women are unable to follow due to numerous challenges during the postnatal period, and lower breastmilk production is one among them. The study aims to identify the impact of a banana stem diet on blood prolactin level (BPL) among postnatal mothers and assess the level of satisfaction after nursing care. **Methods:** A quasi-experimental pilot study was conducted among 20 post-natal mothers. A 4th-day postnatal mother who delivered their baby vaginally was included in the study. Data collection was done in two phases – Phase 1 was the screening, and Phase 2 was the follow-up at the residence of the mothers. The Blood Prolactin Level (BPL) was measured on the 4th day and 12th days following childbirth in both groups. The experimental group received a banana stem diet for one week, while mothers in the control group consumed their usual diet. **Results:** The majority 4(40%) were under the age group of 21-25 years in the intervention group and 6(60%) were under the age group of 26-30 years in the control group. The majority 5 (50%) and 6(60%) of the mothers were primigravida in both groups. The mean value of blood prolactin level had increased by 153.2 ng/ml, p=0.001, with a high effect (Cohen's d = 3.29) in the intervention group whereas in the control group, it increased by 21.4 ng/ml, p=0.080. with moderate effect (Cohen's d =0.56). 70% of the mothers were satisfied with the nurse support during the time of study. **Conclusion:** The findings suggest that banana stem supplementation may enhance blood prolactin levels during the postnatal period, while the supportive presence of nurses reassures mothers, facilitating effective postpartum recovery and newborn care.

Keywords: Banana Stem Diet; Blood Prolactin Level (BPL); Lactation; Nursing Support; Postnatal Mother

INTRODUCTION

The World Health Organization (WHO, 2020) recommends exclusive breastfeeding continuously for at least six months of newborn life. According to the World Health Organization (2023) facts report, only 44% of newborns were exclusively breastfed, indicating that the majority of infants were not breastfed up to six months (Infant and young child feeding, 2023). Studies have identified that a lack of awareness and inadequate facilities in the work environment are significant barriers to exclusive breastfeeding (Al-Katufi *et al*., 2020; Ramani *et al*., 2019). The lactation process normally starts on day 4 or day 5 postpartum (Lawrence & Lawrence, 2008; Shah *et al*., 2024); however, many postnatal mothers face problems in breastfeeding due to less milk production. While nurturing the newborns, postnatal mothers face many challenges, such as mental stress (Maehara *et al.*, 2017), depressed mood (Sharkey *et al*., 2016) and irritation of mothers, which are associated with failure in breastfeeding. Although there are effective pharmacological drugs available in the market to manage lactation problems, very few mothers take drugs. Many mothers cannot afford the cost and to overcome this issue, they opt for bottle feeding; further, it causes complications such as infection in the newborn. The banana stem diet is perfect for postnatal mothers and has galactagogue properties that enhance breast milk production (Gabay, 2002; Heryani & Ningrum *et al*., 2024; Yimyam & Suppansan *et al*., 2023; Yimyam & Pattamapornpong, 2022).

Received: January 20, 2025; Received in revised form: August 29, 2025; Accepted: September 9, 2025

Breastmilk is the best food for newborns. Nutrition requirements during pregnancy and lactation increase (Harding, 1993) and postnatal mothers face breastfeeding problems due to various factors. Pituitary prolactin hormone (hPRL) levels in the blood stimulate breast milk production during the postnatal period (Wray & Prendergast *et al*., 2021). The food made from bananas is one of the popular diets in the North-Eastern regions of India. Many postnatal mothers consumed banana stems or flowers for more milk production. Most of the mothers used cow milk as a substitute for breast milk and bottle feeding or artificial feeding, which causes health issues for the newborn (Brahm & Valdés, 2017) and mothers adopt it as they don't have any choice. It was identified that 8% of women stopped breastfeeding in less than one month of delivery and only 2% of the mothers continued breastfeeding till one year (Halken *et al*., 1995). A similar study in China & Somaliland found that many mothers were unable to maintain exclusive breastfeeding (Dong *et al*., 2022; Jama*et al*., 2020).

The commonest reason for not feeding their baby is due to less breastmilk secretion (Khasawneh & Khasawneh, 2017). Galactagogue foods have proven their effectiveness in enhancing breast milk during the lactation period (Buntuchai *et al*., 2017; Kumari *et al*., 2023). A Study has proven that the herbal galactagogue present in Moringa oleifera helps in breastmilk production (Fungtammasan & Phupong, 2021). A traditional diet prepared from the banana stem is easy to prepare, cost-effective, and affordable. Researchers strongly felt the need to systematically investigate the traditional diet and its benefits in breastmilk production. The study aims to find out the effects of the banana stem diet on blood prolactin levels among postnatal mothers. The banana stem diet is a popular diet among the tribes of northeastern India. This diet is consumed during the postnatal period in a belief that it enhances breastmilk production. While the practice of a banana stem diet during the postnatal period has been followed for decades in Manipur, India, there is a notable scarcity of similar research in European and other developed countries. Furthermore, very few studies on this practice have been documented in Southeast Asian nations.

Aim

To identify the impact of a banana stem diet on blood prolactin level (BPL) among postnatal mothers and assess the level of satisfaction after nursing care.

Objectives

1. To assess the pre-test and post-test blood prolactin levels among postnatal mothers in the Experimental and Control group.

2. To find out the association between pre-interventional prolactin level and selected demographic variables among postnatal mothers in the experimental and control groups.

3. To find out the level of satisfaction after nursing care by the postnatal mother regarding intervention among the experimental group.

Null Hypotheses

H_{01} : There is no significant difference between the pre-interventional and post-interventional mean BPL among postnatal mothers in the experimental and control groups.

H_{02} : There is no significant association between the pre-interventional BPL with selected demographic variables among postnatal mothers in the experimental and control group.

Research/Alternative Hypothesis

H_1 : There is a significant difference between the pre-interventional and post-interventional mean blood prolactin levels among postnatal mothers in the experimental and control groups.

H_2: There is a significant association between the pre-interventional blood prolactin level with selected demographic variables among postnatal mothers in the experimental and control groups.

METHODOLOGY

Target Population

Postnatal mothers on the fourth day following delivery who are experiencing breastfeeding difficulties.

Accessible Population

All fourth-day postnatal mothers residing within the Imphal West district who are experiencing breastfeeding difficulties.

Study Design and Setting

A pilot study was conducted from February to March 2024, involving 20 postnatal mothers who underwent normal vaginal deliveries. A quasi-experimental design was employed, with data collection occurring in two phases. Phase one involved data collection within the postnatal ward, while phase two was conducted at participants' residences.

Inclusion Criteria

Day 4 postnatal mother who has a breastfeeding problem due to less breast milk production (Primi and multi para mother, normal vaginal delivery)

A mother who did not take any medicine for breast milk production is willing to participate.

Exclusion Criteria

Lower Segment Caesarean Section (LSCS) mothers with risk of bleeding or anaemia, those with psychiatric issues or refusal of consent, and mothers with newborn complications (special care, congenital anomalies, lactose intolerance, intrauterine death, or stillbirth) are considered high-risk in the postnatal period.

Data Collection Procedure

The researcher screened 30 postnatal mothers using a checklist which comprised 10 items related to breastfeeding failure and out of those mothers, 20 postnatal mothers were recruited. The banana stem was incorporated into the diet and it was administered in the experiment group whereas control group took a normal diet. The study was supported by a similarly conducted at Indonesia and Thailand (Wahyuningsih & Hidayat *et al.*, 2017;Yimyam & Pattamapornpong, 2022). A blood sample (2ml) was taken following all the aseptic techniques in a 2 ml syringe for serum prolactin on the 4th day and 12th day following delivery in both groups. It was taken in plain vial and carefully transferred to the diagnostic center. The Electrochemiluminescence Immunoassay (ECLIA) method assessed blood prolactin levels (BPL). All the collected data was recorded carefully and entered in the Excel sheet, and confidentiality was maintained. The researcher took support from four accredited social health activity workers (ASHA) during the study.

Measurements

Normal BPL during lactation is between 200 – 400 ng/ml as per the University of California San Francisco, UCSF Health, 2024. In this study, the blood prolactin levels below 200 ng/ml was considered as low and above 400 ng/ml was considered as high.

A structured maternal satisfaction scale (5-point Likert scale) which comprises of 10 items was used. The instrument was validated by eight experts, and reliability testing was conducted using Cronbach's alpha, yielding a value of 0.732. The score was classified Strongly Disagree (SD) -1, Disagree (D)-2, Undecided (UD)-3, Agree (A) -4 and Strongly Agree (SA)-5. Item no 3, 8 & 10 were negative attitude-based questions, therefore reverse scoring was done (SD- 5, D – 4, UD – 3, A-2, SA -1). A score between 1-24 was considered as unsatisfactory and a score between 25-50 was considered as well-satisfied. Breastfeeding practice assessment and maternal satisfaction level were assessed on the 8th day of data collection.

Ethical Consideration

The researchers obtained ethical clearance from the Research Ethical Board Regional Institute of Medical Sciences (RIMS) Imphal, India, with reference number A/206/REB/Prop (FP) 207/135/13/2023 on 24th August 2023 and the study was also registered in the Clinical Trial Registry of India (CTRI), with reference number REF/2024/03/080585 on 24th August 2023.

RESULTS

Table 1: Socio-demographic Profile of the Postnatal Mothers (n = 20)

Socio Demographic Profile		Experimental Group		Control Group	
		Frequency	Percentage %	Frequency	Percentage %
Age	Less than 20	1	10.0	0	00
	21-25	4	40.0	1	10.0
	26-30	3	30.0	6	60.0
	30 and above	2	20.0	3	30.0
Gravida	Primi gravida	5	50.0	6	60.0
	Multigravida	5	50.0	4	40.0
Parity	One child	5	50.0	7	70.0
	Two children	4	40.0	3	30.0
	Three children and above	1	10.0	0	0
Gestational Weeks	Below 37 weeks	0	0	0	0
	37 weeks and above	10	100	10	100
Childbirth Weight	Below 2500 gram	1	10.0	2	20.0
	Above 2500 gram	9	90.0	8	80.0
Sex of the Baby	Male	4	40.0	4	40.0
	Female	6	60.0	6	60.0
Condition of Nipples	Normal Nipple	10	100	10	100
	Abnormal Nipple	0	0	0	0
	Inverted Nipple	0	0	0	0
	Sore or Crack Nipple	0	0	0	0
Time of Breast Feeding Initiated After Child's Birth	Within one hour	8	80.0	5	50.0
	Within four hours	2	20.0	1	10.0
	Within 24 hours	0	0	4	40.0

Table 1 shows the summary of demographic characters- Most of the mothers were in the age group between 21 to 25 years 4 (50%) whereas in the control group, the majority were under the age group of 26-30 years which is 6 (60 %). In both groups all the participants had delivered babies at term (37 weeks and above) and the baby weight was above 2500 gm and also had normal nipple conditions. The majority 5 (50%) and 7 (70%) of the participants, have only one child in both the groups.

Table 2: Comparing the Pre-test and Post-test Levels of Blood Prolactin Level among Postnatal Mothers in Both Groups (n= 20)

Paired '*t*' test		Mean ng/ml	Standard Deviation	Standard Error Mean	*df*	*t* - Value	Significance (2 Sided)	Cohen's d
Experimental Group	Pre-test	198.50	16.628	5.25	9	-8.49	0.001	3.29
	Post-test	351.70	63.730	20.15				
Control Group	Pre-test	206.90	20.491	6.480	9	-1.642	0.080	0.56
	Post-test	228.30	49.522	15.66				

Table 2 shows the effects on blood prolactin level after intervention. In the experimental group, the mean difference between pre-test and post-test BPL scores was 153.2 ng/ml, with a standard deviation of 14.9, a *t*-value of -8.49, a *p*-value of <0.001 and Cohen's d = 3.29, which mean a high effect. In contrast, the control group showed a mean difference of 21.4 ng/ml, a standard deviation of 29.031, a *t*-value of -1.642, a *p*-value of <0.080 and Cohen's *d* = 0.56, which is medium effects. These findings indicate a significantly greater improvement in BPL scores in the experimental group compared to the control group, demonstrating statistically significant effects in the experimental group.

Table 3 displayed data regarding an association between the participants and their blood prolactin levels. No statistically significant association was found between the pre-test BPL levels and the demographic profile in the experimental group.

Table 3: Association Between Experimental Group Pre-test Level of Blood Prolactin Level (BPL) with Demographic Profile (n =10)

Chi Square (Experimental Group Pre Test with Demographic Profile)		Low BPL	Normal BPL	Total	Value	*df*	Significance
Age	Less than 20	1	0	1	30.000[a]	3	0.314
	21-25	1	3	4			
	26-30	3	0	3			
	30 and above	2	0	2			
Total		7	3	10			
Gravida	Primi gravida	4	1	5	10.000[a]	1	0.350
	Multigravida	3	2	5			
Total		7	3	10			
Parity	One child	4	1	5	20.000[a]	2	0.333
	Two children	2	2	4			
	Three and above child	1	0	1			
Total		7	3	10			
Sex of Baby	Male	3	1	4	10.000[a]	1	0.350
	Female	4	2	6			
Total		7	3	10			
Time of Breastfeeding Initiated After Birth	Within one hour	6	1	7	10.000[a]	2	0.350
	Within four hours	1	2	3			
	Within 24 hours	0	0	0			
Total		7	3	10			

a: indicates that the finding is not statistically significant at level (p > 0.05)

Table 4: Association between Control Group pre-test Level of Blood Prolactin Level (BPL) with Demographic Profile (n=10)

Chi Square (Control Group Pre-Test with Demographic Profile)		Low BPL	Normal BPL	Total	Value	*df*	Asymptotic Significance (2-sided)
Age	Less than 20	0	0	0	2.000[a]	3	0.368
	21-25	1	0	1			
	26-30	6	2	4			
	30 and above	3	1	1			
	Total	3	3	10			
Gravida	Primi gravida	3	3	6	7.917[a]	1	0.442
	Multigravida	1	3	4			
	Total	4	6	10			
Parity	One child	3	3	6	7.917[a]	1	0.442
	Two children	1	3	4			
	Total	4	6	10			
Gender of the Child	Male	2	2	4	10.000[a]	1	0.265
	Female	2	4	6			
	Total	4	6	10			
Time of Breastfeeding Initiated After Birth	Within one hour	2	3	5	17.750[a]	2	0.339
	Within four hours	0	1	1			
	Within 24 hours	2	2	4			
	Total	4	6	10			

a: indicates that the finding is not statistically significant at level (p > 0.05)

Similarly, table 4 revealed no statistically significant association was observed between the control group's pre-test BPL levels and their demographic profile.

Table 5 : Distribution of Mothers According to Maternal Satisfaction Score Component Responses (n=10)

Among Experimental Group	Strongly Disagree		Disagree		Undecided		Agree		Strongly Agree		Overall Score
	No.	%	No.	%	No.	%	No.	%	No.	%	
Confident with the diet	0	0	0	0	1	10	5	50	4	40	4.50
Very much comfortable with this traditional diet	0	0	0	0	0	0	8	80	2	20	4.2
Not comfortable when somebody assists	2	20	4	40	3	30	1	10	0	0	3.7
Baby is feeding well after taking this diet	0	0	0	0	1	10	4	40	5	50	4.4
Baby passes urine adequately	0	0	0	0	2	20	4	40	4	40	4.2
I am happy now as my baby sleeps well without interruption	0	0	0	0	2	20	6	60	2	20	4.0
Baby slept well after feeding	0	0	6	60	4	40	0	0	0	0	2.4
This diet may cause diarrhoea	0	0	6	60	4	40	0	0	0	0	3.6
The nurse was very supportive and explained in detail	0	0	0	0	0	0	3	30	7	70	4.7
Breast has not produced enough breastmilk	4	40	4	40	2	20	0	0	0	0	4.2
Overall Score	**3.99±0.65**										

Table 5 displayed regarding maternal level of satisfaction on nursing support. The majority 80% of the mother were very much comfortable with the traditional diet. All the participants expressed satisfaction with the nursing care, and 70 % of them strongly expressed comfortable and satisfied on the supportive care provided by the Nurse. The overall result was found to be 3.99±0.65 which indicates that the mothers were satisfied on this traditional practice as well as they are comfortable with the Nursing support.

DISCUSSION

This pilot study successfully explored the feasibility of using banana stem supplements to address low milk production in postnatal mothers in Imphal, India. High levels of cooperation by the mothers showed that the intervention was accepted culturally. The fact that the intervention is feasible to apply in this community makes it a crucial finding for further study. Nurse visits at their residence as a follow-up care during the postnatal period also proved highly effective, with mothers expressing high satisfaction with the personalized support and guidance provided. This demonstrates that home visits are effective and successful approach to providing nutritional interventions and postpartum care in traditional settings. Preliminary data from the study revealed promising trends related to Blood Prolactin Levels (BPL). Specifically, the mean difference of 153.2 ng/ml in the experimental group suggests a potential positive effect, which indicate further investigation. This initial finding aligns with similar outcomes reported in a previous study from Indonesia (Wahyuningsih *et al*., 2017; Yimyam & Pattamapornpong, 2022). Bananas consist of approximately 3.50% protein, 0.75% fats, and 22.12% carbohydrates, along with adequate minerals and vitamins (Kumari *et al*., 2023). The study further observed improvements in milk production expressed by the lactating mothers in the experimental group, corroborated by similar outcomes reported in an Indonesian study (Buntuchai *et al.*, 2017; Yimyam & Pattamapornpong, 2022). Banana stems, being widely available and culturally favoured and were positively received by participants. Although WHO (2020) and UNICEF (2025 recommend initiating breastfeeding within one hour postpartum (UNICEF 2025), a study has identify that 20% of mothers commenced breastfeeding beyond this recommended timeframe (Table 1).

The research also highlighted mothers' confidence and comfort with the traditional dietary recommendations, emphasizing the significance of culturally relevant nutritional practices in promoting

maternal health—a finding supported by parallel studies conducted in Asian countries (Buntuchai *et al*., 2017; Yimyam *et al*., 2023; Aisya *et al*., 2020; Pohan & Margolang, 2022). A notable outcome of the study was the high satisfaction among mothers regarding nurse home visits. Nurses played a critical role in guiding dietary practices and offering emotional support, with mothers appreciating comprehensive explanations regarding dietary benefits for postpartum recovery. Together with the intervention's successful feasibility, these early trends offer a solid basis for carrying out a large-scale randomised controlled trial to validate the effectiveness of banana stem supplements in enhancing lactation.

CONCLUSION

This study highlights that banana stem supplementation has the potential to significantly enhance blood prolactin levels and improve breastfeeding outcomes among postnatal mothers. The intervention was not only effective but also culturally acceptable, affordable, and easy to integrate into daily diets. Mothers expressed high satisfaction with both the dietary practice and the supportive role of nurses during postpartum care, which contributed to greater confidence and comfort in breastfeeding. Overall, the findings reinforce the value of combining traditional dietary practices with professional nursing support to promote maternal recovery and ensure optimal nourishment for newborns.

Further research is required to strengthen the evidence base. Large-scale, multi-centre randomized controlled trials should be conducted to validate the findings and ensure generalizability across diverse populations. Future investigations should also aim to identify the bioactive compounds in banana stem responsible for its galactagogue effect, explore long-term outcomes on maternal and infant health, and compare its effectiveness with other herbal or pharmacological galactagogues. Cross-cultural studies may assess its acceptance in non-traditional contexts, while policy-level integration could help establish banana stem as a low-cost, culturally sensitive intervention for lactation support. Additionally, future research should continue to explore the synergistic role of nursing interventions alongside dietary supplementation in optimizing postpartum care.

Limitations

The study faced challenges such as difficulties in recruiting and consistently monitoring participants, especially Lower Segment Caesarean Section (LSCS) mothers due to early discharge and travel issues. A small sample size, single location, limited resources, and manpower affected generalizability and follow-up. Logistical constraints impacted data consistency, and the short study duration limited assessment of long-term effects. Additionally, the exact mechanism of how banana stem enhances breast milk production remains unclear, affecting the study's overall comprehensiveness

Conflict of Interest

The authors declare that they have no competing interests.

ACKNOWLEDGEMENT

The authors extend sincere gratitude to the Accredited Social Health Activist (ASHA) workers, Urban Primary Health Centre, Imphal West, India, laboratory technician, Babina Diagnostics, Imphal and statistician Mr. Kartiken, Shanmuga College of Nursing, Tamil Nadu, India, for their crucial contributions to the study. Appreciation is also given to the participants and their families for their cooperation, as well as to the hospital authorities and Diagnostic Center for their support and facilities.

REFERENCES

Aisya, M. W., Zakaria, F., & Daud, W. (2020). The effects of banana blossom (musa Acuminate Colla) consumption on increased breast milk production in the work area of Talaga Jaya. *Journal La Lifesci, 1*(4), 1–7. https://doi.org/10.37899/journallalifesci.v1i4.198

Al-Katufi, B., Al-Shikh, M., Al-Hamad, R., Al-Hajri, A., & Al-Hejji, A. (2020). Barriers in continuing exclusive breastfeeding among working mothers in primary health care in the ministry of health in Al-Ahsa region, Saudi

Arabia. *Journal of Family Medicine and Primary Care, 9*(2), 957. https://doi.org/10.4103/jfmpc.jfmpc_844_19

Brahm, P., & Valdés, V. (2017). The benefits of breastfeeding and associated risks of replacement with baby formulas. *Revista Chilena De Pediatria, 88*(1), 7–14. https://doi.org/10.4067/S0370-41062017000100001

Buntuchai, G., Pavadhgul, P., Kittipichai, W., & Satheannoppakao, W. (2017). Traditional galactagogue foods and their connection to human milk volume in Thai breastfeeding mothers. *Journal of Human Lactation, 33*(3), 552–559. https://doi.org/10.1177/0890334417709432

Dong, D., Ru, X., Huang, X., Sang, T., Li, S., Wang, Y., & Feng, Q. (2022). A prospective cohort study on lactation status and breastfeeding challenges in mothers giving birth to preterm infants. *International Breastfeeding Journal, 17*(1), 6. https://doi.org/10.1186/s13006-021-00447-4

Fungtammasan, S., & Phupong, V. (2021). The effect of Moringa oleifera capsule in increasing breastmilk volume in early postpartum patients: A double-blind, randomized controlled trial. *PLoS One, 16*(4), e0248950. https://doi.org/10.1371/journal.pone.0248950

Gabay, M. P. (2002). Galactogogues: medications that induce lactation. *Journal of Human Lactation, 18*(3), 274–279. https://doi.org/10.1177/089033440201800311

Halken, S., Jacobsen, H. P., Høst, A., & Holmenlund, D. (1995). The effect of hypo-allergenic formulas in infants at risk of allergic disease. *European Journal of Clinical Nutrition, 49 Suppl 1*, S77-83. https://portal.findresearcher.sdu.dk/en/publications/the-effect-of-hypo-allergenic-formulas-in-infants-at-risk-of-alle.

Harding, J. (1993). Nutrition during pregnancy and lactation. An implementation guide. *Midwifery, 9*(2), 101. https://doi.org/10.1016/0266-6138(93)90057-Y

Heryani, S., Ningrum, W. M., Mukti, A. S., & Rohmah, S. (2024). Conservation of local resources: The role of kepok banana blossom in supporting breast milk production. *Interdisciplinary International Journal of Conservation and Culture, 2*(2), 16–21. https://doi.org/10.25157/iijcc.v2i2.4264

Jama, A., Gebreyesus, H., Wubayehu, T., Gebregyorgis, T., Teweldemedhin, M., Berhe, T., & Berhe, N. (2020). Exclusive breastfeeding for the first six months of life and its associated factors among children age 6-24 months in Burao district, Somaliland. *International Breastfeeding Journal, 15*(1), 5. https://doi.org/10.1186/s13006-020-0252-7

Khasawneh, W., & Khasawneh, A. A. (2017). Predictors and barriers to breastfeeding in north of Jordan: could we do better? *International Breastfeeding Journal, 12*(1), 49. https://doi.org/10.1186/s13006-017-0140-y

Kumari, P., Gaur, S. S., & Tiwari, R. K. (2023). Banana and its by-products: A comprehensive review on its nutritional composition and pharmacological benefits. *eFood, 4*(5), e110. https://doi.org/10.1002/efd2.110

Lawrence, R. M., & Lawrence, R. A. (2008). The breast and the physiology of lactation. *Creasy and Resnik's Maternal-Fetal Medicine: Principles and Practice* (6th edition). Saunders Elsevier. https://listwr.com/8XexXX

Maehara, K., Mori, E., Iwata, H., Sakajo, A., Aoki, K., & Morita, A. (2017). Postpartum maternal function and parenting stress: Comparison by feeding methods. *International Journal of Nursing Practice, 23*(S1), e12549. https://doi.org/10.1111/ijn.12549

Pohan, A., & Margolang, J. (2022). *The effect of banana blossom consumption on increasing breast milk production in public mothers at Murniati Clinic Kisaran. 10*(2), 769-773. https://midwifery.iocspublisher.org/index.php/midwifery/article/view/313

Ramani, S., Shaikh, N., Das, S., Pantvaidya, S., Fernandez, A., & Jayaraman, A. (2019). "Everybody breastfeeds if they have milk": Factors that shape exclusive breastfeeding practices in informal settlements of Mumbai, India. *International Breastfeeding Journal, 14*(1), 10. https://doi.org/10.1186/s13006-019-0204-2.

Shah, R., Sabir, S., & Alhawaj, A. F. (2019). *Physiology, Breast Milk.* In StatPearls. StatPearls Publishing.

https://www.statpearls.com/articlelibrary/viewarticle/38275/

Sharkey, K. M., Iko, I. N., Machan, J. T., Thompson-Westra, J., & Pearlstein, T. B. (2016). Infant sleep and feeding patterns are associated with maternal sleep, stress, and depressed mood in women with a history of major depressive disorder (MDD). *Archives of Women's Mental Health, 19*(2), 209–218. https://doi.org/10.1007/s00737-015-0557-5

UNICEF. (2025, August 2). *Benefits of breastfeeding: Breastmilk: nature's first vaccine and complete nutrition for newborns*. UNICEF India. https://www.unicef.org/india/stories/benefits-breastfeeding

University of California San Francisco, UCSF Health. (2024). Prolactin blood test. *UCSF Health*. https://www.ucsfhealth.org/medical-tests/prolactin-blood-test.

Wahyuningsih, D., Hidayat, S. T., Khafidhoh, N., Suwondo, A., Fatmasari, D., & Susiloretni, K. A. (2017). Effect of Musa Balbisiana Colla extract on breast milk production in breastfeeding mothers. *Belitung Nursing Journal, 3*(3), 174–182. https://doi.org/10.33546/bnj.103

World Health Organization. (2020). *Breastfeeding*. https://www.who.int/health-topics/breastfeeding.

World Health Organization. (2023). *Infant and young child feeding*. https://www.who.int/news-room/fact-sheets/detail/infant-and-young-child-feeding

Wray, S., & Prendergast, C. (2021). Physiology of the puerperium and lactation. In K. Lightly & A. Weeks (Eds.), *The continuous textbook of women's medicine: Obstetrics module, volume 15 – The puerperium*. The Global Library of Women's Medicine. https://doi.org/10.3843/GLOWM.415293

Yimyam, S., & Pattamapornpong, S. (2022). Galactagogue effect of banana (Musa x paradisiaca) blossom beverage on breast milk production among mothers undergoing cesarean section. *Nursing and Health Sciences Journal (NHSJ), 2*(3), 190–197. https://doi.org/10.53713/nhs.v2i3.154

Yimyam, S., Suppansan, P., & Jankajonchai, K. (2023). Effectiveness of banana flower beverage on breast milk production among mothers of preterm neonates. *Journal of Neonatal Nursing, 29*(5), 755–759. https://doi.org/10.1016/j.jnn.2023.02.006