EJMR
ERA'S JOURNAL OF MEDICAL RESEARCH
p-ISSN: 2348-9839, e-ISSN: 2394-5222 | www.ejmr.org

Volum 12 Issue 2

ORIGINAL ARTICLE

Exploring the Relationship Between Maternal Demographics and Pre-Intervention Prolactin Levels in the Postnatal Period

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

Received on: 13-06-2025

Publish on: 16-06-2025

ABSTRACT

Background: Prolactin plays a critical role in lactation, and understanding factors influencing its levels is essential for addressing breastfeeding difficulties.

Aim and objective: To determine the association between pre-intervention serum prolactin levels and selected demographic variables among postnatal mothers enrolled in a banana stem diet.

Objective: To find the relationship between pre-intervention prolactin levels and demographic variables.

Material and Methods: A quasi-experimental study was conducted among 100 postnatal mothers in community areas. Convenience sampling identified eligible fourth-day postnatal mothers experiencing breastfeeding difficulties, without previous lactation-inducing medication. Demographic variables were collected using structured questionnaires, and baseline prolactin levels were assessed through blood sampling.

Result: Analysis revealed no statistically significant association between baseline prolactin levels and maternal age (p=0.276), educational status (p=0.720), family structure (p=0.557), family income (p=0.676), gravida (p=0.108), or parity (p=0.321). While minor differences were observed, such as higher mean prolactin levels among mothers aged 26–30 and primigravida participants, these variations did not reach statistical significance.

Conclusion: This study found demographic variables do not significantly affect baseline prolactin levels in postpartum mothers with lactation insufficiency, emphasizing physiological regulation and suggesting further exploration of biological or behavioral factors.

Keywords: *Banana Stem Diet, Maternal Nutrition, Postnatal Mothers, Prolactin Levels.*

Era's Journal of Medical Research. 12(2);2025 [doi: 10.24041/ejmr.2025.21]

INTRODUCTION

Breastfeeding is universally acknowledged as the optimal source of nutrition for newborns, offering a range of health benefits for both the child and the mother.[1] The success of lactation, particularly in the early postnatal period, is largely dependent on the secretion of prolactin,[2] a pituitary hormone that plays a important role in the initiation and maintenance of milk production.(3,4) While prolactin secretion is physiologically regulated by suckling stimuli, several maternal demographic and biological factors—including age, parity, mode of delivery, and nutritional status—may influence baseline prolactin levels and, by extension, breastfeeding success. In recent years, interest has grown in the use of functional foods and natural dietary interventions to support lactation. Banana stem, a traditional dietary component in many parts of Asian countries, is believed to possess galactagogue properties (5–10) and is commonly consumed during the postnatal period. However, there is limited scientific literature evaluating the baseline hormonal profiles of mothers prior to such dietary interventions, particularly in relation to sociodemographic characteristics. Understanding the pre-intervention prolactin levels and their potential association with maternal demographic variables is essential not only for identifying predictors of lactation challenges but also for designing targeted interventions that can enhance maternal and neonatal outcomes. Moreover, baseline hormonal assessment is crucial in dietary trials to ensure that the observed effects can be attributed to the intervention rather than to pre-existing individual variability. Therefore, this study aims to explore the association between pre-intervention prolactin levels and selected demographic variables among postnatal mothers who are participants in a banana stem diet trial. The findings are expected to contribute to evidence-based nutritional strategies for improving lactation outcomes in the postnatal population.

[1]Sharda School of Nursing, Sharda University, Greater Noida, UP, India.
[2]RIMS Hospital, Imphal West, Manipur, India.
Corresponding Author: Pinky Devi Phougeishangbam
(**Email:** pinky.phou@gmail.com**)**

How to cite: Phougeishangbam PD, Khan I, Singh MR. Exploring the Relationship Between Maternal Demographics and Pre-Intervention Prolactin Levels in the Postnatal Period. Era J Med Res. 2025;12(2):20–25.

Materials and methods: This one-year quasi-experimental study included 100 fourth-day postnatal mothers from Imphal West experiencing breastfeeding difficulties. Participants were selected through convenience sampling and included only those with normal vaginal deliveries and no lactation-inducing medication. Mothers with LSCS, postnatal complications, stillbirths, congenital anomalies, psychiatric conditions, or who declined consent were excluded.Data collection was carried out in two sequential phases:

Phase I: Participant Screening and Eligibility Assessment

In the initial phase, the researcher visited the postnatal ward and screened a total of 310 postnatal mothers for lactation difficulties using a standardized screening checklist. Of these, 120 mothers were identified as experiencing breastfeeding challenges. These individuals were further assessed for eligibility based on predefined inclusion criteria. Ultimately, 100 eligible participants were selected and assigned to either the experimental group (n = 50) or the control group (n = 50).

Phase II: Group Allocation and Follow-Up

During the second phase, eligible participants were allocated into two groups—experimental and control—based on geographic clustering. The Nambul River served as a natural boundary, demarcating the two clusters to ensure spatial separation. This allocation method was purposefully employed to reduce the likelihood of cross-contamination or interpersonal interactions between the groups throughout the intervention period.

Prior to data collection, informed consent was obtained from all participants. The purpose of the study and procedures involved were clearly explained to them, ensuring ethical compliance and voluntary participation. Demographic data were collected using a structured questionnaire. The variables assessed included maternal age, educational status, type of family, monthly income, gravida, parity, mode of delivery, and time of breastfeeding initiation. To assess baseline prolactin levels, venous blood samples (2 mL) were collected on the 4th postpartum day. The samples were processed in a certified laboratory using standard protocols. The experimental group received a banana stem-based dietary intervention for one week. On the 11th postpartum day, a follow-up blood sample was collected to measure post-intervention prolactin levels and assess the effectiveness of the dietary intervention.

Ethical clearance was obtained from the Institutional Ethics Committee RIMS hospital, reference no A/206/REB/Prop (FP) 207/135/13/2023 dated 24/08/2023. Patient information sheet was provided to all the participants. Confidentiality of personal information was strictly maintained.

RESULT

The age distribution between the experimental and control groups was comparable, with the highest percentages in the 26–30 and 31–35 age ranges. No significant difference was found ($\chi^2 = 4.46$, $p = 0.348$).

The educational levels of mothers in both groups were similar, with 52% having secondary education and around 22% holding graduate or higher degrees. No significant difference was found ($\chi^2 = 0.06$, $p = 0.969$).

Family type distribution was similar between groups, with most in the Control Group from joint families (56%) and 50% in the Experimental Group from nuclear families. The difference was not statistically significant ($\chi^2 = 0.36$, $p = 0.548$). Although the Control Group had slightly more participants with a family income above ₹15,000 (38%) compared to the Experimental Group (34%), the chi-square test ($\chi^2 = 4.18$, $p = 0.124$) indicated no significant difference in income distribution between the groups.

Gravida: In the Control Group, 44% were primigravida and 56% were multigravida, while in the Experimental Group, 54% were primigravida and 46% were multigravida. The chi-square test (chi-square = 1.00, p-value = 0.317) indicated no significant difference between the two groups in terms of gravida status. Parity distribution was comparable between groups, with similar numbers of mothers having one child. More mothers in the Control Group had two or more children. The difference was not statistically significant ($\chi^2 = 4.84$, $p = 0.089$).

Most babies in both groups weighed 2500 grams or more at birth—90% in the Control Group and 94% in the Experimental Group. The chi-square test ($\chi^2 = 0.54$, $p = 0.461$) showed no significant difference between groups. The gender distribution was similar across groups, with 52% male and 48% female in the Control Group, and 64% male and 36% female in the Experimental Group. The difference was not statistically significant ($\chi^2 = 1.48$, $p = 0.224$).

Most women in both groups (94%) had normal nipples, while 6% had short nipples. The chi-square test ($\chi^2 = 0.00$, $p = 1.000$) showed no significant difference between the groups. The majority of mothers initiated breastfeeding within the first hour—96% in the Control Group and 92% in the Experimental Group. The chi-square test ($\chi^2 = 0.71$, $p = 0.400$) showed no significant difference between groups.

The mean pre-test BPL scores varied across age groups, with the highest in the 26–30 years group (234.46) and lowest in the 21–25 group (206.27). ANOVA results ($F = 1.30$, $p = 0.276$) showed no statistically significant differences, indicating age had no significant effect on BPL scores. The mean pre-test BPL scores varied slightly by education level, ranging from 222.88 for primary to 228.92 for secondary education. ANOVA results ($F = 0.33$, $p = 0.720$) showed no significant influence of education on BPL scores. Pre-test BPL scores were similar for nuclear (223.66) and joint (228.02) families. The unpaired t-test ($t = 0.59$, $p = 0.557$) showed no significant difference, indicating family type did not affect BPL scores.

Pre-test BPL scores ranged from 222.17 for incomes above ₹15,000 to 236.00 for incomes below ₹10,000. ANOVA results ($F = 0.39$, $p = 0.676$) showed no significant differences, indicating family income had no impact on BPL scores.

The mean pre-test BPL was 232.02 for primigravida and 220.16 for multigravida women. The unpaired t-test ($t = 1.62$, $p = 0.108$) showed no significant difference, indicating gravida status did not affect BPL scores. The mean pre-test BPL scores varied slightly by parity, with 231.33 for mothers with one child, and around 220 for those with two or more. ANOVA ($F = 1.15$, $p = 0.321$) showed no significant differences.

Table 1: Distribution of Cases according to Demographic Characteristics

Demographic Characteristics		Control Group		Experimental Group		Significance	
		No.	%	No.	%	chi sq	p-value
Age	21 – 25 years	8	16.0	3	6.0	4.46	0.348
	26 – 30 years	16	32.0	19	38.0		
	31 – 35 years	13	26.0	19	38.0		
	36 – 40 years	12	24.0	8	16.0		
	41 – 45 years	1	2.0	1	2.0		
Mother's Education	Primary education	13	26.0	13	26.0	0.06	0.969
	Secondary education	26	52.0	25	50.0		
	Graduation and above	11	22.0	12	24.0		
Type of Family	Nuclear Family	22	44.0	25	50.0	0.36	0.548
	Joint Family	28	56.0	25	50.0		
Family Monthly Income	Below 10000	0	0.0	4	8.0	4.18	0.124
	10001-15000	31	62.0	29	58.0		
	15000 and above	19	38.0	17	34.0		

Table 2: Distribution of Cases according to Obstetric Characteristics

Obstetric Characteristics		**Control Group**		**Experimental Group**		**Significance**	
		No.	**%**	**No.**	**%**	**chi sq**	**p-value**
Gravida	Primi gravida	22	44.0	27	54.0	1.00	0.317
	Multi gravida	28	56.0	23	46.0		
Parity	One child	25	50.0	27	54.0	4.84	0.089
	Two child	24	48.0	17	34.0		
	Three child and above	1	2.0	6	12.0		
Weight of baby at Birth	Below 2500 gm	5	10.0	3	6.0	0.54	0.461
	2500 gm and above	45	90.0	47	94.0		
Gender of the Baby	Male	26	52.0	32	64.0	1.48	0.224
	Female	24	48.0	18	36.0		
Appearance of the Nipples	Normal Nipple	47	94.0	47	94.0	0.00	1.000
	Short Nipple	3	6.0	3	6.0		
Time of Breastfee-ding Initiated	Within 1 hour	48	96.0	46	92.0	0.71	0.400
	Within 4 hour	2	4.0	4	8.0		

The distribution of cases according to obstetric characteristics for the Control and Experimental Groups reveals the following:

Table 3: Association of demographic characteristics with Blood Prolactin Level

Demographic Characteristics		BPL - Pre Test	
		Mean	SD
Age	21 – 25 years	206.27	21.03
	26 – 30 years	234.46	40.93
	31 – 35 years	225.22	37.18
	36 – 40 years	223.25	34.65
	41 – 45 years	225.00	11.31
	ANOVA	F=1.30, p=0.276	
Mother's Education	Primary education	222.88	32.95
	Secondary education	228.92	41.87
	Graduation and above	222.91	28.94
	ANOVA	F=0.33, p=0.720	
Type of Family	Nuclear Family	223.66	36.36
	Joint Family	228.02	37.43
	unpaired t test	t=0.59, p=0.557	
Family Monthly Income	Below 10000	236.00	29.36
	10001-15000	227.58	36.53
	15000 and above	222.17	38.45
	ANOVA	F=0.39, p=0.676	

Table 4: Association of obstetric characteristics with BPL Pretest Scores

Obstetric Characteristics		BPL - Pre Test	
		Mean	SD
Gravida	Primi gravida	232.02	44.65
	Multi gravida	220.16	26.43
	unpaired t test	t=1.62, p=0.108	
Parity	One child	231.33	43.43
	Two child	220.15	28.91
	Three child and above	220.29	15.32
	ANOVA	F=1.15, p=0.321	

DISCUSSION

This study examined associations between pre-intervention blood prolactin levels and demographic and obstetric factors among postnatal mothers, aiming to identify groups potentially benefiting most from lactation-enhancing dietary interventions.

Demographic Variables and Pre-Intervention Prolactin Levels

The results revealed no statistically significant association between maternal age and pre-test prolactin levels (p = 0.276). Although mothers aged 26–30 years exhibited the highest mean BPL (234.46 ± 40.93), the variation across age groups did not reach statistical significance. These findings suggest that age, within the postpartum range of this study population, may not be a primary determinant of serum prolactin concentration. This aligns with existing literature that highlights the neuroendocrine regulation of prolactin as being largely independent of maternal age, especially in the early postpartum phase. (11) A study investigated the relationship between postpartum maternal serum hormone levels and blood pressure measurements in preeclampsia patients. (12) While their study primarily focused on hormonal fluctuations in pathological conditions, they reported no significant differences in serum prolactin levels across different maternal age groups, reinforcing the notion that age may not significantly influence prolactin concentrations postpartum. A reputable resource on breastfeeding, notes that prolactin levels are primarily influenced by factors such as breastfeeding frequency, intensity, and duration, rather than maternal age. This aligns with the understanding that neuroendocrine regulation of prolactin is largely independent of age, especially in the early postpartum phase. (13). These studies collectively support the assertion that maternal age does not have a significant impact on serum prolactin levels during the postpartum period, emphasizing the role of other factors in prolactin regulation.

Similarly, maternal education level did not show a significant association with baseline prolactin values (p = 0.720). Although secondary-educated mothers had marginally higher mean BPL (228.92 ± 41.87), the difference was negligible. This result indicates that formal education, which may influence breastfeeding knowledge and attitudes, does not directly correlate with endogenous prolactin secretion prior to any dietary intervention. (11) Similar study also report that there is no significant correlation was found between maternal education level and prolactin levels. The same has been mentioned in reputed Cleveland Clinic. (13). The type of family structure—nuclear or joint—also did not significantly impact baseline BPL (p = 0.557). Social support, often greater in joint families, is considered a facilitating factor for breastfeeding; however, its physiological impact on prolactin levels appears minimal. It is supported by a study article (14). Monthly family income showed no significant association with baseline prolactin levels (p = 0.676), despite slightly higher levels in lower-income mothers. Similar study also report the same (15). Overall, socioeconomic factors appear not to influence baseline prolactin concentrations.

Obstetric Variables and Pre-Intervention Prolactin Levels

The study revealed no significant association between obstetric variables—gravida and parity—and pre-intervention prolactin levels in postnatal mothers. Primigravida and mothers with one child showed slightly higher prolactin levels, but these differences were not statistically significant (p = 0.108 and p = 0.321, respectively). These findings align with existing literature,[11] indicating that reproductive history does not significantly influence basal prolactin levels in the early postpartum period. Prolactin regulation is primarily governed by neuroendocrine mechanisms and the physiological response to breastfeeding stimuli.

Limitations

Psychosocial variables such as maternal stress, emotional well-being, and breastfeeding frequency may affect prolactin levels. Future studies should consider incorporating these dimensions.

CONCLUSION

The study found no significant association between demographic or obstetric variables and pre-intervention prolactin levels, indicating consistent baseline prolactin across maternal profiles and supporting equal suitability of galactagogue interventions.

Conflict of Interest: Authors declared no conflict of interest

Acknowledgement: Gratitude to ASHA workers, diagnostic laboratory team and all the participants for their invaluable support and cooperation.

REFERENCES

1. Exclusive breastfeeding for optimal growth, development and health of infants [Internet]. [cited 2024 Jun 5]. Available from: https://www.who.int/tools/elena/interventions/exclusive-breastfeeding
2. The physiological basis of breastfeeding. In: Infant and Young Child Feeding: Model Chapter for Textbooks for Medical Students and Allied Health Professionals [Internet]. World Health Organization; 2009 [cited 2024 Sep 29]. Available from: https://www.ncbi.nlm.nih.gov/books/NBK148970/
3. Al-Chalabi M, Bass AN, Alsalman I. Physiology, Prolactin. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 [cited 2024 Nov 10]. Available from: http://www.ncbi.nlm.nih.gov/books/NBK507829/
4. Hannan FM, Elajnaf T, Vandenberg LN, Kennedy SH, Thakker RV. Hormonal regulation of mammary gland development and lactation. Nat Rev Endocrinol. 2023 Jan;19(1):46–61.
5. Amornlerdpison D, Choommongkol V, Narkprasom K, Yimyam S. Bioactive Compounds and Antioxidant Properties of Banana Inflorescence in a Beverage for Maternal Breastfeeding. Appl Sci [Internet]. 2020 Dec 31 [cited 2025 Apr 21];11(1):343. Available from: https://www.mdpi.com/2076-3417/11/1/343
6. Fitrah Ramadani, Andi Satriana. The Effectiveness of Giving Banana Heart to Adequate Breast Milk in Babies Less than 6 Months in Terms of Weight Gain. Int J Public Health Excell IJPHE [Internet]. 2022 Dec 2 [cited 2025 Apr 24];2(1):248–52. Available from: https://ejournal.ipinternasional.com/index.php/ijphe/article/view/190
7. Yimyam S, Pattamapornpong S. Galactagogue effect of banana (Musa x paradisiaca) blossom beverage on breast milk production among mothers undergoing cesarean section. Nurs Health Sci J NHSJ [Internet]. 2022 Sep 1 [cited 2024 Jun 5];2(3):190–7. Available from: https://nhs-journal.com/index.php/nhs/article/view/154
8. Aisya MW, Zakaria F, Daud W. The Effects of Banana Blossom (Musa Acuminate Colla) Consumption on Increased Breast Milk Production in the Work Area of Talaga Jaya. J Lifesci [Internet]. 2020 Nov 28 [cited 2025 Jan 25];1(4):1–7. Available from: https://newinera.com/index.php/JournalLaLifesci/article/view/198
9. Dhey FN, Wulandari S, Afriliana FD. The effect of consumption bananas flower to increase breastmilk of postpartum woman.
10. Intan D, Hastuti NT, Indrawan IWA, et al. Effectiveness of Banana Blossom Consumption and Oxytocin Massage in Breastfeeding Mothers on Infant Weight Gain. Indones J Hum Nutr [Internet]. 2024 Jul 25 [cited 2025 Jan 25];11(1). Available from: https://ijhn.ub.ac.id/index.php/ijhn/article/view/738
11. Wati LR, Sargowo D, Nurseta T, Zuhriyah L, Rahardjo B. Correlations Among Maternal and Infant Factors, Lead Exposure, and Serum Prolactin Levels During Lactation: A Cross-sectional Study in Indonesia. J Prev Med Pub Health [Internet]. 2023 Sep [cited 2025 Jun 1];56(5):422–30. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10579643/

12. Kasoha M, Takacs Z, Dumé J, Findeklee S, Gerlinger C, Sima RM, et al. Postpartum Assessment of the Correlation between Serum Hormone Levels of Estradiol, Progesterone, Prolactin and ß-HCG and Blood Pressure Measurements in Pre-Eclampsia Patients. Diagn Basel Switz. 2022 Jul 12;12(7):1700.

13. Lactation (Breast Milk Production): How it Works [Internet]. [cited 2025 Jun 1]. Available from: https://my.clevelandclinic.org/health/body/22201-lactation

14. Breastfeeding, Family Physicians Supporting (Position Paper) [Internet]. [cited 2025 Jun 1]. Available from: https://www.aafp.org/about/policies/all/breastfeeding-position-paper.html

15. Bürger B, Schindler K, Tripolt T, Griesbacher A, Stüger HP, Wagner KH, et al. Factors Associated with (Exclusive) Breastfeeding Duration—Results of the SUKIE-Study. Nutrients [Internet]. 2022 Jan [cited 2025 Jun 1];14(9):1704. Available from: https://www.mdpi.com/2072-6643/14/9/1704

Orcid ID:

Pinky Devi Phougeishangbam - https://orcid.org/0000-0001-7403-1393

Imran Khan - https://orcid.org/0000-0002-1428

M. Rameshwar Singh - https://orcid.org/0000-0003-1924-6492