


# Low Latch Score: A Red Flag Sign and an Educational Tool for Intervention Among Mothers to Promote Exclusive Breastfeeding

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Poonam Vernekar<sup>1</sup>, Manisha Bhandankar<sup>1</sup>  and Pooja Hiremath<sup>1</sup>

## Abstract

**Introduction:** LATCH score is used by the health-care professionals (HCPs) to identify mothers who require assistance in breastfeeding. We conducted this study to assess if the low LATCH score can be an indicator to alert the HCPs for intervention to achieve exclusive breastfeeding (EBF) till 6 weeks and also used as an educational tool for mothers to understand and rectify their technique of breastfeeding.

**Methods:** In this prospective cohort study, LATCH score was assessed after delivery within 24 h, at 48 h, and at discharge. After first assessment, mothers were informed and counselled about LATCH scoring tool and their confidence was assessed using Likert scale at each time point. Follow-up was done at 6 weeks either by person at the time of immunization or through telephone to know the status of EBF and weight of the infant.

**Results:** A total of 251 mothers and neonates were enrolled. Prevalence of EBF was found to be 76% at 6 weeks. Overall, the median LATCH Score at 24 h was found to be 6 (2,10) and at 48 h was 7 (3,10) whereas the median LATCH score at 48 h for those delivered vaginally was 7 (4,10) and those delivered by LSCS was 6.5 (3,9) ( $P < .0001$ ). LATCH score of  $\geq 6$  at 48 h had sensitivity and specificity of 80% (confidence interval [CI] 68%, 89%) and 69% (CI 62%, 76%) respectively with area under the curve 0.81 (CI 0.74, 0.87) to predict EBF at 6 weeks. We found statistically significant change in mother's confidence level compared from 24 h to 48 h with better LATCH score and EBF by 6 weeks after informing them about LATCH score.

**Conclusion:** A LATCH score of  $< 6$  at 48 h can be a significant indicator (Red Flag sign) to intervene and promote exclusive breastfeeding. LATCH scoring itself may be used as educational tool to improve the technique of breastfeeding and thus promote EBF.

## Keywords

Lactation, LATCH score, maternal education, breastfeeding, newborn,

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## Background

Breast milk is the best nutrition for a newborn infant. The benefits of exclusively breastfeeding for 6 months are well documented over the years and have been endorsed by the World Health Organization (WHO).<sup>1</sup> Despite the extensive efforts on education and public awareness by the WHO and UNICEF worldwide, only 58% of infants less than 6 months are exclusively breastfed.<sup>2</sup> Latest analysis indicates that non-exclusive breastfeeding (EBF) and other suboptimal infant feeding practices contribute to 11.6% of mortality in children less than 5 years of age due to preventable diseases such as respiratory tract infections and diarrheal episodes in infants.<sup>2</sup>

Studies from India have reported several reasons related to breastfeeding which led to nonEBF in the first 6 months of life such as insufficient milk (53.6 %), sore or cracked nipples, breast engorgement, and so on.<sup>3,4</sup> Some studies have also reported the use of LATCH score to predict EBF.<sup>5-7</sup>

However, the assessment of LATCH score in these studies was done by health-care professional (HCP), mostly the lactation counselors. This facility may not be available in all the postnatal wards in peripheral hospitals. Hence, empowering the mother herself with the knowledge of what is LATCH score and how to improve it by correct technique of breastfeeding may help to promote EBF. The aim of this study was to study the use of LATCH score as assessment tool to predict EBF by 6 weeks of postnatal age (Table 1). The primary objective was to assess if the low LATCH score can be an

<sup>1</sup> Department of Pediatrics, KAHER's Jawaharlal Nehru Medical College, Belagavi, Karnataka, India

### Corresponding author:

Manisha Bhandankar, Department of Pediatrics, KAHER's Jawaharlal Nehru Medical College, Belagavi, Karnataka, India.  
E-mail: manisha.bhandankar1970@gmail.com

**Table 1.** LATCH Score.

Score Value	0	1	2
L—Latch	Too sleepy or reluctant and No latch obtained	Repeated attempts, Must hold nipple in mouth, and Must stimulate to suck	Grasps breast, Tongue down and forward, Lips flanged, Rhythmic suckling
A—Audible Swallowing	None	A few with stimulation	Spontaneous, intermittent (less than 24 h old), Spontaneous, frequent (greater than 24 h old)
T—Type of Nipple	Inverted	Flat	Everted (after stimulation)
C—Comfort Level (Breast/Nipple)	Engorged, Cracked, bleeding, large blisters or bruises, Severe discomfort	Filling, Small blisters or bruises, Mother complains of pinching Mild/moderate discomfort	Soft, Tender, Intact nipples (no damage)
H—Hold Positioning	Full assist (staff holds infant at breast)	Minimal assist (ie, elevate head of bed, place pillows), Teach one side, mother does other. Staff helps, mother takes over feeding.	No assist from staff. Mother able to position/hold infant.

Source: Jensen et al.<sup>8</sup>

Note: Scoring: 0-3—Poor, 4-7—Moderate, 8-10—Good.

indicator to alert the HCPs for intervention to achieve EBF till 6 weeks while the secondary objective was to study if LATCH score can be used as an educational tool to train the mothers for effective breastfeeding before discharge.

Effective breastfeeding technique involves the correct positioning of the infant at the breast to stimulate the oral searching reflex of the baby. LATCH score, an objective method of assessing breastfeeding, designed in 1994, is employed by the HCP to identify the problems in breastfeeding.<sup>8</sup> The LATCH charting system gives a numerical score of 0, 1, or 2 to 5 components of breastfeeding. “L” is for how well the infant latches onto the breast, “A” is for the amount of audible swallowing noted, “T” is for the type of nipple, “C” is for maternal comfort during feeding, and “H” is for the amount of help the mother needs to hold her infant to the breast. On the 0 to 10 range, a LATCH score of 0 to 3 is regarded as poor, 4 to 7 as moderate, and 8 to 10 as good. Higher the score, better are the chances of successful breastfeeding. We conducted this study to assess if the low LATCH score during hospital stay can be an indicator to alert the HCPs for intervention to achieve EBF till 6 weeks and also as an educational tool for mothers to understand and rectify their technique of breastfeeding.

## Methodology

This was prospective cohort study conducted in KLE's Dr Prabhakar Kore Hospital in North Karnataka after obtaining approval from institutional ethics committee of Jawaharlal Nehru Medical College (Ref: MDC/DOME/64 dated November 24, 2018). Written consent was obtained from the mothers after delivery to participate in the study. This hospital follows the protocol of initiating breastfeeding within half an hour of birth in case of normal vaginal delivery (NVD) and

within 2 h for neonates delivered by lower segment caesarean section (LSCS). As per the study protocol, nursing staff from labor room, postnatal wards, and neonatal intensive care unit (NICU) were trained for assessment of LATCH score and to teach mothers about components of LATCH score. A total of 251 mother infant dyads were recruited for the study from January 2019 to December 2019. Inclusion criteria were mothers with singleton pregnancy who delivered term healthy infants not requiring resuscitation at birth, weighing more than 2,500 g. Mother's educational and socioeconomic status was noted in the proforma.<sup>9</sup> LATCH score and mother's confidence level to breastfeed was assessed within 24 h of birth, at 48 h, at discharge by HCP and the mother herself, and then by the mother at 6 weeks. The first assessment was done by the primary investigator or trained nursing staff in the delivery room who recorded the LATCH score and identified those mothers with LATCH score <7. These mothers were assisted to improve the LATCH score through guidance and assistance from the HCP. Fifty-four mothers (21.5%) scored >7 in the first assessment and did not require much support from the team (Table 2). After the first assessment, mother was educated about components of LATCH score and how to assess herself. For this, we used printed pictures (all 4 components of correct latch, types of nipple), photos, and videos (audible swallow, position, stages of help a mother needs during breastfeeding till she can perform all by herself). The study staff used this material while explaining to the mother about LATCH score which helped mother to assess her technique of breastfeeding and rectify wherever necessary. Mother's confidence was assessed by the study staff using Likert type scale with 1 to 5 score given based on if mother was not strongly confident—score 1 (required support throughout feeding), score 2—required support to initiate latching and positioning, score 3—required support to initiate latching, score

4—comfortable to initiate feeding but required help in positioning, and score 5—strongly confident (could breastfeed the baby without any support from HCP or family member).<sup>10</sup> During the hospital stay any significant events such as hypoglycemia, hyperbilirubinemia needing interventions were documented. Follow-up was done at 6 weeks either personally at the time of immunization or telephonically and mother was asked to score herself using LATCH scoring system. Infant was considered to be exclusively breastfed when no liquid or solid diet other than breast milk (excluding medications) had been given to the baby.<sup>11</sup> Information on reasons for non-EBF, hospital admissions if any, and weight of the infant was recorded at 6 weeks follow-up.

Initial LATCH score was compared with the LATCH score at 48 h, at discharge, and at 6 weeks by mother herself to know if it is a useful educational tool. Sensitivity, specificity, receiver operator curve (ROC), and likelihood ratio (LR) of the latch score to predict EBF at 6 weeks were calculated. The categorical data were expressed in terms of rates and percentages. The association between the outcome, clinical,

and demographic characteristics was tested using chi-square test, Mann-Whitney test (MW), and Monte Carlo simulation (MC) test.

## Results

Table 2 gives demographic details of 251 mothers and neonates enrolled in the study. A total of 78.09% mothers had university education, 43.2% were primiparous, and 33% delivered by NVD. A total of 80% of the mothers with university education and 62% mothers with preuniversity education exclusively breastfed their infants at 6 weeks of age. Similarly, mothers coming from higher socioeconomic strata were found to be more committed to EBF at 6 weeks of age compared to those from lower and middle socioeconomic strata.

Figure 1 gives the flowchart of number of mothers and their LATCH score at different time points. The number of mothers with LATCH score more than 7 increased over the different time points. The LATCH score assessed by the mother and HCP was exactly the same at the time of discharge.

**Table 2.** Demographic Details of Mother and Baby.

Mother		N = 251	Baby		
Age (Years)	<25	73 (29.09%)	Gender	Male	130
	25-35	166 (66.13%)		Female	121
	>35	12 (4.78%)			(48.2%)
Education Level	Preuniversity	55 (21.91%)	Birth Weight (Mean $\pm$ SD) in kg	3 $\pm$ 0.35	
	University	196 (78.09%)			
Type of delivery	Vaginal	85 (33.06%)	Weight at Discharge in kg (Mean $\pm$ SD)	2.8 $\pm$ 0.34	
	LSCS	166 (66.13%)			
Parity	Primi	110 (43.2%)			
Socioeconomic status	Lower middle+ Middle	64 (25.49%)			
	Upper middle+ Upper	187 (74.5%)			

Total No of mothers enrolled 251		
	LATCH Score	No of Mothers
At 24 h	0-3	220
	4-7	14
	8-10	17
At 48 h	0-3	01
	4-7	193
	8-10	57
At Discharge	0-3	0
	4-7	50
	8-10	201
At 6 weeks	0-3	0
	4-7	14
	8-10	237

**Figure 1.** Flowchart of LATCH Score.

Table 3 gives median LATCH score at different time points over breastfeeding at sixth week and shows significant association of higher LATCH score with exclusive breastfeeding at time point. Table 4 gives the cut-off of LATCH score at different time points with sensitivity and specificity, likelihood ratio, and area under the curve (AUC) (confidence interval [CI]) in prediction breastfeeding at sixth week.

A total of 9.96% (25) neonates enrolled in the study had symptomatic hypoglycemia with blood sugar level <45 gm/dL and needed admission to NICU.<sup>12</sup> The median LATCH score among those who had hypoglycemia within 24 h of birth was 4 (2, 7) and 6 (3, 10) among nonhypoglycemia infants. Overall, median LATCH score of 4 (2, 7) at 24 h and 6 (4, 9) at 48 had higher incidence of hypoglycemia. Addition of formula feeding corrected hypoglycemia in these infants and 15 of them continued to receive mixed feeding at 6 weeks. The odds of baby with hypoglycemia during hospital stay

**Table 3.** Comparison of LATCH Score at Different Point of Time With Exclusive Breastfeeding at 6 Weeks.

Variable		Breastfeeding at Sixth Week		P Value
		No (n = 60)	Yes (n = 191)	
LATCH Score	At first feed	5 (2, 7)	6 (3, 10)	<.0001
	At 48 h	6 (3, 8)	7 (4, 10)	<.0001
	At discharge by HCP	7 (4, 10)	9 (6, 10)	<.0001
	At by mother discharge by Mother	7 (4, 10)	9 (6, 10)	<.0001
	At sixth week	9 (6, 10)	10 (8, 10)	<.0001

**Note:** From 93.2% at 48 h, the number of mothers with latch score  $\leq 7$  decreased to 77.29% by 48 h. Of these, 23.9% mothers did not continue exclusive breastfeeding by 6 weeks.

**Abbreviation:** Mann Whitney Test.

**Table 4.** Cut-off for LATCH Score at Different Time Points With Sensitivity, Specificity, Likelihood Ratio, and Area Under Curve With Confidence Interval.

Time Point	LATCH Score	Sensitivity	Specificity	LR <sup>+</sup>	LR <sup>-</sup>	AUC (CI)
At 24 h	>5*	73.3%	71.73%	2.5938	0.3717	0.79 (0.73, 0.85)
	>6	28%	98%	16.65	0.73	0.64 (0.60, 0.67)
	>7	9%	100%	Infinity	0.91	0.63 (0.60, 0.66)
At 48 h	>5	95%	43%	1.67	0.12	0.78 (0.70, 0.86)
	>6*	80%	69%	2.589	0.289	0.81 (0.74, 0.87)
	>7	28%	95%	5.65	0.76	0.62 (0.58, 0.66)
At discharge	>7	95%	53%	1.93	0.19	0.74 (0.67, 0.81)
	>8*	80%	69%	2.589	0.289	0.83 (0.77, 0.88)
	>9	32%	98%	19.16	0.69	0.65 (0.61, 0.68)
At by mother discharge	>7	89%	55%	1.98	0.20	0.74 (0.67, 0.81)
	>8*	80%	65%	2.315	0.305	0.82 (0.75, 0.87)
	>9	31%	98%	18.15	0.70	0.65 (0.61, 0.68)
At sixth week	>7	100%	17%	1.20	0	0.89 (0.87, 0.92)
	>8	98%	38%	1.59	0.05	0.84 (0.77, 0.91)
	>9*	72%	82%	4.02	0.34	0.79 (0.73, 0.86)

**Note:** \*Bold values indicate best cut off.

**Abbreviations:** AUC, Area under curve; CI, confidence interval; LR<sup>+</sup>, positive likelihood ratio; LR<sup>-</sup>, negative likelihood ratio.

being not exclusively breastfed at sixth week was 5.9 (CI: 2.51, 14.16) times more and the LATCH score among majority of them was  $<7$  at follow-up. Hyperbilirubinemia during neonatal period did not affect the rate of EBF at 6 weeks (Table 5).

The mean time of first feed among those delivered by vaginal delivery (VD) and LSCS was  $37.48 \pm 24.67$  min and  $84.35 \pm 33.04$  min, respectively. The LATCH score at 48 h for those delivered vaginally was 7 (4, 10), while those delivered by LSCS was 6.5 (3, 9) ( $P = <.0001$ ). At discharge, median LATCH score by HCP and mother was 8 (4, 10) among LSCS mothers and 9 (5, 10) among VD ( $P = .0005752$ ); ( $P = .001043$ ). By MW test, there is significant difference in the

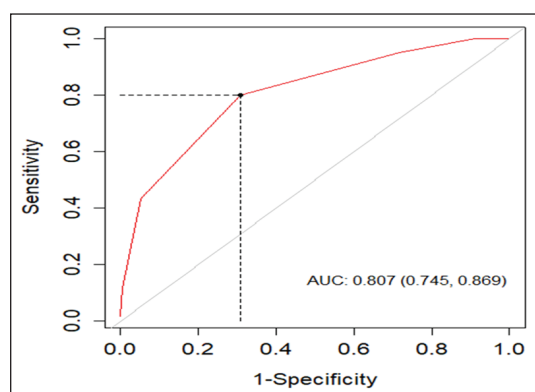
distribution of LATCH score over type of delivery at each of these time points. A total of 13.2% of VD infants received mixed feeding at 6 weeks compared to 28.2% of infants delivered by LSCS ( $P = .006$ ).

We plotted ROC curve for LATCH score in predicting breastfeeding at 6 weeks and the maximum area under curve was obtained for LATCH score  $>6$  at 48 h compared to other latch score with sensitivity and specificity of 80% (CI: 68%, 89%) and 69% (CI: 62%, 76%) respectively with positive LR of 2.589 (CI: 2.06, 5.78,) and AUC 0.81 (CI: 0.74, 0.87) (Figure 2). All mothers except 3 (5%) with good LATCH score (8-10) at 48 h continued to successfully breastfeed at 6 weeks.

**Table 5.** LATCH Score in Presence of Hypoglycemia and Hyperbilirubinemia in the Baby Requiring Intervention and Number of Mother and Baby Dyad.

		LATCH Score at 48 h	P Value
Hypoglycemia	Yes (n = 25)	6 (4, 9)	.000243* <sup>MW</sup>
	No (n = 226)	7 (3, 10)	
Hyperbilirubinemia	Yes (n = 205)	7 (3, 10)	0.6139 <sup>MW</sup>
	No (n = 46)	7 (5, 9)	

**Note:** Lower LATCH score was significantly associated with hypoglycemia but was not associated with hyperbilirubinemia in babies. MW: Mann-Whitney test of statistical analysis.



**Figure 2.** ROC Plot for LATCH Score at 48 h in Predicting Breastfed at Sixth Week.

**Note:** The LATCH score at 48 h had maximum area under the curve (AUC) of 0.81 (0.74, 0.87) and Positive LR of 2.58.

Prevalence of EBF was found to be 76% at the end of 6 weeks. Table 6 gives the change in mothers confidence from 24 h to 48 h assessed using Likert scale after educating them about components of LATCH score and how to improve them. We found that only 43.33% mothers with Likert scale 1 at 48 h were successful at EBF at 6 weeks while 79% mother with Likert scale 2 to 3 were successful at breastfeeding up to 6 weeks.

We also analyzed the weight gain by the infants in the first 6 weeks and its relation to the LATCH score. Mothers of infants with weight gain  $\geq 1$  kg ( $\approx 23$  g/day) within 6 weeks had significantly better LATCH score of  $>6$  at 48 h and 9 at discharge ( $P < .00001$ ) compared to those infants with less weight gain (Table 7).

## Discussion

WHO and UNICEF recommend initiation of breastfeeding within the first hour of birth and that infants should be exclusively breastfed for the first 6 months of life—meaning no other foods or liquids are provided other than medications.

In this study, we used LATCH score as a tool both to predict EBF by 6 weeks postnatal period and to teach mothers correct technique of breastfeeding. We found that the LATCH score of  $>6$  at 48 h had 80% specificity and 69% sensitivity in predicting EBF at 6 weeks with AUC of 0.81 (0.74, 0.87 positive LR 2.58). A statistically significant change in mother's confidence level from 24 h to 48 h was noted after educating them about components of LATCH score and how to improve it.

This study was designed to teach mothers about components of LATCH score in the immediate postnatal period and improve the LATCH score by addressing those components which lead to score less than 7. We found that

**Table 6.** Comparison of Mother's Confidence Level and Latch Score at Different Time Points and EBF at Six Weeks.

		Breastfed at Sixth Week			P Value
Mother's Confidence		LATCH Score	No (n = 60)	Yes (n = 191)	
At 24 h	I	6 (2, 9)	58 (25.44%)	170 (74.56%)	.2844
	2-3	7 (4, 8)	2 (9.09%)	20 (90.91%)	
	4-5	7 (5, 10)	0 (0%)	1 (100%)	
At 48 h	I	6 (3, 7)	17 (56.67%)	13 (43.33%)	.0004998*
	2-3	7 (4, 10)	41 (20.81%)	156 (79.19%)	
	4-5	8 (5, 10)	2 (8.33%)	22 (91.67%)	
At Discharge	I	4	1 (100%)	0 (0%)	.0004998*
	2-3	7 (5, 10)	45 (57.69%)	33 (42.31%)	
	4-5	9 (4, 10)	14 (8.14%)	158 (91.86%)	

**Notes:** Likert type scale. \*indicate Monte-Carlo test for statistical analysis.

**Abbreviation:** MC, Monte-Carlo's simulation.

Score 1—required support throughout feeding.

Score 2—required support to initiate latching and positioning.

Score 3—required support to initiate latching.

Score 4—comfortable to initiate feeding but required help in positioning.

Score 5—strongly confident (could breastfeed the baby without any support from HCP or family member).



**Table 7.** Comparison of Latch Score Over Significant Weight Gain.

Latch Score	Weight Gain		P Value
	<1 Kg (n = 105)	≥1 Kg (n = 146)	
At birth	5 (2, 9)	6 (3, 10)	.001009*
At 48 h	6 (3, 9)	7 (4, 10)	.002717*
At discharge	8 (4, 10)	9 (5, 10)	<.00001*
At by mother discharge	8 (4, 10)	9 (5, 10)	<0.00001*
At 6 <sup>th</sup> week	10 (6, 10)	10 (6, 10)	<0.00001*

**Note:** Lower LATCH score till discharge was significantly associated with lesser weight gain in the first 6 weeks of life. \*MW: Mann-Whitney test.

explaining the mothers what is correct latching with the help of pictures and videos is useful to gain maternal compliance in initiating early breastfeeding and more so in first-time mothers. The second component (audible swallowing) needs some experience on part of the mother and most mothers could identify this by 48 h of postnatal age. Mothers could also follow the steps of stimulation and syringing to make nipple everted. Improved awareness among the mothers from day 1 of delivery helped in prevention and management of engorged breasts. Demonstration of proper positioning of the baby particularly in post-LSCS mothers helped mothers to recognize the most comfortable position for the neonate and herself.

Studies done on early initiation of breastfeeding have shown higher LATCH score prior to discharge of the mother and newborn dyad from the hospital.<sup>13,14</sup> It is likely that early initiation helps in early recognition of problems related to type of nipple (inverted/flat/normal) leading to early intervention when required. Despite huge efforts to generate awareness by WHO and UNICEF regarding importance of early initiation of breastfeeding, globally less than 42% infants are breastfed within half an hour of birth.<sup>2</sup> In the current study, breastfeeding was initiated within half an hour of birth among 21% infants.

We found that use of educational material helped mothers to improve their confidence and they were able to learn to score themselves and thus recognize the components of LATCH score which needed attention at individual level. This would be useful in busy postnatal wards and at the peripheral hospitals where the HCP may not be available all the time to improve LATCH score.

The most common reasons for not exclusively breastfeeding were less secretions (33.3%), hypoglycemia in the immediate postnatal period (21.67%), and flat/inverted nipples (16.66%). These are all preventable causes by ensuring proper technique, support, and motivation of the mother. Oliveira et al<sup>13</sup> reported the main reasons for early weaning at 6 weeks were primarily related to maternal problems.

Various studies have reported LATCH score at various time points after delivery and then followed them up to 6

weeks to 6 months to find the rates of EBF. The percentage of EBF varied from 50% to 84% in these studies. Sowjanya and Venugopalan<sup>15</sup> reported that LATCH score of >8 at 48 h had sensitivity of 93.55% and 92.1% specificity to predict EBF by 6 weeks with relative risk of 9.28 (3.6-23.4) while Shah et al<sup>5</sup> have recently reported that LATCH score of ≥6 has sensitivity of 92.1% and specificity of 66.7% to predict EBF by 6 weeks and weight gain of ≥ 20 g/day at 6 weeks of age. In our study too, those mothers who had LATCH score >6 at 48 h of delivery were 2.58 times more likely to exclusively breastfeed their infants at 6 weeks. Latch score of >6 at 48 h was also associated with weight gain of ≥23 g/day compared to those with lesser LATCH score ( $P = .0027$  by MW test).

The mother's educational status, socioeconomic class, and type of delivery had strong correlation with EBF at 6 weeks. Odds of being exclusively breastfed by sixth week was 2.2 (CI: 1.217771, 4.247188) and 2.4 (CI: 1.259404, 4.573593) times higher for the infant of those mothers coming from higher socioeconomic strata and with university education, respectively. This supports the importance of maternal education in improving infant feeding practices in our country. By chi-square test, there was no significant dependency on parity of the mother ( $P = .2002$ ) and gender of the infant ( $P = .5687$ ).

In a study using breastfeeding self-efficacy scale (BSES-SF), the scale not only helped to identify high-risk mothers with low confidence but also helped to plan the additional support to the mothers who would need it.<sup>19</sup> In this study too, we found statistically significant change in mother's confidence level when compared from 24 h to 48 h after educating them about components of LATCH score and how to improve it ( $P = <.00001$ ).

## Summary

LATCH score can be used effectively to aid EBF among educated mothers who delivered healthy term newborns. Thus, LATCH scoring itself may be used as educational tool to boost maternal confidence by improving the technique of breastfeeding. LATCH score of less than 6 at 48 h postnatal age may be a significant indicator (Red Flag sign) for HCP to intervene and improve the technique of breastfeeding prior to discharge. We recommend that counselling every mother on components of LATCH score before being shifted out of the labor room may be made a part of essential newborn care.

There are certain limitations to this study. Majority of mothers who participated in the study were well educated. So, the applicability of the LATCH score for self-assessment among mothers with primary or no education is not understood. A comparative study to understand if use of LATCH score as an educational tool improves rates of EBF also needs to be undertaken in future trials though pain reduction on day 2 could be a confounder for better LATCH score in our study. We did not record all the growth parameters of the cohort at

6 weeks follow-up in both the groups which is also a limitation of the study.

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The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

### Ethical Approval

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The participant has consented to the submission of the article to the journal.

### ORCID iD

Manisha Bhandankar  <https://orcid.org/0000-0002-8226-8072>

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